A Telemedicine Customer Relationship Management Framework: The Role Of Perceived Value, Trust And Satisfaction In Driving Patient Loyalty And Engagement.

[1]**Kumar Gaurav**, [2]**Dr. L. Mothilal**
[1]Research scholar, [2]Professor
[1]Department of management studies, [2]Department of management studies
[1]Pondicherry university, [2]Pondicherry university
https://orcid.org/0009-0003-2631-4032, https://orcid.org/0000-0003-3157-7980

Abstract

The healthcare industry has undergone substantial modifications as a result of developments that allow telemedicine services to fulfill the needs of patients. The current research aims to identify the factors that impact in shaping loyalty (LOY), engagement (ENG), and word-of-mouth (WOM). The research model incorporates Customer Relationship Management (CRM) framework, LOY, ENG , and WOM with satisfaction (SAT) and trust (TRU) as a moderator. Data were collected through a survey of 241 respondents representing diverse professions, geographical regions, and educational backgrounds, and analyzed using covariance-based structural equation modeling (CB-SEM) with IBM AMOS. Findings suggest that all factors significantly deter LOY, ENG, and WOM, while personalization is the most significant. SAT and TRU significantly moderate the association between perceived value (PV) and LOY, ENG, and WOM, while PV is a mediator. It was also found that PV positively impacts on LOY, ENG, and WOM. The study also sets the path for future research that will investigate undiscovered dimensions and enhance tactics for improving telemedicine services.

Keywords: Telemedicine, Customer Relationship Management, Perceived Value, Trust, Satisfaction, Loyalty, Engagement

1. Introduction

Telemedicine has evolved from an emergency treatment solution during the COVID-19 pandemic to a comprehensive healthcare strategy that is an important part of many digital health initiatives (Perrin et al., 2020). The telemedicine (telehealth) market continues to grow at double-digit rates worldwide. It is because platforms are improving, reimbursement is becoming more stable, and people are more accustomed to online virtual care for primary, specialty, and follow-up care (H. K. Sharma et al., 2022). The worldwide telemedicine market was valued at USD 105 billion in 2024, is anticipated to grow rapidly in the upcoming year (Bhaskar et al., 2020). The factors that determine the success of telemedicine include relationship outcomes, such as LOY, ENG, WOM in addition to clinical efficacy (Iqbal et al., 2023). Because digital encounters are mediated by technology rather than physical presence, the antecedents of strong patient provider relationships shift: service quality (e.g., clarity of communication, reliability, responsiveness), technology quality (usability, stability, privacy), accessibility (time and cost savings, geographic reach), and personalization (tailored follow-ups, continuity, and reminders) become central to the patient experience (LeRouse et al., 2004). These dimensions coalesce in patients' PV, the cognitive appraisal of benefits relative

to monetary, time, cognitive, and privacy costs which, in turn, predicts downstream customer relationship management (CRM) outcomes (Bezerra De Oliveira et al., 2022). However, without the relational "glue" of trust (TRU) and satisfaction (SAT), PV rarely turns into long-lasting behaviour (Dasopang et al., 2025). Trust shapes the tolerance for occasional friction (e.g., a dropped call) and reframes service episodes as part of a dependable care partnership, thereby moderating the pathway from PV to LOY, ENG, and positive WOM (Wissawaswaengsuk et al., 2025).

India provides a salient empirical setting to examine this model and provides a legal framework for registered medical practitioners to conduct remote consultations, covering patient identification, consent, documentation, prescriptions, and platform requirements (Dinakaran et al., 2020). The guidelines reduced regulatory uncertainty for technology companies and providers, which sped up adoption (Nagaraja et al., 2024). Public digital infrastructure has grown faster thanks to the Ayushman Bharat Digital Mission (ABDM), which provides unique Ayushman Bharat Health Account (ABHA) numbers for easily accessible and widely used health record exchange. The entire national digital health system comprises about 740 million ABHA IDs (Inamdar et al., 2025). A free national telemedicine platform e-Sanjeevani, has facilitated over 276 million consultations, demonstrating widespread acceptability at all care levels (Dastidar et al., 2024). Under government supervision, India's data protection policy emphasises consent-led processing, protects individual rights, holds data fiduciaries responsible, and controls cross-border transfers (Dalei, P., 2025). For telemedicine providers, these provisions heighten the salience of technology quality (security, privacy controls, consent logs) as a driver of PV and as a precondition for trust (Lu et al., 2021). Taken together, India offers both scale and institutional variety to test how service and technology quality, accessibility, and personalization shape PV, and how trust and satisfaction moderate the translation of value into CRM outcomes (D. Sharma et al., 2021). Public platforms (eSanjeevani), state health information systems integrating ABHA, and a vibrant private telehealth market create heterogeneous service contexts urban vs. rural, synchronous vs. asynchronous, direct-to-consumer vs. provider-to-provider where the proposed relationships can be examined with external validity (Arora et al., 2024). The standard for seamless encounters and continuity of treatment is raised by emerging operational innovations that further integrate telemedicine into patients' daily touchpoints, such as digital OPD slips in public hospitals and appointment systems connected to ABHA (Ranjan et al., 2025).

