Bridging the Healthcare Gap: Understanding Continued Telemedicine-Usage Behaviour in Emerging Economies

Abstract

Purpose – This study analyses the role of factors responsible for continued telemedicine usage in emerging economies.

Design/Methodology/Approach – A sequential mixed-methods approach was utilized to analyse the data. This included in-depth interviews with telemedicine users to identify the factors influencing their continued telemedcicine usage, followed by quantitative analysis to empirically validate the relationship postulated within the research model.

Findings – The primary findings show that attitude, social influence, and satisfaction directly impact users' continued intention to use telemedicine services. These factors underscore the importance of both individual perceptions and external influences in shaping intention to continue to use telemedicine services.

Originality – This research explains the intention to continue telemedicine usage through a multi-theoretic perspective that combines technology continuance theory and the unified theory of acceptance and use of technology.

Practical implication – The results show that factors such as satisfaction, attitude, and social influence impact the continued usage of telemedicine services in emerging economies. Specific policy initiatives and awareness programs can be implemented to promote long-term telemedicine usage. In addition, improving apps with user-friendly interfaces, local language options, and voice commands, alongside enhanced security measures, would serve to build trust in, and improve accessibility to, telemedicine.

Social implication – The study's findings can be used to improve healthcare services in areas where facilities are inaccessible.

Keywords: E-health innovations, Healthcare, Telemedicine, Continuance intention, Service Operations, Mixed-methods

1. Introduction

Telemedicine has become a ground-breaking healthcare solution that effectively utilizes technology to connect healthcare providers and patients (Chauhan *et al*., 2022). Telemedicine has also proven useful in emergency situations, such as the SARS pandemic in 2003, MERS-CoV in 2015, and the COVID-19 pandemic. As per Rouidi *et al*. (2022), telemedicine refers to a knowledge-intensive and interactive technological framework that mediates medical

transactions, enabling seamless communication between geographically separated healthcare actors, such as healthcare professionals or patients. It uses information and communication technologies such as video consultation, message, and chat. These can be utilized via smartphone, iPad, and other wireless devices to conduct patient evaluation, diagnosis, treatment, monitoring, and follow-up, without the need for travel. In addressing emergencies such as COVID-19, the Canadian and Indian governments even made regulatory-level changes to promote the use of telemedicine and permitted diagnosis and treatment through home phone calls and video conferencing (Bhaskar et al., 2020) . However, despite its many benefits and the growing endorsement of telemedicine by governments globally, individuals are often reluctant to continue their usage of such services. For instance, McKinsey and Company (2021) revealed that telemedicine usage peaked during the first wave of COVID-19 in April–May 2020, but sharply declined by around 50% after the COVID-19 situation began to stabilize. Similarly, in the United States, telehealth claims as a percentage of total Medicare claims rose to a peak of 13% in April 2020. However, just after the peak, numbers started to decline and finally settled at between 6% to 7% of total claims (Spglobal.com, 2021). In light of the decline highlighted in the McKinsey report, our study delves deeper into the factors that influence continued usage of telemedicine services. This could help reverse the decline and encourage long-term usage of telemedicine services.

Extant literature on telemedicine has primarily focused on measuring and predicting ‘first-time user behaviour’ or ‘technology acceptance behaviour’ among various stakeholders (e.g., physicians, patients, nurses, and pharmacists) in the healthcare system (Baudier *et al*., 2021; Cobelli *et al*., 2021; Zhang and Zaman, 2020). However, the long-term viability and continued usage intention with respect to telemedicine have received limited attention (as noted by Almutairi *et al*., 2021; Wang *et al*., 2022). Almutairi et al. (2021) used Delone and Maclean’s (2003) model to study the continuance intentions of telemedicine users by considering data from a single private hospital in Kuwait. We argue that findings from a specific hospital may not be generalizable to other circumstances, such as general telemedicine usage, or to other geographies. Moreover, Delone and Maclean’s (2003) model is a general information systems (IS) success model and may not capture the unique nuances of continued telemedicine usage. Subsequently, Wang et al. (2021) used a modified technology acceptance model (TAM). However, TAM does not capture the impact of other significant variables, such as confirmation of user expectations and facilitating conditions, which could be crucial for continued telemedicine usage. Studying continued telemedicine-usage intention is crucial for researchers and companies, as the cost incurred in attracting new customers is much higher

