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Analysing the Drivers and Overcoming Barriers in the Adoption of Telemedicine in Indian Healthcare: A Conceptual Framework for Post-COVID-19 Era

Rohit Raheja[1*], Pranab K. Pani[2], Sadia Riaz[3]

[1*]DBA Scholar, SP Jain School of Global Management, Mumbai, INDIA, Email: rohit.ds19dba009@spjain.org
[2]Faculty of Economics and Statistics, SP Jain School of Global Management, Dubai, UAE, Email: pranab.pani@spjain.org
[3]Associate Professor (IT and Research Methods), SP Jain London School of Management, London, UK
Email: sadia.riaz@spjain.ac.uk

***Corresponding Author:** Rohit Raheja
*DBA Scholar, SP Jain School of Global Management, Mumbai, INDIA, Email: rohit.ds19dba009@spjain.org

Abstract

This paper introduces a theoretical framework for examining the factors that promote and impede the integration of telemedicine within the Indian healthcare system in the aftermath of the COVID-19 pandemic. It covers factors such as societal pressures, technology availability, government regulations, patient's perspectives, and the attitude of healthcare providers. It additionally emphasizes the enhancement of access to high-quality healthcare services. By integrating stakeholder theory and surpassing the boundaries of the Technology Acceptance Model (TAM), this research formulates an extensive framework for the adoption of telemedicine in India. The framework offers insights and practical strategies for effectively integrating telemedicine with the care system. It aims to guide policymakers, healthcare providers, and stakeholders in shaping the future of telemedicine from the unique perspectives of all involved parties. The study fills a research gap in this area and contributes to the practical application of telemedicine in real-life scenarios.

Keywords: telemedicine adoption, telehealth barriers, healthcare technology adoption, post-pandemic healthcare system, telemedicine implementation challenges, digital healthcare, healthcare technology framework, telemedicine utilization

1 Introduction

1.1 Background

The global healthcare landscape has significantly transformed due to the COVID-19 pandemic, leading to a swift transition towards telemedicine (Tran et al., 2020). It has emerged as an alternative approach to delivering healthcare services. In India, telemedicine has surfaced as a robust solution for providing essential healthcare while mitigating the risk of viral transmission after the pandemic. The rapid adoption of telemedicine, accelerated by the pandemic, has highlighted its capacity to enhance healthcare accessibility and achieve improved health outcomes. This is especially true for underserved and remote regions (Sageena et al., 2021).

However, implementing telemedicine in the Indian healthcare space depends on various drivers and barriers that must be carefully examined. Understanding the factors contributing to its successful adoption and identifying the obstacles is crucial for shaping effective strategies and policies in the post-COVID-19 era (Kumar et al., 2022). The drivers of telemedicine adoption in India include several societal pressure factors. These include reaching patients in rural and remote areas with limited healthcare infrastructure. Technological advancements, affordable smartphones, and internet connectivity also contribute to the increased accessibility of telemedicine services. Furthermore, policy changes and regulatory support have facilitated the integration of telemedicine into the Indian healthcare system (Bhaskar et al., 2020) The barriers include limited digital literacy among patients and healthcare providers, inadequate technological infrastructure, concerns regarding privacy and data security, legal and ethical considerations, financial sustainability, and resistance to change among healthcare professionals (Kissi et al., 2023). Addressing these barriers is essential to ensure the effective integration of telemedicine and its long-term sustainability in Indian healthcare (Gajarawala et al., 2021). Therefore, developing a conceptual framework that analyzes the drivers and overcomes the barriers to telemedicine adoption in Indian healthcare post-COVID-19 is of utmost importance. Such a framework will provide a comprehensive understanding of the factors influencing telemedicine adoption in India. It will also offer practical strategies for policymakers, healthcare providers, and stakeholders to promote its successful implementation. By leveraging the potential of telemedicine, India can enhance healthcare accessibility, improve patient outcomes, and bridge the healthcare divide in remote and underserved areas.

1.2 Importance of telemedicine in India

India has been experiencing growth in healthcare expenditure in the last several years. The importance of public healthcare and social security in India can be gauged from the fact that the share of healthcare expenditure in total expenditure on social services has risen from 21% in the financial year 2021 to 26% in the financial year 2023 (Economic Survey, 2022-

23). India, a vast nation with diverse healthcare needs, can greatly benefit from the implementation of telemedicine. Telemedicine can potentially enhance access to healthcare services, particularly in remote and rural areas. This is necessary for dealing with the challenge of limited accessibility. Additionally, it can contribute to addressing the shortage of healthcare professionals in the country (Dash et al., 2021).

By leveraging telemedicine, healthcare providers can expand their capacity and establish a broader network of facilities and experts. This interconnectedness facilitates seamless collaboration and knowledge sharing among healthcare professionals to improve the overall quality of healthcare services. Moreover, telemedicine is crucial for raising awareness and educating the public and medical professionals about various health issues (Dash et al., 2021).

Both government and private organizations provide telemedicine services in India (Chakraborty et al., 2023). The government has launched initiatives such as the National Telemedicine Network and the eSanjeevani platform to promote telemedicine adoption. These initiatives focus on establishing telemedicine nodes at state-level health institutions for better coordination and integration. This is based on satellite communication through space technology for reaching remote and inaccessible areas. Private organizations like Tata Group's 1mg contribute to telemedicine services by offering online pharmacy, diagnostics, teleconsultation, AI doctors, and health content (Dash et al., 2021).

Despite the potential benefits, the adoption of telemedicine technology in India has been relatively slow. However, initiatives like the National Medical College Network, National Telemedicine Network, and State Telemedicine Network are currently being utilized to harness the power of telemedicine and technology in the country. These initiatives aim to improve coordination, integration, and access to telemedicine services in India, especially in remote and rural areas (Viswanath et al., 2022).