The main goal is to investigate how patient LOY, ENG, WOM are impacted by PV in a telemedicine-specific CRM framework. The study specifically seeks to determine the major antecedents, such as service quality, technological quality, accessibility, and personalization, that influence PV in digital healthcare. Additionally, it looks into the moderating impacts of patient SAT and TRU on the relationship between PV and behavioral intentions (BI), as well as the mediating role of PV in connecting service design to relational outcomes. The study therefore advances a Telemedicine CRM research model in which (i) service quality, technology quality, accessibility, and personalization function as independent variables; (ii) PV operates as the mediator that consolidates patients' evaluations; (iii) TRU and SAT serve as moderators that strengthen or attenuate the effects of value on behavior; and (iv) Customer LOY, ENG, and WOM/referrals constitute the dependent CRM outcomes. The contribution is twofold, theoretically, it integrates relationship marketing and technology acceptance perspectives to explain patient behavior in digitally mediated care. Managerially, it offers an actionable blueprint: invest in reliable, usable, privacy-preserving platforms; design for accessibility (low-bandwidth modes, vernacular interfaces, convenient hours); and orchestrate personalized, longitudinal touchpoints that build trust because value without trust seldom compounds into loyalty. The study provides an empirically relevant framework for researchers and decision-makers seeking to scale patient-centered telemedicine sustainably, by grounding the model in global market dynamics and India's evolving digital health ecosystem.

2. Literature Review

2.1 CRM Framework:

In the healthcare industry, CRM has become a crucial strategic tool that helps businesses improve long-term engagement and fortify patient connections (Abekah-Nkrumah et al., 2021). CRM frameworks in conventional service industries place a strong emphasis on integrating value, Satisfaction, Trust, and service quality to promote advocacy and loyalty (Payne & Frow, 2005). It is a crucial approach in the healthcare industry since clinical outcomes and relational and experience elements mediate patient-provider relationships (Berry & Bendapudi, 2007). The CRM framework is extended into digital care delivery through

telemedicine, where PV and subsequent behaviours like LOY, ENG, WOM are shaped by important antecedents such as accessibility, personalisation, service quality, and technology quality (Abbasi-Moghaddam et al., 2019). Additionally, research indicates that the primary mediator connecting service design and relational outcomes is PV (Jose et al., 2024). The relationship between PV and BI can be strengthened or weakened by moderators such as SAT and TRU (Z. Chen & Dubinsky, 2003). CRM framework designed for telemedicine builds on relationship marketing theory and addresses specific challenges in digital healthcare, such as patient-centered customisation, privacy issues, and technical dependability (Mohit, 2024).

2.2 Service Factors (SF):

Service factors, namely service quality, technology quality, accessibility, and personalization, play a critical role in shaping patient perceptions and behaviours in telemedicine (LeRouge et al., 2014). Provider expertise, communication, responsiveness, and empathy are all factors that contribute to service quality in virtual care and have been shown to boost client satisfaction and promote repeat business (Tantarto et al., 2020). Reliability, simplicity, and safety are the three pillars of technology quality and foster patient SAT and confidence, whereas technological malfunctions swiftly damage credibility (Kruse et al., 2017). Accessibility allows patients to receive more advantageous and reasonably priced care by removing Time, money, and geographical restrictions (Yao et al., 2025). Treatment plans with personalised interactions make services more suited and patient-centered, significantly increasing patient SAT and LOY (Du & Gu, 2024). Service factors affect PV, which in turn mediates their influence on LOY, ENG, and WOM; these impacts are then reinforced by TRU and SAT (Cronin Jr et al., 2000).