than that involved in retaining existing ones (Jia *et al*., 2023). Additionally, in terms of country context, studies to date have been dominantly conducted in developed nations. Regarding methodological approach, studies have primarily used quantitative structural equation modelling (SEM) (Steinhauser *et al*., 2020) – only one study (Chau and Hu, 2002) has used a mixed-methods approach for examining telemedicine adoption by physicians. In addition, most studies have used only the TAM, the theory of planned behaviour, or the unified theory of acceptance and use of technology (UTAUT) to explore telemedicine adoption (Cobelli *et al*., 2021; Schmitz *et al*., 2022). Appendix A1 illustrates studies conducted on telemedicine adoption to date based on their context, methodology, target audience, country (developed vs. emerging nations), and key constructs. Prior studies in developed nations have examined factors such as habit, patient cognition, self-rated health, institution size, etc., which may not have significant relevance in the emerging-economy context. Factors such as habit might be less influential due to the relatively limited experience and familiarity with telemedicine among patients in these regions, unlike in countries with more established digital health practices. Similarly, institution size often correlates with resources in developed nations (Wu et al., 2021); however, in emerging economies, smaller or mid-sized institutions may lack the necessary infrastructure to guarantee a quality telemedicine experience, making this factor less relevant. In addition, factors such as patient cognition and self-rated health can be unreliable due to varying levels of health awareness and digital literacy among populations in emerging economies, impacting the relevance of these variables.

While technological adoption behaviour focuses on the reasons behind individuals' adoption or non-adoption of specific technological products or services, the study of continued usage intention aims to delve more deeply into the factors influencing individuals' decisions to either persist in using, or discontinue using, those products or services. Examining individuals' intention to continue using telemedicine services is expected to yield significant insights for both researchers and companies, because investment associated with attracting new customers far outweighs the costs involved in maintaining the loyalty of existing ones. Moreover, understanding the determinants of continued telemedicine usage will not only aid in resource optimization but also empower stakeholders to proactively tailor services, improve user experiences, and solidify the foundation of telemedicine as a sustainable and effective healthcare solution. To address the above-mentioned gaps in the extant literature, this paper explores the factors responsible for continued telemedicine usage in emerging economies. We explicitly address the following research question (RQ):

RQ: *What are the factors that influence continued telemedicine-usage intention in emerging economies?*

To address the RQ, a mixed-methods approach is adopted. First, a preliminary qualitative study is conducted to identify the factors that impact continued telemedicine usage. Thereafter, a quantitative study employing SEM is carried out to examine the hypothesized relationship among identified factors obtained through the qualitative study.

The findings of the study have important practical and theoretical implications with respect to continued telemedicine usage. First, we provide empirical evidence by identifying the significant factors responsible for continued intention to use telemedicine in emerging economies. By understanding these factors, healthcare providers can develop interventions and strategies to promote continued telemedicine usage. Second, this study uses an advanced theoretical lens that combines technology continuance theory (TCT) and UTAUT to understand the continuance phenomenon in greater depth.

2. Preliminary qualitative study

A preliminary qualitative study was conducted to investigate the factors responsible for continued telemedicine usage among individuals. The study involved 21 semi-structured interviews with individuals who were aware of telemedicine features and capabilities. The convenience sampling approach was utilized in identifying the participants for the interview, as this method allows researchers to efficiently gather a sample of participants, enabling expedited data collection while maintaining overall efficiency (Tan *et al*., 2023). The number of participants was determined according to the theoretical saturation principle (Corbin and Strauss, 1990) – that is, data were collected until no new information emerged. The respondent profile is presented in Appendix A2. All interviews were transcribed for in-depth examination. After transcription, thematic analysis was performed on the qualitative data using the MAXQDA 2022.4 software (Braun and Clarke, 2006). To ensure rigor and reliability, all research team members (one research scholar and three professors) meticulously reviewed the interviews and conducted separate coding. The average length of the interviews was approximately 15 minutes. Following individual analysis, the team collectively discussed the findings, which enabled them to draw comprehensive themes from the interview responses. As a result, eight factors were identified as impacting continued usage intention: confirmation, perceived usefulness, perceived ease of use, perceived risk, satisfaction, attitude, social influence, and facilitating condition. Appendix A3 provides a comprehensive overview of the

thematic analysis, including the components identified, verbatim quotes from the interviews with respondents, and how the hypotheses align with the identified constructs.

3. Theoretical background and hypothesis development

A novel framework utilizing TCT and UTAUT was proposed to understand the key determinants of telemedicine service usage.

3.1. Theoretical background

TCT provides a deeper understanding of the factors influencing an individual's decision to continue using technology. TCT posits that continued use is primarily determined by how well a technology meets users' expectations, and its perceived usefulness (Liao *et al*., 2009). However, very few studies have applied TCT to explain the continued usage of technology within the healthcare sector (Gilani *et al*., 2017). UTAUT, developed by Venkatesh *et al.* (2003), aims to explain and predict user acceptance of technology. Recent studies have successfully applied UTAUT in the healthcare context, demonstrating its relevance in understanding user behaviour for health technology (Arfi et al., 2021; Philippi et al., 2021). The contextual usage of various factors present in the TCT and UTAUT is described in Section 3.2. Perceived risk emerged as a new factor from the preliminary qualitative study that is not captured in the TCT, and UTAUT is also included in the proposed framework. This inclusion addresses gaps in existing models, ensuring a more holistic understanding of telemedicine continued usage. Figure 1 elucidates the research framework to explain continued telemedicine usage intention. Relevant empirical literature and observations derived from the qualitative investigation are considered to develop the hypotheses.