1.3 Factors influencing the adoption of telemedicine

The global adoption of telemedicine is subject to the influence of numerous factors. Among these, a crucial determinant is the state of technological infrastructure and internet connectivity, as Adenuga et al. (2020) highlighted in Nigeria's context. Similarly, Sagaro et al. (2020) emphasize the significance of addressing organizational barriers, particularly infrastructure challenges like unstable power supplies, poor communication networks, and limited internet connectivity bandwidth in Ethiopia. These considerations underscore the vital role of robust technological support in the successful implementation of telemedicine across diverse regions.

Disparities in regulatory frameworks and legal considerations across countries significantly impact the integration and compliance of telemedicine with healthcare laws. Al-Samarraie et al. (2020) revealed in their study on Middle Eastern countries that the prevalence of privacy and security concerns is paramount in virtual healthcare. They recommend standardizing specific privacy regulations to instil patient confidence in disclosing personal information. Similarly, Ferorelli et al. (2020) explain that in Italy, the evolution of telemedicine raises a series of legal issues related to authorization, accreditation, patient confidentiality, and the compatibility of existing practices with the general regulatory framework due to the absence of specific provisions. These results underscore the vital need to tackle legal considerations as a key factor in guaranteeing the effective adoption of telemedicine in various geographical areas

Reimbursement policies and insurance coverage exert a notable influence on the rates of telemedicine adoption, as financial support for telemedicine services serves as a significant incentive. Adler-Milstein et al. (2014) confirm this correlation in the United States of America, where policies facilitating private-payer reimbursement for telehealth demonstrate a higher likelihood of telehealth adoption. This underscores the significance of favourable reimbursement mechanisms in encouraging the uptake of telemedicine services.

The impediments to telemedicine adoption in India display a substantial degree of similarity. Nevertheless, a thorough literature review has identified specific obstacles that impede the widespread acceptance and expansion of telemedicine in the country. This underscores the necessity for precise interventions aimed at mitigating these obstacles and facilitating the seamless integration of telemedicine into India's healthcare framework

The availability and dependability of internet connectivity pose a substantial barrier, especially in rural regions. Moreover, limited digital literacy and inadequate technology accessibility among specific population segments can impede their utilization of telemedicine services. Over the years, research has consistently demonstrated that the effectiveness of digital technological advancements in healthcare hinges on numerous interrelated factors. Recently, Alt et al. (2021) conducted a study exploring how healthcare providers have leveraged technology to enhance the quality of healthcare facilities. The researchers underscored the significance of technology access, which constitutes the foundational step in implementing digital transformations within healthcare systems.

Furthermore, the ever-changing regulatory framework and legal aspects pertaining to telemedicine necessitate greater clarity to ensure patient safety and protect data privacy. Mahajan et al. (2020) highlight that clinicians encounter challenges in delivering telemedicine services, especially in medico-legal cases where comprehensive documentation is essential. Such challenges can hinder the widespread adoption of telemedicine in India, calling for clearer guidelines to facilitate its seamless integration into the healthcare system.

Cultural and social nuances carry substantial significance in the realm of telemedicine. For its effective implementation, empirical testing of societal and cultural hypotheses becomes imperative as it offers valuable insights for conducting investigations and analyses. This approach ensures a well-informed and culturally sensitive adoption of telemedicine (Garavand et al., 2022).

1.4 Telemedicine Services in India

Both government and private organizations provide telemedicine services in India. The Indian government has introduced numerous programs to encourage telemedicine, such as the National Telemedicine Network and the *eSanjeevani* platform. Private organizations also provide telemedicine services in India, including teleconsultations, remote monitoring, and telepathology. IoT technology in telemedicine refers to internet-connected devices and sensors used for monitoring and transmitting patient data and providing remote healthcare services (Ateriya et al., 2018).

Teleconsultations are remote consultations between patients and doctors using videoconferencing, phone calls, or messaging apps. Patients can consult with doctors from the comfort of their homes. Doctors can provide medical advice, prescribe medication, and even order lab tests remotely. Some well-known teleconsultation services in India are *Practo*, *DocsApp*, and *Medlife* (Chauhan et al., 2022).

Remote monitoring involves using digital devices to monitor a patient's health remotely. Individuals have the option to utilize devices such as blood pressure monitors, glucose monitors, and pulse oximeters for monitoring vital signs within the comfort of their homes. Then, the data can be transmitted to doctors for analysis (Ghani et al., 2010). Remote monitoring can help in the early detection of health problems and prevent complications. Some well-known remote monitoring services in India are Portea Medical, Medtronic, and Philips (Suzuki et al., 2020).

Telepathology is emerging as a pivotal solution for enhancing access to pathology services in remote regions of the nation. By leveraging digital imagery, telepathology enables the remote diagnosis and treatment of ailments. Pathologists can analyze digital representations of bodily fluids or tissue specimens, furnishing diagnoses from afar. Esteemed Indian telepathology services include *SRL Diagnostics*, *Metropolis Healthcare*, and *Thyrocare* (Dash et al., 2021).

E-prescriptions involve the use of digital technology to prescribe medications remotely. Doctors can prescribe medications using messaging apps, and patients can receive smartphone e-prescriptions. E-prescriptions can help to reduce the risk of errors and improve regularity in medication. Some well-known e-prescription services in India are *Netmeds*, *Medlife*, and *1mg*.

Mobile health (mHealth) involves using mobile devices and apps to deliver healthcare services remotely. Individuals have the capability to utilize mobile applications to retrieve medical information, monitor their health condition, and engage in communication with healthcare providers. Some prominent mHealth platforms in India include *Hello Doctor*, *HealthifyMe, and Medisafe.*

Telemedicine services in India, such as teleconsultations, remote monitoring, telepathology, e-prescriptions, and mHealth, have come of age. Both government and private organizations provide these services and facilitate access to healthcare services in remote and rural areas of the country (Feroz et al., 2020).

