Antecedents and impact of 5G for Telemedicine in India

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Antecedents and impact of 5G for Telemedicine in India

Emergent Research Forum (ERF)

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Abstract

Telemedicine services must rise to the challenge of reach, quality and scalability in order to offer effective healthcare services and specialists access to the homes of hundreds of millions of people in India. Increasing rollout of 5G networks provide an unprecedented opportunity to healthcare service providers to offer near real-time, high-quality and interactive telemedicine services. In this research-in-progress paper, leveraging on the technology–organization–environment (TOE) framework, we propose various factors that influence the adoption intention of 5G for Telemedicine from an organizational perspective. Next, we intend to test the theorized relationships via a field survey of relevant stakeholders and domain experts. Through this study, we will offer deeper understanding into the TOE framework for the adoption of 5G for Telemedicine. Further, on the practical front, the study will help the healthcare service providers and partners to strategize and focus on specific factors to implement Telemedicine services leveraging 5G effectively.

Keywords

5G, telemedicine, industry adoption, TOE framework

Introduction

5G, the fifth generation of wireless transmission technology, is expected to have a significant influence in many aspects of contemporary society, including healthcare (Li 2019). 5G is expected to be rolled out in India by end of 2022 (Garg 2022). The Indian healthcare sector is growing at a fast pace due to its reinforced coverage, services and increasing expenditure by public as well private players (IBEF 2022). The Indian Healthcare market is expected to increase to US$ 372 billion in 2022 at a CAGR of 39% (Bajaj 2022) and the the e-health market size is estimated to reach US$ 10.6 billion by 2025 (IBEF 2022).

India is facing a number of challenges despite the expected growth in the healthcare sector. India has the second highest population in the world, with approximately 1.38 billion people (O’Neill 2022) and an increasing life expectancy which adds to an expanding population. In addition, the aging population, uneven geographical distribution and unbalanced supply and demand of medical resources, are other problems faced. Communities in many rural and semi-urban parts of the country need trusted access and credible primary care nearer their homes (Tata Trusts 2021). A low presence of doctors in these areas has resulted in limited access to healthcare facilities for large numbers of people (Sarwal et al. 2021).This has put a lot of stress on India’s healthcare system and healthcare facilities have been feeling the strain due to unmanageable patient-load. Apart from metropolitan cities, demand for health services is rising in smaller towns across India (IBEF 2022).

Telemedicine is about providing healthcare services remotely by healthcare professionals by leveraging information and communication technologies for the exchange of relevant information for diagnosis, treatment and prevention of disease and injuries. Through Telemedicine and Mobile Medical units, primary
healthcare services and specialist advice can be effectively brought to the doorsteps of people in these remote locations of the country. The network support for Telemedicine has to be robust in order to effectively support near real-time data and high-quality images and video. Hence, the need to add a high-speed 5G network to existing architectures for medical consultations and improve the quality of care (AT & T 2019). With the increased adoption of Internet of Things (IoT) technologies, the amount of data on networks is expected to increase and 5G technologies have the potential to help overcome these challenges. In a developing country like India where there are different constraints in accessing healthcare, telemedicine can be instrumental in providing access to the limited medical resources and infrastructure. The Covid-19 situation accelerated the adoption of digital technologies and gave rise to the high demand for online consultations and technology platforms (Hebbar et al. 2020).

This study adopted the Technology–Organization–Environment (TOE) framework (Tornatzky, Fleischer and Chakrabarti 1990) as the guiding theoretical lens to explore the key factors that influence the adoption of 5G technology for Telemedicine. Our primary research question is:

**RQ: What are the key factors influencing the adoption intention of 5G technology for Telemedicine in India and what is the extent of impact?**

**Literature Review**

**Fifth Generation (5G) technology**

The emergence of the 5G network in 2020s, is expected to transform industries and economies. The important characteristics of 5G technology which are most value to healthcare include high speed data transfer rate, super-low latency, connectivity and capacity and high bandwidth and durability per unit area (GSMA 2021; Li 2019). 5G will drive near real-time, high-quality video required for remote medical consultations. The high speed will offer faster diagnostics while the low latency will offer quick transfers of images and files thus enhancing remote monitoring of patients and medical learning and improving the efficiency of the administrative processes. By leveraging 5G and extending health care providers’ reach beyond hospitals, telemedicine will improve access to quality care, helping patients get treated sooner and reaching specialists, otherwise not available (Stefano and Kream 2018).