3.2. Hypothesis development

3.2.1. Impact of confirmation of expectations on perceived risk, perceived usefulness, perceived ease of use, and satisfaction

Confirmation of expectations explains the degree to which individuals perceive a match between their anticipated expectations from information technology (IT) products or services and the actual performance of those products. Hence, confirmation assessment can be conducted through a comparative analysis of the initial expectations and the subsequent experience actually encountered (Bhattacherjee, 2001). When expectations are recognized and met, perceived usefulness and satisfaction increase (Chiu *et al*., 2021). Moreover, when

expectations regarding telemedicine systems are initially confirmed, satisfaction with the systems is enhanced.

Conversely, if users' expectations with telemedicine systems are not met, this can negatively influence their satisfaction level. In the context of telemedicine, individuals having preconceived notions or concerns about possible downsides of telemedicine usage are more likely to seek confirmation of those beliefs. If an individual perceives telemedicine as risky, they are more likely to seek information that confirms their beliefs and concerns, leading to a negative relationship between confirmation and perceived risk (Ayanso *et al*., 2015). On the other hand, perceived ease of use relates to users' perceptions of how effortless and intuitive use of a service or product is. If an individual perceives telemedicine as easy to use, they are more likely to seek information that confirms their beliefs, leading to a positive relationship between confirmation and perceived ease of use. Thus, the following hypotheses are proposed:

H1: Confirmation of expectations is negatively associated with perceived risk.

H2: Confirmation of expectations is positively associated with perceived usefulness.

H3: Confirmation of expectations is positively associated with perceived ease of use.

H4: Confirmation of expectations is positively associated with satisfaction.

3.2.2. Impact of perceived risk on perceived usefulness, satisfaction, and continuance intention

Contrary to the prevailing optimistic perspectives regarding attributes such as perceived ease of use and perceived usefulness, the concept of perceived risk denotes an individual's negative perception towards adopting a novel product or service (Arfi *et al*., 2021). It is a critical impediment to the intention to use that product or service. Perceived risk is defined as 'the risk of loss in pursuing the desired outcome of using an e-service'. Perceived risk has various dimensions, such as performance risk, financial risk, physical risk, psychological risk, and social risk. Moreover, numerous categories of risk (social, technical, time, security, and privacy) have been discovered and proven as obstacles to the adoption of any technology, thereby influencing individuals' behaviour (Bakshi *et al*., 2019). The inherent unpredictability and uncontrollability of cyberspace can expose individuals to varying degrees of risk. Therefore, the perception of risk is widely recognized as a substantial impediment to the widespread acceptance and utilization of various online services. The existence of perceived risk can erode individuals' favourable perceptions, consequently reducing their confidence level in the perceived utility of various products or services (Im *et al*., 2008). In addition, it is worth noting that heightened levels of perceived risk often coincide with heightened expectations, leading to lower degrees of satisfaction (Ho *et al*., 2008). Previous research has

consistently demonstrated that perceived risk associated with new technologies or products has an adverse effect on individuals' acceptance and behavioural intention (Kim *et al*., 2008). As a result, we anticipate a negative association between perceived risk and perceived usefulness, satisfaction, and intentions to continue using telemedicine services. In this study, perceived risk refers to privacy and security risks associated with the acquisition, use, and dissemination of personal data (Yi *et al*., 2013). The misuse of personal information could be exacerbated by health IT. Past research has revealed a negative association between online privacy and security concerns and the use of online health technology (Chang, 2018). Thus, based on the above discussion, the following hypotheses are proposed:

H5: Perceived risk is negatively associated with perceived usefulness.

H7: Perceived risk is negatively associated with satisfaction.

H8: Perceived risk is negatively associated with the continuance intention.