2 Methodology

The study involved a comprehensive literature review on the global and Indian adoption of telehealth technology. Various databases, including EBSCO, Google Scholar, Proquest, Science Direct, and Scopus, were utilized for the purpose. The search process consisted of using specific keywords based on previous studies. The keywords included telehealth, mobile health, m-health, telemedicine, telecare, and e-health. Additionally, keywords related to India, Subcontinent, and South Asia were incorporated. Another set of search keywords without specific geographic restrictions was used to gather global results. The sourced literature was studied to include only peer-reviewed studies published between 2017 and 2023. This timeframe was considered optimal for capturing research on the global adoption of telemedicine (Petticrew and Roberts, 2006). Non-English literature was excluded from the review. A thorough analysis of the obtained literature revealed different approaches to telemedicine adoption in the healthcare sector. The models for the adoption of technology were also documented. The review process involved extracting the determinants, drivers, and barriers of telehealth from the literature. These were then used to develop a conceptual framework for the study. The literature review involved synthesizing factors that influenced the adoption of telehealth. The initial factors included awareness, cost, benefits, drawbacks, medical errors, information exchange, technological advancements, and wireless technology. Based on the literature review, the determinants were categorized as drivers and barriers, as seen in Table 1 below.

Table 1 The drivers and barriers of telemedicine adoption in general

Telehealth drivers (in general)	*Telehealth barriers (in general)*
Improved access to healthcare in remote areas.	Lack of reimbursement or inadequate policies.
Cost savings for patients and healthcare systems.	Limited or unreliable internet access.
Enhanced convenience and reduced travel.	Privacy and security concerns.
Timely and proactive healthcare interventions.	Resistance to change and traditional models.
Increased efficiency and productivity.	Legal and regulatory barriers.
Reduction in unnecessary hospital visits.	Limited awareness and understanding.
Improved patient outcomes and quality of care.	Resistance from healthcare professionals.
Access to specialized expertise, regardless of location.	Inadequate training and education.
Remote monitoring of chronic diseases.	Limited interoperability and integration.
Faster diagnosis and treatment through teleconsultations.	Complex licensing and credentialing requirements.
Coordinated and collaborative care among professionals.	Lack of standardized protocols and guidelines.

Rapid dissemination of medical knowledge.	Insufficient evidence-based research.
Support for emergency and disaster response.	Limited availability and affordability of equipment.
Expanded healthcare services to more people.	Language and cultural barriers.
Patient engagement and empowerment.	Reluctance to invest in infrastructure.
Support for mental health through telepsychiatry.	Concerns about liability and malpractice.
Teletriage for efficient resource allocation.	Resistance from medical associations.
Remote cancer care and Tele oncology.	Poor integration into existing workflow.
Access to telepharmacy services.	Patient privacy and confidentiality challenges.
Education and training for healthcare professionals.	Limited follow-up and continuity of care.
Tele-monitoring of vital signs.	Difficulty in remote assessment and diagnosis.
Support for tele-rehabilitation.	Inadequate support from payers and insurers.
Remote prenatal and postnatal care.	Limited interpretation services.
Access to specialists for second opinions.	Socioeconomic disparities and technology access.
Enhanced healthcare equity.	Resistance from patients preferring in-person care.
Streamlined workflows and processes.	Lack of telemedicine regulations and policies.
Integration with electronic health records.	Limited coverage for certain specialities.
Telemedicine in rural and developing areas.	Challenges in managing emergencies remotely.
Telemedicine for medical research and trials.	Limited trust and scepticism from patients.
Improved patient satisfaction.	Geographic or modality-based reimbursement restrictions.

Additionally, a compilation of drivers and barriers specific to Indian telehealth has been created, as depicted in Table 2. This list of drivers and barriers establishes a conceptual framework for adopting telehealth in India.

Table 2 The drivers and barriers to telemedicine adoption in India

Telehealth drivers in India	*Telehealth barriers in India*
Enhanced healthcare service accessibility in remote regions	Limited internet connectivity, especially in rural areas.
Enhanced convenience and flexibility for patients.	Insufficient technological infrastructure and resources.
Cost savings and reduced travel time for patients.	Concerns regarding patient privacy and data security.
Increased efficiency and shorter waiting times.	Regulatory barriers and ambiguity in telemedicine practices.
Early detection and prevention of diseases through remote monitoring.	Inadequate reimbursement policies and limited insurance coverage.
Better coordination of care among healthcare providers.	Low awareness and understanding of telemedicine.
Integration with electronic health records (EHRs) for seamless information exchange.	Language and cultural barriers in communication.
Support for specialized telemedicine services.	Resistance to change and preference for in-person visits.
Bridging the urban-rural healthcare divide and reducing disparities.	Socioeconomic disparities and unequal access to technology.
Ensuring continuity of care during public health emergencies.	Limited integration of telemedicine into existing healthcare systems.

3 Discussion

The literature review acknowledges the challenges faced in implementing telemedicine in India and the global telehealth landscape after the COVID-19 pandemic. It highlights a significant dearth of research on the adoption of telemedicine. According to Kondrateva et al. (2020), there are notable gaps in the existing telemedicine literature on adopting electronic health solutions. Carati and Margelis (2013) proposed identifying the barriers and facilitators in the implementation of telehealth in various contexts.

The comprehensive review of existing literature has brought to light a significant gap in the study of telemedicine adoption in India. A strong theoretical framework is lacking to guide researchers in this area. This gap highlights the urgent need to establish a well-defined conceptual framework to provide a structured path for investigating the complex factors influencing telemedicine adoption in India. Such a framework would greatly enhance the clarity and depth of understanding in future research endeavors.