5G is expected to benefit all economic sectors of the global economy. By the end of 2023, 1 billion 5G connections worldwide is expected and by 2025, 5G will account for more than two in five people around the world to live within the reach of a 5G network and just over a fifth of total mobile connections (GSMA 2021). Mobile technology enhanced by 5G holds the potential to drive long-term, sustainable growth of global GDP (Campbell et al. 2017) and create an agile network catering to varying needs of the economy (GSMA 2021). 5G’s superior throughput, heterogeneity, latency, energy efficiency and flexibility will support applications such as remote healthcare, smart homes, Virtual Reality (VR), Augmented Reality (AR), and massive machine-to-machine communications for automating industry (Li 2019).

**Telemedicine**

Telemedicine is constantly evolving and has come a long way in terms of both healthcare delivery and technology as it incorporates new advancements in technology and adapts to the changing health needs and contexts of societies. Research studies have supported telemedicine services as a promising solution to improve several chronic medical conditions such as obesity, hypertension, depression, diabetes and cancer (Kamal et al. 2020). Telemedicine can increase the access to specialized care by limiting geographic dispersion and health disparities (Segato and Masella 2017), thus enhancing the citizens’ quality of life. Around the world, telemedicine services are enhancing the efficacy of physicians, reducing medical costs and improving the access to health care services (Esmaeilzadeh et al. 2010; Jin and Chen 2015). The global telemedicine market has grown significantly in recent years. As of 2019, the telemedicine global market was valued at some 50 billion U.S. dollars. The global telemedicine market is forecast to grow significantly in the future with the value of nearly 460 billion U.S. dollars by 2030 (Stewart 2021).

Since 2010, the telemedicine market size in India has seen a gradual increase and is expected to grow at a compound annual growth rate (CAGR) of 31 percent from 2020 to 2025 (Kanwal 2022). In 2019, India’s
telemedicine market size was around 830 million U.S. dollars. This figure is forecast to increase significantly in the coming years, reaching approximately 5.4 billion U.S. dollars by 2025 (Kanwal 2022).

Telemedicine in India has immense potential to grow from its nascent stages. Although telemedicine has been practiced in the Indian healthcare sector, where few telemedicine apps such as MDLIVE, LEMONAID, Doctor on Demand, Talkspace and PlushCare (Jewell and Sherrell 2022) have been used, the 2020 Covid-19 pandemic provided the nation’s health systems an unprecedented opportunity to make a concerted effort to increase coverage and access.

**Technology-Organization-Environment (TOE) Framework**

In this research, the Technology-Organization-Environment framework of Tornatzky et al. (1990) has been used as a theoretical lens to understand the role of technology, organization and environment in influencing the adoption of 5G for telemedicine (Baker 2012). Several studies have found significant association of all or some of the contextual factors with technology adoption and performance such as healthcare (Damali et al. 2021), mobile applications (Chiu et al. 2017), and IS applications (Thong 1999). The researchers who used the TOE framework to evaluate the adoption of new technologies by firms have assumed unique factors or measures based on the technology under study. Hence, the factors we have chosen are assumptions based on the past experience of the authors. Firms need to carefully evaluate opportunities for 5G adoption based on their relevance, benefits and the capability to adopt. Hence, it is important to assess the above-mentioned parameters to determine the adoption capability of the healthcare organization (Chau and Tam 1997). In this research, grounding our work on TOE framework, we aim to explore the technology, organization and environment contextual factors that influence the adoption of 5G Telemedicine.

**Research Model & Hypotheses**

Figure 1 presents the proposed research model based on the TOE framework, which theorizes the role of technology, organization, and environment for the adoption intention of 5G for Telemedicine by healthcare organizations and the extent of its impact.

![Figure 1. Research Model for accelerating the adoption of 5G for Telemedicine](image-url)
Proposed Methodology and Future Work

We propose to present this at the PACIS 2022 - Emergent Research Forum (ERF) with the details of each variable and further validate the model. We will be using both primary and secondary research for testing the hypothesis.

Expected Contribution

This research-in-progress paper is expected to make two major contributions. First, in this research, grounding our work on TOE framework, we have explored significant factors for the adoption of 5G technologies for telemedicine in India. Future research can be built further on TOE framework to add new factors and extend the theoretical framework. Second, on the practical front, the study will help the healthcare service providers and partners to strategize and focus on specific factors to implement Telemedicine services leveraging 5G effectively.

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REFERENCES

Garg, A. 2022. “Expect in 2022: 5G roll out in India expected by year-end, prices could be similar to 4G,” India Today. (https://www.indiatoday.in/technology/features/story/expect-in-
5G for Telemedicine in India