3.2.3. Impact of perceived ease of use on perceived usefulness, continuance intention, and attitude

Perceived ease of use is 'the degree to which a person believes that a service or product can be used without any hassle or effort' (He *et al*., 2018). When individuals perceive a technology or product as easy to use, it enhances their overall perception of its usefulness. When a technology or product is perceived as simple, intuitive, and user-friendly, individuals tend to develop a higher inclination towards perceiving it as useful. Consequently, when users perceive that telemedicine does not require significant effort or technical expertise to navigate and interact with the system, it tends to enhance their perception of its usefulness (Rouidi *et al*., 2022). Perceived ease of use of telemedicine platforms or applications can positively influence users' perception of the technology's practical value and utility in facilitating healthcare delivery remotely. Studies have suggested that when a technology or product can be used without effort, there is a higher likelihood of more positive attitudes towards using the product or service (Asif & Fazel, 2024; Teerawongsathorn et al., 2024) . Thus, in line with the theoretical evidence, the following hypotheses are proposed:

H6: Perceived ease of use is positively associated with perceived usefulness.

H12: Perceived ease of use is positively associated with continuance intention.

H13: Perceived ease of use is positively associated with attitude.

3.2.4. Impact of perceived usefulness on satisfaction, continuance intention, and attitude

Perceived usefulness refers to individuals' perception of the anticipated benefits of using the product or service (Davis, 1989). When individuals perceive a product or service as useful, they believe it can effectively meet their expectations and provide the desired benefits, leading to higher satisfaction levels (Liaw and Huang, 2013). When perceived usefulness is high, it often indicates that the product or service successfully fulfils its intended purpose and delivers the expected benefits. When patients perceive telemedicine as useful, therefore, the are likely to believe that it can successfully address their healthcare concerns and provide convenience, accessibility, and quality care. This alignment between perceived usefulness and patient-perceived benefits leads to higher levels of satisfaction with the telemedicine experience. Perceived usefulness assumes an external motivational role by shaping users' decision-making regarding selecting and utilizing a particular service or product. The consistent findings of previous studies have highlighted the robust predictive capacity of perceived usefulness when it comes to behavioural intention concerning the IS (Caffaro *et al*., 2020). When patients perceive telemedicine as useful, it can be assumed that they believe it provides tangible benefits and effectively addresses their healthcare needs. This positive perception of usefulness also creates a favourable attitude towards telemedicine and increases the likelihood of patients intending to continue using it in the future (Liao *et al*., 2009). According to TAM, perceived usefulness and perceived ease of use predict attitude towards any service or product. Attitude towards telemedicine is defined by positive or negative emotions related to using it. Several studies have demonstrated that when people find any service or product useful, they are more likely to accept it. Thus, the following hypotheses are proposed:

H9: Perceived usefulness is positively associated with satisfaction.

H10: Perceived usefulness is positively associated with continuance intention.

H11: Perceived usefulness is positively associated with attitude.

3.2.5. Satisfaction and continuance intention

Satisfaction refers to 'the degree of contentment or fulfilment experienced by users when interacting with a particular technology or information system' (Liao *et al*., 2009). The presence of consumer satisfaction is considered to be essential for fostering ongoing purchase intentions. Consequently, satisfaction significantly influences users' propensity to maintain their adoption of products or services. When users perceive products or services as useful, their satisfaction levels increase, resulting in continuous adoption. Satisfaction experienced by patients during their telemedicine encounters can significantly influence their intention to

continue using these services. If patients are pleased with the convenience, accessibility, and quality of telemedicine services, they will be more likely to intend to continue using telemedicine for future healthcare requirements (Eldaly *et al*., 2022). On the other hand, if patients encounter issues or dissatisfaction with telemedicine, such as technical difficulties or a perceived lack of personalized care, it may negatively impact their intention to continue using telemedicine. Hence, we proposed the following hypothesis:

H14: Satisfaction is positively associated with continuance intention.

3.2.6. Attitude and continuance intention

Attitude is defined as 'the individual's cognitive and affective appraisal of the expected outcomes associated with the performance of a given behaviour' (Lihua, 2022). According to TAM, attitude plays a crucial role as an evaluative predisposition towards behaviour (Venkatesh and Davis, 2000). Previous research has consistently demonstrated that attitude strongly indicates an intention to utilize telemedicine services, with several studies providing evidence of a positive correlation between attitude and intention to continue using the technology (Wang *et al*., 2022). Accordingly, we proposed the following hypothesis:

H15: Attitude is positively associated with continuance intention.

3.2.7. Social influence and continuance intention

Social influence is the extent to which an individual's beliefs, opinions, and behaviour are influenced by others (Wang *et al*., 2013). Social influence plays a crucial role in determining the extent to which users embrace the use of IT. A positive impact of social influence on user behaviour has been found regarding the adoption of telemedicine health services (Zhou and Li, 2014). Notably, Kaium *et al*. (2020) confirmed a significant effect of social influence on patient behaviour, specifically related to the sustained use of m-health services. Thus, the following hypothesis is proposed:

H16: Social influence is positively associated with continuance intention.