To address this gap, the development of an innovative theoretical framework tailored specifically to the nuances of telemedicine adoption is a promising approach. Researchers can use this framework to shed light on previously hidden aspects of the adoption process by aligning empirical data with this conceptual structure. This alignment allows for a more comprehensive understanding of the various factors that impact adoption decisions and enhances the rigor of subsequent investigations. It has the potential to reveal underlying drivers and barriers that may not have been apparent

before.
Crucially, the future direction of research in this field benefits significantly from creating a functional and comprehensive conceptual framework. Clearly articulating the key factors that drive or hinder telemedicine adoption is crucial to gaining comprehensive insights. As the landscape of digital healthcare continues to evolve, empirical analyses grounded in a solid theoretical framework are poised to contribute to a nuanced understanding of the forces that shape telemedicine adoption trends.
In summary, the current state of research on telemedicine adoption in India is hindered by the absence of a robust theoretical framework. Establishing such a framework is essential to guide future investigations, providing researchers with a structured approach to uncover the intricate dynamics at play. This will lead to a deeper and more comprehensive understanding of the factors influencing telemedicine adoption, ultimately contributing to the advancement of telemedicine in India's healthcare landscape. In summation, the integration of a robust theoretical framework holds pivotal significance in advancing the scholarly investigation into the adoption of telemedicine in India. The forthcoming studies stand to gain substantial methodological and analytical traction through the harmonious convergence of empirical data and a well-structured conceptual scaffold. Ultimately, this convergence is poised to unravel novel insights and perspectives, shedding light on the intricate determinants that steer the course of telemedicine adoption in the Indian healthcare landscape.
Given the scarcity of research in this particular domain, this study aims to establish a conceptual framework specifically tailored for the adoption of telemedicine in India. The study investigates the worldwide drivers and barriers associated with telehealth for the framework's development. While previous research has predominantly relied on the technology acceptance model (TAM) to examine technology adoption of telemedicine, this study ventures beyond that conventional approach. By integrating stakeholder theory with TAM, the study constructs an all-encompassing conceptual framework that incorporates the diverse perspectives of telemedicine stakeholders. This framework is carefully designed to facilitate practical implementation in real-world settings.
Numerous additional factors have been extracted from the literature review, as outlined in Tables 1 and 2. Based on these factors, distinct themes have been formulated to construct a conceptual framework for analyzing telemedicine adoption within the Indian context. Figure 1 below illustrates this conceptual framework.

Figure 1 Conceptual framework for telehealth adoption in India

3.1 Societal pressures

Societal pressures include social norms, beliefs, attitudes, and expectations of individuals within a community regarding adopting telemedicine (Graf-Vlachy et al., 2018). These pressures are influenced by the cultural and social context in which telemedicine is introduced and utilized. The preference for face-to-face consultations can make individuals and communities reluctant to embrace telemedicine. Interacting with unfamiliar individuals remotely can cause embarrassment and hesitation, particularly among female patients who may feel uncomfortable sharing personal details.
Moreover, some may perceive telemedicine as less effective and providing lower quality care than traditional healthcare. This can discourage doctors and patients from utilizing it. However, societal pressures can also arise during public health emergencies, leading to accelerated adoption of telemedicine. In such situations, telemedicine is a valuable tool for healthcare providers to deliver care while reducing the risk of disease transmission. Promoting social distancing, alleviating overcrowding in healthcare facilities, and prioritizing public health are driving factors for telemedicine adoption (Krausz et al., 2020). In certain societies, seeking healthcare or mental health support may be associated with cultural or social stigmas. Telemedicine addresses this issue by offering anonymity and privacy, enabling individuals to seek medical advice. Such consultation is without fear of judgment or having to disclose their health concerns in a public setting. By overcoming these societal barriers, telemedicine encourages individuals to access necessary care (Bucci et al., 2019).
Many people in India are unaware of telemedicine and how it works. This deficiency in knowledge can result in hesitancy when it comes to utilizing telemedicine services. Therefore, people need to be educated about telemedicine and its benefits. Trust is a crucial factor in healthcare delivery. Patients need to trust the healthcare providers to provide the right treatment. In the case of telemedicine, patients may have trust issues as they are not physically present with the healthcare provider (Mahajan et al., 2020). Therefore, there is a need to build trust by providing high-quality telemedicine services. With the right approach, telemedicine can revolutionize healthcare delivery in India, especially in rural areas (Sageena et al., 2021).

3.2 Availability of technology

The implementation of telemedicine in India is influenced by the availability of technology and the quality of telecommunication infrastructure. This availability significantly impacts the country's adoption and effectiveness of telemedicine servicesIndia is an extensive and heterogeneous country, characterized by a substantial population and significant healthcare resource disparities between urban and rural regions. The availability of technology presents both challenges and opportunities for telemedicine. Research suggests that the intention to use telemedicine among doctors and patients in India, as well as the quality and satisfaction of telemedicine services, are influenced by technology availability (Bhatia, 2021).
Several technological aspects contribute to telemedicine implementation. This includes the availability of telecom

bandwidth, enabling the delivery of telemedicine and tele-consulting programs to rural markets via mobile phones. Reliable and affordable internet connectivity is crucial for transmitting data, images, and videos between remote locations and healthcare centres (Ganapathy et al., 2022).

Moreover, the availability of compatible and user-friendly devices and software enhances telemedicine applications' ease of use and functionality. Secure and interoperable systems ensure patient data privacy and confidentiality while facilitating integration with other health information systems (Kaplan, 2020). Therefore, technology availability is critical in enabling telemedicine implementation in India, depending on the level and quality of infrastructure development and investment within the country.

Improving technology availability can help overcome barriers and challenges associated with telemedicine adoption in India. These include inadequate medical and technological infrastructure, a digital divide between urban and rural areas, technological illiteracy, limitations in conducting physical examinations, restricted patient-provider relationships, legal and ethical concerns, and a lack of awareness and trust (Maitrey et al., 2023).

3.3 Patient/user perspective

Patient/user influence on telemedicine adoption in India refers to the factors that affect the intention and behaviour of patients in using telemedicine services, such as telephone, mobile, internet, etc., to access health care remotely (Mishra, 2020).