3.2.8. Facilitating conditions and continuance intention

Facilitating conditions include the factors and resources that an individual perceives as supportive of their activities to adopt a product or service. These conditions include both technical and non-technical forms of support. Regarding telemedicine applications, the concept of facilitating conditions pertains to the degree to which individuals believe that telemedicine service providers will supply the technical structure required for the effective utilization

of telemedicine services (Yamin and Alyoubi, 2020). In addition, Nysveen and Pedersen (2016) argued that the presence of adequate infrastructure plays a crucial role in enabling users to effectively utilize telemedicine services, thereby enhancing their proficiency in engaging with such technologies. In light of this, a final hypothesis is formulated:

H17: Facilitating conditions are positively associated with continuance intention.

<Insert Figure 1>

4. Data and methodology

A sequential mixed-methods approach was used to conduct this study. This approach was selected for several reasons. First, the combination of multiple approaches (i.e., qualitative and quantitative) helps to mitigate the biases and limitations associated with individual methods (Zhang, 2017; Cresswell and Clark, 2007). Second, this approach addresses the limitations associated with the type of data collected (Maier *et al*., 2023).

In the first phase, a qualitative study was conducted using semi-structured interviews to identify antecedents in continued telemedicine-usage intention. Subsequently, a research model was formulated based on the insights obtained from the qualitative analysis and the literature review. In the second phase, a quantitative model was used to evaluate the relationship proposed in the research model.

The study was conducted in the context of India, as this country provides a unique environment for understanding continued telemedicine-usage intention due to its emerging-economy context. Specifically, India is the most populated economy in the world, with a total population of 1.45 billion (World Population Review, 2023), but it lacks accessible healthcare facilities. Consequently, there is a scarcity of healthcare providers and health infrastructure (Combi *et al*., 2016). In addition, the recent growth in the internet user base in India (from 193 million in 2013 to 932 million in 2023, Statista. (2021)) offers an exceptional opportunity to increase telemedicine usage in the country and thereby provide access to healthcare services even in remote locations. Appendix A4 describes the outline of the methodology used in this research.

4.1. Survey design

Data were collected through a self-administered questionnaire circulated among telemedicine users residing in India. It was disseminated using email and digital platforms such as Instagram, LinkedIn, Telegram, and WhatsApp. The survey specifically targeted individuals

who had used telemedicine at least once in their lifetime, either for their own health or on behalf of family members and friends. For screening purposes, the respondents were asked at the beginning of the survey whether they had ever used telemedicine services in the past. They were also asked to indicate any telemedicine service platforms used. Moreover, we used an instructional manipulation check question – 'If you are still reading, please choose the "agree" option' – to ensure that respondents were paying attention to the survey and answering accurately. Data were collected for a duration of eight months, from August 2022 to March 2023. The survey completion rate was 62.11%, with a total of 428 complete and valid responses out of a total 689. Appendix A5 summarizes the participants' demographic profiles based on age, gender, education level, income level, and place of residence for the final analysis. The majority of the participants reported using telemedicine services such as Practo, Tata 1mg, PharmEasy and eSanjeevani (Ministry of Health and Family Welfare).

4.2. Survey instrument

The data were collected using a standardized questionnaire based on the research framework (Zhou *et al*., 2023). Each item was evaluated on a 5-point Likert scale ranging from '1= strongly disagree' to '5= strongly agree' (Hashimy *et al*., 2023; Low *et al.*, 2011). All the items utilized in this study were derived from pre-existing scales. A few control variables, including age, gender, and education, were employed in addition to the primary construct to eliminate the confounding effects of respondent characteristics on the outcome variable. All measurement items are provided in Appendix A6.

5. Results

To examine the validity of the proposed hypotheses, we used partial least squares SEM (PLS-SEM). The PLS-SEM method effectively examines new theoretical frameworks and predicts variance associated with endogenous constructs. In addition, PLS-SEM is less stringent regarding normality and is commonly employed for second-order constructs (Sarstedt *et al*., 2021). The method can also handle small sample sizes and non-normal data distributions (Hair *et al*., 2017). The relationship among the variables was tested using Smart PLS 4.0 software.

5.1. Measurement model: Reliability and validity testing

The factor loadings, construct validity, and construct reliability were tested using the measurement model. The factor loadings of all items were higher than 0.708, which is

considered a reasonable benchmark for construct reliability (Hair *et al*., 2019). For indicator FC4, the factor loading is 0.639, which is slightly less than the prescribed value of 0.708. However, per PLS-SEM guidelines, if the values of construct validity and average variance extracted (AVE) are greater than the thresholds of 0.70 and 0.50, respectively, then items with of a multi-item construct with a lower factor loading can be retained. Therefore, despite the lower loading value, FC4 was retained. The Cronbach's alpha values ranged from 0.822 to 0.905, whereas the composite reliability values ranged from 0.916 to 0.873 – all above the acceptable value of 0.7 (Hair *et al*., 2017). Thus, construct reliability was ensured. Furthermore, to measure the construct validity, we checked the AVE; this was found to be within the acceptable limit, ranging from 0.636 to 0.785 (Sarstedt *et al*., 2021). Table 1 presents a comprehensive overview of the reliability and validity statistics, explicitly focusing on factor loadings, Cronbach's alpha, composite reliability, and AVE.