The perceived usefulness of telemedicine refers to an individual's belief that utilizing telemedicine services will enhance their overall healthcare experience. This encompasses various benefits such as increased access to healthcare, convenience, timesavings, and improved health outcomes. Telemedicine is vital in providing convenient access to healthcare services, especially for individuals residing in remote areas where in-person consultations may be difficult (Seto et al., 2019). By enabling patients to receive medical consultations from the comfort of their homes, telemedicine eliminates the need for travel and reduces waiting times (Almathami et al., 2020). Moreover, telemedicine facilitates ongoing monitoring and follow-up care, enabling patients to maintain a consistent relationship with their healthcare providers. It also offers the advantage of accessing expert opinions and consultations for patients needing specialized care that may not be readily available locally (Song et al., 2021). Additionally, telemedicine provides patients access to health information, educational resources, and self-management tools, allowing them to enhance their health and well-being through these avenues. Patients who recognize the potential of telemedicine in enhancing their healthcare and well-being are likely to find it useful.

The perceived ease of telemedicine influences a patient's perception of using telemedicine services. The design and functionality of the telemedicine platform or application play a crucial role in shaping patients' perceived ease of use. A well-designed and intuitive user interface that is easy to navigate can enhance patients' comfort and confidence while using telemedicine services (Sim et al., 2021).

Patients' familiarity and comfort with technology also significantly determine their perceived ease of using telemedicine. Individuals who are more technologically proficient or with digital healthcare services may find telemedicine easier to use than those who are less familiar (Payán et al., 2022).

Reliable and seamless internet connectivity is essential for effective telemedicine consultations. Patients' access to high-speed internet and the availability of compatible devices, such as smartphones or computers, can affect their perception of using telemedicine. Limited connectivity or the absence of suitable devices may pose challenges for patients in utilizing telemedicine services (Baker et al., 2018).

Language barriers and cultural norms can also influence patients' comfort and ease with telemedicine. Providing telemedicine services in local languages and considering cultural preferences in communication and healthcare practices can enhance patients' perception of telemedicine (Sivaraman et al., 2020).

The user's attitude influences the degree of positive or negative feelings toward using telemedicine. The degree to which a patient/user worries about the security and confidentiality of his or her personal and medical information when using telemedicine will determine the usage of the telemedicine application. Individual beliefs on the positive and negative consequences influence telemedicine usage. The COVID-19 pandemic has increased the awareness and demand for telemedicine services in India and opportunities for its adoption. The pandemic has underscored the necessity for telemedicine in enhancing the accessibility, quality, and affordability of healthcare services, particularly for individuals residing in remote, rural, or underserved regions. The pandemic has also exposed the gaps and barriers in India's telemedicine infrastructure, policy, regulation, and education (Dhatterwal, 2023).

Some patients may have complex medical needs requiring an in-person doctor visit. Telemedicine may not be suitable for these patients. For example, if a patient needs a physical examination or medical tests, telemedicine may be unable to provide that. Medical needs are one of the most important factors that can influence the successful adoption of telemedicine in India. The medical needs of patients can be complex and varied, and telemedicine may not be suitable for all types of medical conditions. Moreover, patients may require a physical examination to diagnose and treat their medical conditions (Haque and Hayden, 2022).

3.4 Government regulations

Government regulations play a pivotal role in shaping the telemedicine industry in India (Murima et al., 2022). To enhance the adoption of telemedicine, healthcare organizations should concentrate on improving technology readiness, perceived

usefulness, organizational support, and regulatory support. In March 2020, the Indian government introduced the Telemedicine Practice Guidelines, which established a framework for telemedicine services in the country. According to these guidelines, telemedicine involves utilizing information and communication technologies (ICT) to exchange valid information. Such information is used for diagnosis, treatment, prevention of diseases and injuries, research, evaluation, and the continuing education of healthcare providers to advance individual and community health (Mathew, 2022).

The guidelines provide specific recommendations for telemedicine usage in primary, specialty, and emergency care settings. They also outline the responsibilities of healthcare providers, patients, and the technical requirements for telemedicine consultations. The government has implemented measures to facilitate the expansion of telemedicine in India. These measures encompass initiatives initiated by the Ministry of Health and Family Welfare (MoHFW) to encourage telemedicine adoption in rural and remote regions, such as the National Health Stack and the National Digital Health Blueprint (Rai et al., 2022).

However, certain regulatory challenges still need to be addressed to facilitate the growth of telemedicine in India. For instance, the guidelines lack clear guidance on data privacy, security, liability, and reimbursement matters. There is also a need for greater clarity regarding the legal and regulatory frameworks governing telemedicine, including the licensing and accreditation of telemedicine providers. Overall, government regulations significantly influence the development and expansion of telemedicine in India. While the Telemedicine Practice Guidelines represent a positive step, further efforts are required to address regulatory challenges and support the industry's growth (Jain, 2023).

Additionally, the government can work with insurance companies to ensure that telemedicine consultations are covered by health insurance. The government needs to ensure that different telemedicine platforms can communicate with each other. This allows healthcare providers to share patient information across different systems, which is necessary for providing coordinated care. The government plays a crucial role in creating an environment conducive to adopting telemedicine (Pathak et al., 2021).

3.5 Role of medical practitioners

Many doctors in India quickly recognized the potential of telemedicine and embraced it early on to provide healthcare services. They utilized telemedicine platforms to offer patients remote consultations, diagnosis, and treatment, especially in rural and remote areas with limited access to healthcare. These doctors played a crucial role in spreading awareness about telemedicine among their peers and patients. By sharing their experiences and success stories, they motivated their colleagues to adopt telemedicine as a viable healthcare delivery method. Furthermore, their involvement in conducting evidence-based research on the effectiveness and safety of telemedicine has been pivotal in establishing trust and credibility within the healthcare community. These research findings have influenced policymakers and regulatory bodies to develop guidelines and regulations supporting the adoption of telemedicine (Napitupulu et al., 2021).