<Insert Table 1>

The discriminant validity was tested through the heterotrait–monotrait (HTMT) ratio of correlations. The HTMT metric is explained as the average correlation between indicators across different constructs relative to the average correlation between indicators measuring the same construct. Subsequently, a HTMT value must be under 0.90 to confirm satisfactory discriminant validity (Henseler *et al*., 2015). Appendix A7 summarizes the HTMT criteria for discriminant validity. Based on the analysis, the measurement model demonstrates a strong alignment with the observed data.

5.2. Assessing common method bias and multicollinearity

To minimize common method bias (CMB), we informed participants in advance that their identity would be kept anonymous and their responses would be used for research purposes only. We also requested them to fill out the questionnaire honestly, and highlighted the value of their responses. We have used Harman's single-factor test to check CMB. Harman's single-factor test posits that CMB exists if (a) a single factor emerges from un-rotated factor solutions, or (b) a single factor accounts for the majority of covariance among the measurement variables (Podsakoff *et al*., 2003). The results of Harman's single-factor test indicated that the first factor accounted for 38.20% of the total variance, which was less than the cut-off value of 50%. This indicates that CMB is not a major concern in our data. Next, the variance inflation factor (VIF) test was also conducted to check for any multicollinearity present in the data (Hair *et al*., 2017). The VIF values for all variables in the study were found

to be less than 5 (see Table 2). This suggests that no significant multicollinearity issues are present in the results.

<Insert Table 2>

5.3. Structural model assessment (direct effects)

In order to assess the statistical significance and gauge the magnitude of the path coefficients within the model, a PLS bootstrapping analysis was conducted employing 10,000 subsamples (Hair *et al*., 2019). The initial step involved examining the influence of control variables – namely, age, gender, and education – on continued intention to use telemedicine. The results showed that the control variables – age (β: 0.006, p-value = 0.870), gender (β: -0.051, p-value = 0.169), and education (β: -0.005, p-value = 0.877) – were not statistically significant. Table 3 provide results of the hypotheses testing. H2–H4, H6, H7, H9, H11, and H13–H16 were supported at a 1% significance level, and H1 at a 5% significance level.

<Insert Table 3>

The coefficient of determination (R^2) and the blindfolding-based cross-validated redundancy measure (Q^2) were used to evaluate the model's ability to explain the variance of the dependent variable and predict outcomes (Hair *et al*., 2019). The R^2 value for intention to continue using telemedicine revealed that its predictors accounted for 64.5% of the variance. Similarly, satisfaction was explained to approximately 62.2% by its predictors, followed by attitude at 55.6%, perceived usefulness at 52.8%, and perceived ease of use at 30.7%. In addition, Q^2 values that are higher than 0, 0.25, and 0.50 infer a PLS model's small, medium, and large predictive power (Hair *et al*., 2019). The values of Q^2 in this study (Continuance intention = 0.542, Satisfaction = 0.586 and Attitude = 0.424) confirmed the research model's medium to high predictive power.

6. Discussion

Our hypotheses results reveal the following insights. First, the satisfaction of telemedicine users increases their likelihood of continuing to use telemedicine services (H14). This finding is in line with prior literature (e.g., Chen *et al.*, 2012; Bhattacherjee, 2001), and highlights the importance of delivering high-quality telemedicine services that meet users' expectations and needs in terms of perceived usefulness, mitigating the perceived level of risk and confirming their anticipated service quality. The results indicate that operations managers should focus on

enhancing ease of access, communication effectiveness, risk minimization (including privacy risks), and overall user satisfaction and improved health outcomes. Monitoring user feedback, performance metrics, and patient outcomes can provide valuable insights to optimize operational processes, address service gaps, and improve user satisfaction. By consistently striving for excellence in service delivery, operations managers can foster a positive user experience that motivates users to continue utilizing telemedicine services.

Second, the findings show that attitude is a significant and positive determinant of intention to continue using telemedicine services (H15), which is again aligned with previous literature (Lee, 2010; Bhattacherjee, 2001). The finding indicates that individuals who have a favourable attitude towards telemedicine are more likely to continue using the service. Taking cues from this, operations managers should aim to develop the positive attitudes of the users towards their telemedicine platforms by emphasizing in their communication and marketing efforts the expected benefits, convenience, and cost-effectiveness of telemedicine. Clear and concise messaging, educational campaigns, and targeted promotional activities can help to eliminate misconceptions regarding telemedicine usage. Additionally, operations managers should prioritize user-centred design principles and continuously adapt their services based on user feedback to reinforce positive attitudes toward telemedicine.