Telemedicine requires a skilled and knowledgeable healthcare workforce to operate and maintain the technology (Bhattacharyya and Mandke, 2022). Medical practitioners, nurses, and other healthcare providers require training in telemedicine to deliver high-quality healthcare. Telemedicine's successful adoption in India depends greatly on the medical practitioners. By addressing their concerns, healthcare providers and policymakers can help ensure that telemedicine is widely adopted and improves access to quality healthcare for all (Bhat et al., 2021).

Telemedicine can address the issue of low affordability and accessibility of healthcare services that affect a significant portion of the population. Doctors play an important role in tackling the lack of awareness and education among patients and healthcare providers regarding preventive and primary healthcare (Goyal et al., 2022). The endorsement of telemedicine by doctors has contributed to building trust and acceptance among patients. By assuring telemedicine's safety, reliability, and convenience, doctors have made patients more open to virtual consultations. Positive experiences shared by doctors have further motivated patients to seek telemedicine services (Aberer et al., 2021).

4 Conclusion

Following a thorough analysis of a diverse array of literature exploring the intricate landscape of telemedicine adoption within healthcare, encompassing both global and Indian contexts, a robust and encompassing conceptual framework has been meticulously crafted. This framework holds the potential to catalyze the seamless integration of telehealth practices into the complex and multifaceted realm of the Indian healthcare system. Through a strategic alignment of its components, including societal influences, technological accessibility, regulatory oversight, patient perspectives, and the attitudes of healthcare providers, this framework offers a comprehensive perspective that informs the implementation of telehealth in India. Moreover, its conceptual constructs extend their reach beyond national boundaries, promising applicability across diverse healthcare sectors internationally.

As a dynamic construct, the conceptual framework is a testament to the potential synergy between theory and practice. It transcends theoretical abstraction to evolve into a tangible tool that could reshape the contours of healthcare policy and practice. By encapsulating an amalgamation of crucial themes, the framework brings into focus the intricate interplay of factors pivotal in the successful adoption of telehealth practices. Societal dynamics, technological infrastructure, regulatory frameworks, patient perspectives, and healthcare provider attitudes coalesce within this framework, offering a panoramic view of the complex ecosystem wherein telemedicine operates.

While the promise of the conceptual framework is evident, its true potential is realized when translated into tangible policy implications. It emerges as a guiding star, offering insights that could influence and shape the course of healthcare

policy formulation and operational strategies. This framework could play a pivotal role in governmental and non-governmental healthcare decision-making by providing a structured approach to navigate the multifaceted challenges and opportunities inherent in telehealth integration. It could facilitate nuanced policy recommendations that consider the intricate balance between the regulatory environment, societal expectations, technological infrastructure, and the evolving attitudes of healthcare providers and patients alike.

Nonetheless, it is paramount to recognize the study's limitations, rooted in the foundational nature of this conceptual framework. While the framework's potential is immense, it is inherently theoretical. The real-world dynamics of telehealth adoption necessitate empirical exploration to validate the framework's efficacy and relevance. This study's lack of real-world data emphasizes the significance of future empirical research endeavors, especially within the context of India and similar developing nations. Such research endeavours could offer deeper insights into the practical manifestations of the framework's components, unveiling the nuances that could influence or challenge its application.

With an eye toward the future, the conceptual framework beckons for further exploration. Its modular components provide a structured canvas upon which the complexities of telehealth adoption can be scrutinized. Researchers and scholars can leverage this framework as a robust foundation for empirical investigations, designing studies that delve into the intricate interplay between the identified themes. The framework's value proposition can be further fortified through meticulous analysis, contributing to a more nuanced understanding of telehealth adoption that extends beyond theoretical constructs.

In the grand tapestry of healthcare evolution, the conceptual framework for telehealth adoption emerges as a pivotal thread. Its comprehensiveness, encompassing a spectrum of influential factors, positions it as a cornerstone for shaping the trajectory of healthcare transformation. As telehealth increasingly gains prominence, particularly within the Indian healthcare landscape, this framework promises to redefine patient care paradigms. Bridging the theoretical with the practical aligns with the overarching goal of rendering healthcare more accessible, equitable, and patient-centric.

In summation, the conceptual framework forged through this meticulous exploration of telehealth adoption encompasses both theoretical depth and pragmatic potential. Its emergence from the synthesis of global and Indian perspectives underscores its universal applicability. However, while it stands as an intellectual cornerstone, the framework's true validation rests on empirical validation. By championing future research endeavours, we can deepen our understanding of telehealth adoption within the intricate fabric of healthcare systems, contributing to a transformative evolution that transcends geographical borders and maximizes the potential for enhanced patient care.

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References

1. Abd Ghani, M.K., Bali, R.K., Naguib, R.N., Marshall, I.M. and Wickramasinghe, N.S. (2010) 'Critical analysis of the usage of patient demographic and clinical records during doctor-patient consultations: a Malaysian perspective', *International Journal of Healthcare Technology and Management*, Vol. 11, Nos. 1-2, pp.113-130
2. Aberer, F., Hochfellner, D.A. and Mader, J.K. (2021) 'Application of telemedicine in diabetes care: the time is now', *Diabetes Therapy*, Vol. 12, No. 3, pp.629-639
3. Adenuga, K.I., Iahad, N.A. and Miskon, S. (2020) 'Telemedicine system: service adoption and implementation issues in Nigeria', *Indian Journal of Science and Technology*, Vol. 13, No. 12, pp.1321-1327
4. Adler-Milstein, J., Kvedar, J. and Bates, D.W. (2014) 'Telehealth among US hospitals: several factors, including state reimbursement and licensure policies, influence adoption', *Health Affairs*, Vol. 33, No. 2, pp.207-215
5. Almathami, H.K.Y., Win, K.T. and Vlahu-Gjorgievska, E. (2020) 'Barriers and facilitators that influence telemedicine-based, real-time, online consultation at patients' homes: a systematic literature review', *Journal of Medical Internet Research*, Vol. 22, No. 2, e16407
6. Al-Samarraie, H., Ghazal, S., Alzahrani, A.I. and Moody, L. (2020) 'Telemedicine in Middle Eastern countries: progress, barriers, and policy recommendations', *International Journal of Medical Informatics*, Vol. 141, pp.104232
7. Alt, R. and Zimmermann, H.D. (2021) 'The digital transformation of healthcare: an interview with Werner Dorfmeister', *Electronic Markets*, Vol. 31, No. 4, pp.895-899
8. Ateriya, N., Saraf, A., Meshram, V.P. and Setia P. (2018) 'Telemedicine and virtual consultation: the Indian perspective', *The National Medical Journal of India*, Vol. 31, No. 4, pp.215–218
9. Baker, J. and Stanley, A. (2018) 'Telemedicine technology: a review of services, equipment, and other aspects', *Current Allergy and Asthma Reports*, Vol. 18, pp.1-8
10. Bhaskar, S., Bradley, S., Chattu, V.K., Adisesh, A., Nurtazina, A., Kyrykbayeva, S., Sakhamuri, S., Yaya, S., Sunil, T., Thomas, P., Mucci, V., ... and Jarusriboonchai, P. (2020) 'Telemedicine across the globe - Position paper from the COVID-19 pandemic health system resilience PROGRAM (REPROGRAM) international consortium (Part 1),' *Frontiers in Public Health*, Vol. 8, pp.556720
11. Bhat, K.S., Jain, M. and Kumar, N. (2021) 'Infrastructuring telehealth in (in)formal patient-doctor contexts', *Proceedings of the ACM on Human-Computer Interaction*, Vol. 5, CSCW2, pp.1-28
12. Bhatia, R. (2021) 'Telehealth and COVID-19: Using technology to accelerate the curve on access and quality healthcare for citizens in India', *Technology in Society*, Vol. 64, pp.101465
13. Bhattacharyya, S.S. and Mandke, P.V. (2022) 'Study of awareness, adoption, and experience of telemedicine

technology services; perspectives during coronavirus (COVID-19) pandemic crisis and associated economic lockdown in India', *Journal of Science and Technology Policy Management*, Vol. 13, No. 4, pp.788-811
14. Bucci, S., Schwannauer, M. and Berry, N. (2019) 'The digital revolution and its impact on mental health care', *Psychology and Psychotherapy, Theory, Research and Practice*, Vol. 92, No. 2, pp.277-297
15. Carati, C. and Margelis, G. (2012) 'Towards a national strategy for Telehealth in Australia 2013-2018', *Global Telehealth*
16. Chakraborty, I., Edirippulige, S. and Ilavarasan, P.V. (2023) 'The role of telehealth startups in healthcare service delivery: a systematic review', *International Journal of Medical Informatics*, Vol. 174, pp.105048
17. Chauhan, A., Jakhar, S.K. and Jabbour, C.J.C. (2022) 'Implications for sustainable healthcare operations in embracing telemedicine services during a pandemic', *Technological Forecasting and Social Change*, Vol. 176, pp.121462
18. Dash, M., Shadangi, P.Y., Muduli, K., Luhach, A.K. and Mohamed, A. (2021) 'Predicting the motivators of telemedicine acceptance in the COVID-19 pandemic using multiple regression and ANN approach', *Journal of Statistics and Management Systems*, Vol. 24, No. 2, pp.319-339
19. Desson, Z., Weller, E., McMeekin, P. and Ammi, M. (2020) 'An analysis of the policy responses to the COVID-19 pandemic in France, Belgium, and Canada', *Health Policy and Technology*, Vol. 9, No. 4, pp.430-446
20. Dhatterwal, J.S., Kaswan, K.S., and Kumar, N. (2023) 'Telemedicine-based development of M-Health informatics using AI', *Deep Learning for Healthcare Decision Making*, Vol. 159
21. Ferorelli, D., Nardelli, L., Spagnolo, L., Corradi, S., Silvestre, M., Misceo, F., ... and Dell'Erba, A. (2020) 'Medical legal aspects of telemedicine in Italy: application fields, professional liability and focus on care services during the COVID-19 health emergency', *Journal of Primary Care & Community Health*, Vol. 11
22. Feroz, A.S., Ali, N.A., Ali, N.A., Feroz, R., Meghani, S.N. and Saleem, S. (2020) 'Impact of the COVID-19 pandemic on mental health and well-being of communities: an exploratory qualitative study protocol', *BMJ Open*, Vol. 10, No. 12, e041641
23. Gajarawala, S.N. and Pelkowski, J.N. (2021) 'Telehealth benefits and barriers', *The Journal for Nurse Practitioners*, Vol. 17, No. 2, pp.218-221
24. Ganapathy, K., Haranath, S.P., Baez, A.A. and Scott, B.K. (2022) 'Telemedicine to expand access to critical care around the world', *Critical Care Clinics*, Vol. 38, No. 4, pp.809-826
25. Garavand, A., Aslani, N., Nadri, H., Abedini, S. and Dehghan, S. (2022) 'Acceptance of telemedicine technology among physicians: a systematic review', *Informatics in Medicine Unlocked*, Vol. 30, pp.100943
26. Graf-Vlachy, L., Buhtz, K. and König, A. (2018) 'Social influence in technology adoption: taking stock and moving forward', *Management Review Quarterly*, Vol. 68, pp.37-76
27. Haque, S.N. and Hayden, E.M. (2022) 'Telehealth'. In *Clinical Informatics Study Guide: Text and Review* (pp.255-259). Cham: Springer International Publishing
28. Jain, D. (2023) 'Regulation of digital healthcare in India: ethical and legal challenges', *Healthcare*, Vol. 11, No. 6, pp.911
29. Kaplan, B. (2020) 'Revisiting health information technology ethical, legal, and social issues and evaluation: telehealth/telemedicine and COVID-19', *International Journal of Medical Informatics*, Vol. 143, pp.104239
30. Kissi, J., Dai, B., Achmpong, E.K., Dankyi, A.B. and Antwi, J. (2023) 'An empirical study of healthcare professionals willingness to utilize telehealth services based on protection motivation theory', *International Journal of Healthcare Technology and Management*, Vol. 20, No. 1, pp.74-89
31. Kitchenham, B. (2004) 'Procedures for performing systematic reviews', *Keele, UK, Keele University*, Vol. 33, pp.1-26
32. Kondrateva, G., Baudier, P. and Ammi, C. (2020) 'The digital native's paradox: adoption of telemedicine cabin', In *International Marketing Trends Conference, Paris* (pp.16-18)
33. Krausz, M., Westenberg, J.N., Vigo, D., Spence, R.T. and Ramsey, D. (2020) 'Emergency response to COVID-19 in Canada: platform development and implementation for eHealth in crisis management', *JMIR Public Health and Surveillance*, Vol. 6, No. 2, e18995
34. Kumar, N., Kumar, G. and Singh, R.K. (2022) 'Analysis of barriers intensity for investment in big data analytics for sustainable manufacturing operations in the post-COVID-19 pandemic era', *Journal of Enterprise Information Management*, Vol. 35, No. 1, pp.179-213
35. Mahajan, V., Singh, T. and Azad, C. (2020) 'Using telemedicine during the COVID-19 pandemic', *Indian Pediatrics*, Vol. 57, pp.658-661
36. Maitrey, S., Seth, D., Kansal, K. and Kumar, A. (2023) 'Telemedicine: a new opportunity for transforming and improving rural India's healthcare', In *Image Processing and Intelligent Computing Systems* (pp.297-304). CRC Press
37. Mathew, M. (2022) 'Integrated health care delivery and telemedicine: existing legal impediments in India', In *Emerging Technologies in Data Mining and Information Security: Proceedings of IEMIS 2022, Volume 2* (pp.527-534). Singapore: Springer Nature Singapore
38. Mishra, V. (2020) 'Factors affecting the adoption of telemedicine during COVID-19', *Indian Journal of Public Health*, Vol. 64, No. 6, pp.234