Third, social influence has a positive and significant effect on intention to continue using telemedicine (H16), per prior literature (Sun *et al.,* 2014). We posit that social networks and interpersonal relationships help shape individuals' intention to use telemedicine in the future. Thus, companies can harness the power of social influence to drive telemedicine usage by creating various awareness campaigns, engaging key opinion leaders, and leveraging community networks.

Next, regarding the respective influence of confirmation of expectations on perceived risk, perceive usefulness, perceived ease of use, and satisfaction. The results align with the findings by Liao *et al*. (2009) and Bhattacherjee (2001). We find that confirmation of expectations negatively impacts perceived risk (H1). This indicates that when users feel more confident about telemedicine services, they perceive lower levels of risk in its utilization. Furthermore, the positive impact of confirmation of expectations on perceived usefulness, perceived ease of use, and satisfaction (H2, H3, H4) indicates that providing reassuring information about telemedicine services enhances users' confidence in telemedicine's benefits. Thus, focusing on high-quality service delivery, clearly communicating features and benefits, and addressing user queries can foster confirmation of expectations and enhance users' perception of the service's usefulness. We also find that perceived ease of use positively

impacts perceived usefulness (H6). Thus, managers should prioritize simplicity, intuitive design, and clear instructions to enhance the ease of use for users. Addressing perceived risk is also crucial in improving user satisfaction, as perceived risk negatively impacts satisfaction (H7), as found in previous literature (Peng *et al.*, 2019). Managers should implement robust data security measures, adhere to privacy regulations, and communicate transparently with users about the safety and reliability of the telemedicine service. Moreover, perceived usefulness positively influences satisfaction (H9) (as per Liaw and Huang, 2013). It can thus be inferred that providing clear information about how telemedicine can complement traditional healthcare and improve health outcomes can reinforce users' perceptions of usefulness and drive their satisfaction. Furthermore, perceived usefulness and perceived ease of use positively influence attitude (H11, H13), as found by Asif and Fazel (2024) and Liao *et al.* (2009). Users who perceive telemedicine as useful and easy to use exhibit a positive attitude towards the service. Perceived usefulness pertains to the benefits and practicality of telemedicine, while perceived ease of use emphasizes the platform's user-friendliness. Thus, prioritizing the delivery of high-quality services, providing clear information, and optimizing the platform's design are vital to enhance both perceived usefulness and ease of use. Ultimately, fostering a positive attitude and encouraging continued telemedicine usage should be prioritized by telemedicine service providers.

We find insufficient evidence to support the hypothesis that perceived risk negatively impacts perceived usefulness (H5). Managers should focus on implementing measures to mitigate perceived risk and build user confidence in telemedicine. This may include improving data security and privacy measures, enhancing communication about the benefits and safety of telemedicine, and providing transparent information about the service. Furthermore, there is insufficient empirical evidence to support our hypotheses that perceived risk, perceived usefulness, perceived ease of use, and facilitating conditions impact the continued usage intention of telemedicine (H8, H10, H12, H17). The findings suggest that these factors may not significantly influence telemedicine users' continued usage intention in our emerging-economy context. However, these findings run counter to those of prior literature (Caffaro *et al*., 2020; Nysveen and Pedersen 2016; Liao *et al*., 2009; Kim *et al*., 2008; Bhattacherjee, 2001). This could be attributed to several reasons specific to emerging nations. First, individuals in these regions may perceive the risks associated with traditional healthcare systems – such as long wait times, limited accessibility, and inadequate healthcare infrastructure – as more significant than the potential risks of telemedicine. Second, the benefits of telemedicine, such as increased access to healthcare services and reduced travel time and

costs, may outweigh concerns regarding privacy or misdiagnosis. Therefore, users may be willing to embrace telemedicine despite the perceived risks, hence the lack of support for our related hypotheses. It is essential for operations managers to address and mitigate any actual risks associated with telemedicine while also providing clear communications and transparency to alleviate users' concerns. Similarly, contrary to our hypothesis (H10), perceived usefulness does not affect continued usage intention. This finding suggests that users, especially in emerging nations, may prioritize other factors over the perceived usefulness of telemedicine. Emerging nations often face specific healthcare challenges, including limited resources, inadequate access to healthcare facilities, and high healthcare costs. As a result, users may view telemedicine as a pragmatic solution regardless of their perception of its usefulness. Further, we do not find a positive relationship between perceived ease of use and continued intention to use telemedicine in the context of India. This finding highlights the complexities of technology adoption and digital literacy in emerging economies. Users therein may face challenges related to inadequate technological infrastructure, limited familiarity with digital platforms, or low digital literacy rates. Thus, ease of use alone may not be a decisive factor in determining users' intention to continue using telemedicine. Similarly, regarding facilitating conditions, the lack of supporting evidence suggests that factors beyond facilitating conditions may play a more prominent role in shaping users' intention to continue using telemedicine. Emerging nations often face infrastructure challenges, such as unreliable internet connectivity and limited access to technology. However, users may prioritize other factors, such as the quality of healthcare services, affordability, and support from healthcare professionals and community networks.

6.1. Theoretical implications

This study contributes to the literature in multiple ways. First, we contribute to the scarce literature on continued telemedicine adoption. Second, to our knowledge, this is the first study in which TCT is combined with UTAUT to explain continued telemedicine usage. Furthermore, we employ an extended TCT that incorporates perceived risk as an additional construct to investigate continued telemedicine usage. Third, we report several noteworthy findings about the continued usage intention of telemedicine, and thereby make an additional essential contribution to the existing literature. Past literature on technology adoption in other contexts has emphasized the importance of perceived risk, perceived usefulness, perceived ease of use, and facilitating conditions (Caffaro *et al*., 2020; Nysveen and Pedersen 2016; Liao et al., 2009; Kim *et al*., 2008; Bhattacherjee, 2001). However, we did not find these factors to be significant in the context of continued telemedicine usage. We posit that this contradictory

observation is due to the unique factors inherent in emerging economies such as India, which are characterized by an increasing population, lower income, and poor healthcare infrastructure. Thus, our findings highlight the need to reassess the significance of factors such as perceived risk, perceived usefulness, perceived ease of use, and facilitating conditions in other contexts. Fourth, our study finds that control variables, including age, gender, and education, are not significantly relevant. This indicates that in the case of crucial healthcare technologies such as telemedicine, people continue to use the service irrespective of their age, gender, and educational background. Thus, researchers should explore other factors that may be more salient in determining users' intention to continue using telemedicine in emerging nations.

6.2. Practical implications

This research holds substantial practical significance for decision-makers involved in developing and implementing telemedicine services, especially in emerging nations. First, addressing factors that impact the continued use of telemedicine can potentially enhance its widespread continued use. Healthcare organizations should focus on confirmation of expectations and perceived risk, highlighting perceived usefulness, improving ease of use, enhancing user satisfaction, leveraging social influence, and enabling facilitating conditions. Second, the findings indicate that the primary factor hindering the intention of the general public to continue using telemedicine is their lack of trust in the service, and its perceived insecurity. To promote its continued usage, healthcare practitioners and policy-makers responsible for its implementation should prioritize efforts to address the public's concerns regarding telemedicine's safety, reliability, and effectiveness. This can be done by launching awareness programmes through advertisements and social media campaigns. Furthermore, establishing an independent agency operating under the supervision of a trusted legal body, such as the judiciary, could prove beneficial in terms of fostering continued telemedicine usage. This would enhance trust among users, as they would perceive the telemedicine system as being safeguarded by a trusted authority. Furthermore, practitioners should improve app designs to ensure a user-friendly experience by focusing on factors such as perceived usefulness, ease of use, and user satisfaction. Improved interfaces, simplified navigation, local language options, and voice commands can further increase the continued usage intention of telemedicine users.

7. Conclusion, limitations and future research directions

This study sheds light on the factors contributing to continued telemedicine-usage intention over time. Using a sequential mixed-methods approach, we find that user satisfaction, attitude, and social influence directly contribute to continuance intention among telemedicine users in an emerging economy. Our findings can help governments to redefine their policies and develop intervention strategies to promote the continued use of telemedicine. Furthermore, the results can foster patient retention and the growth of the healthcare sector.

The study is subject to several limitations, which can be addressed in future studies. First, the study was conducted in a context-specific environment, and the findings may not be generalizable to other contexts. It is suggested that researchers investigate the hypotheses in diverse settings and examine the impact of cultural factors on continued telemedicine-usage intention. Second, although attempts were made to include participants from diverse groups, it is possible that the respondents, who had already used telemedicine services at the time of the survey, were predominantly from a tech-savvy group. In addition, as the channel used for the survey was mainly social media, this may have attracted a higher proportion of educated and young respondents, who are prominent on these platforms. Third, the research employed a cross-sectional design, which did not allow for the assessment of how continued telemedicine-usage intention manifested over time. It is recommended that the model be further tested using longitudinal data with additional variables, such as residential status, and income. Lastly, future research can explore potential mediating relationships within the research framework.

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