39. Napitupulu, D., Yacub, R. and Putra, A.H.P.K. (2021) 'Factor influencing telehealth acceptance during COVID-19 outbreak: extending UTAUT model', *International Journal of Intelligent Engineering and Systems*, Vol. 14, No. 3, pp.267-281
40. Pathak, N., Deb, P.K., Mukherjee, A. and Misra, S. (2021) 'IoT-to-the-rescue: a survey of IoT solutions for COVID-19-like pandemics', *IEEE Internet of Things Journal*, Vol. 8, No. 17, pp.13145-13164
41. Payán, D.D., Frehn, J.L., Garcia, L., Tierney, A.A. and Rodriguez, H.P. (2022) 'Telemedicine implementation and use in community health centres during COVID-19: clinic personnel and patient perspectives', *SSM-Qualitative Research in Health*, Vol. 2, pp.100054
42. Petticrew, M. and Roberts, H. (2008) *Systematic reviews in the social sciences: A practical guide*. John Wiley and Sons
43. Rai, R.K., Pandey, A., Gupta, A., Singh, G. and Rawat, J. (2022) 'Use of telemedicine in the evaluation of pediatric surgical patients in COVID-19 time', *Annals of the National Academy of Medical Sciences (India)*, Vol. 58, No. 3, pp.164-167
44. Sagaro, G.G., Battineni, G. and Amenta, F. (2020) 'Barriers to sustainable telemedicine implementation in Ethiopia: a systematic review', *Telemedicine Reports*, Vol. 1, No. 1, pp.8-15
45. Sageena, G., Sharma, M. and Kapur, A. (2021) 'Evolution of smart healthcare: telemedicine during COVID-19 pandemic', *Journal of The Institution of Engineers (India): Series B*, pp.1-6
46. Seto, E., Smith, D., Jacques, M. and Morita, P.P. (2019) 'Opportunities and challenges of telehealth in remote communities: a case study of the Yukon Telehealth System', *JMIR Medical Informatics*, Vol. 7, No. 4, e11353
47. Sim, R. and Lee, S.W.H. (2021) 'Patient preference and satisfaction with telemedicine for glycaemic control in patients with type 2 diabetes: a review', *Patient Preference and Adherence*, Vol. 15, pp.283-298
48. Sivaraman, M. and Fahmie, T.A. (2020) 'A systematic review of cultural adaptations in the global application of ABA-based telehealth services', *Journal of Applied Behaviour Analysis*, Vol. 53, No. 4, pp.1838-1855
49. Song, Y., Bernard, L., Jorgensen, C., Dusfour, G. and Pers, Y.M. (2021) 'The challenges of telemedicine in rheumatology', *Frontiers in Medicine*, Vol. 8, pp.746219
50. Tran, B.X., Hoang, M.T., Vo, L.H., Le, H.T., Nguyen, T.H., Vu, G.T., Latkin, C.A., Ho, C.S. and Ho, R.C. (2020) 'Telemedicine in the COVID-19 pandemic: motivations for integrated, interconnected, and community-based health delivery in resource-scarce settings?', *Frontiers in Psychiatry*, Vol. 11, pp.564452
51. Upadhyay, N., Kamble, A. and Navare, A. (2023) 'Virtual healthcare in the new normal: Indian healthcare consumers' adoption of electronic government telemedicine service', *Government Information Quarterly*, Vol. 40, No. 2, pp.101800
52. Viswanath, K., Hiremath, R.N., Patel, P., Yadav, N., Gupta, S. and Rana, T.S. (2022) 'Telemedicine: revisiting the past, present, and future during COVID pandemic', *Asian Journal of Pharmaceutics and Clinical Research*, Vol. 15, No. 5, pp.10-14

Figure 1 Conceptual framework for telehealth adoption in India