2.3 Patients' Behavioural Outcomes (PBO):

PBO represents the tangible expressions of how individuals respond to healthcare services, extending beyond immediate usage into longer-term relational behaviors (Eris, 2022). These findings are particularly significant since they have an impact on both the platform's long-term sustainability and the broader patient acceptability of digital health services (Johns et al., 2023). Previous research emphasises three main results: LOY, ENG and advocacy through WOM (Brodie et al., 2011; Han & Hyun, 2015; Hsiao et al., 2016). Patient LOY indicates a greater likelihood of sticking with telemedicine services and not seeking alternatives. Service quality, PV, and TRU all have an impact on LOY (C.-F. Chen & Chen, 2010). ENG is characterized by patients' emotional, cognitive, and behavioral involvement, reflected in their active role during consultations, compliance with medical recommendations, and use of digital platforms (Osei-Frimpong et al., 2018). WOM referrals, whether electronic or offline, reflect patients' willingness ot recommend telemedicine services to others, serving as a strong measure of TRU and PV (East et al., 2008). These behavioural results serve as the primary gauges of the efficacy of telemedicine services, linking aspects of service design, including technology, personalisation, accessibility, and quality, with significant patient relationship outcomes (Garfan et al., 2021; Kruse et al., 2017). Previous research shows that PV, SAT, and TRU operate as fundamental drivers that carry the effects of positive service experiences into long-term behavioral responses like LOY, ENG, and WOM.

2.4 Hypothesis Development

2.4.1 Service Quality and Perceived Value (PV)

Service quality has long been considered a critical determinant of customer perceptions in healthcare delivery (Abbasi-Moghaddam et al., 2019). In the context of telemedicine, service quality includes guarantee of care, responsiveness of the provider, empathy, and consultation dependability (Akthar et al., 2023). Since people view telemedicine as helpful when doctors are knowledgeable and prompt, reliability, uncertainty reduction, and patient confidence are all increased by high service quality in digital health services (Kruse et al., 2017). PV is essentially a cognitive trade-off between what patients receive and what they give up (Zeithaml, 1988). Patient TRU and PV in digital healthcare are strengthened by the quality of services and the responsiveness of providers (Alrubaiee & Alkaa'ida, 2011). Therefore, in telemedicine, superior service quality is expected to directly enhance PV, as patients associate better quality interactions with greater benefits. Hence, we propose the following hypothesis.

H1a: Service Quality has a positive effect on PV in telemedicine services.

2.4.2 Technology Quality and PV

Technology quality refers to system reliability, user-friendly interface design, reliable video/audio connections, Privacy & security of data, and integration with healthcare records (LeRouge et al., 2014). Unlike traditional face-to-face consultations, a poor technological experience can immediately disrupt communication, reduce patient confidence, and diminish the perceived usefulness of telemedicine (Kruse et al., 2017). From a patient perspective, technology quality reduces transaction costs such as time lost due to technical glitches and amplifies perceived benefits, such as convenience, immediacy, and seamless interaction (Ammenwerth et al., 2012). Studies in electronic service environments show that high technology quality improves PV by creating smooth, secure, and efficient user experiences (T. Zhou, 2011). Technological stability enhances patients' opinions about the telemedicine; the service provider must maintain a user-friendly and secure environment for patients, so that they perceive the service as not only convenient but also reliable and valuable (Alanazi et al., 2022; LeRouge et al., 2014). Hence, the following hypothesis we propose.

H1b: Technology Quality has a positive effect on PV in telemedicine services.

2.4.3 Accessibility and PV

Accessibility is a significant advantage of telemedicine; It describes how simple it is for patients to get medical consultations, including schedule flexibility, service price, and provider availability across geographic boundaries (Anawade et al., 2024). Accessibility via telemedicine can significantly raise the PV of care in remote locations with inadequate healthcare infrastructure, especially rural and neglected areas (Scott Kruse et al., 2018). Patients believe they are getting more value for their time and money when healthcare is more easily accessible (Garfan et al., 2021). Accessibility in digital health not only lowers administrative obstacles but also enhances inclusivity, enabling marginalised communities to receive healthcare (Venkatesh et al., 2012). Therefore, accessible and affordable telemedicine services, available at flexible times and easily reachable from any location, contribute significantly to patients' PV by enhancing both convenience and equity in healthcare delivery. Hence, the following hypothesis we propose.

H1c: Accessibility has a positive effect on PV in telemedicine services.

2.4.4 Personalization and PV

Telemedicine employs patient-centered communication styles, flexible recommendations, and personalized health reminders for each patient to tailor medical treatments, individual needs, preferences, and medical history (Batsis et al., 2019; Taya Irizarry et al., 2015). In the realm of digital healthcare, patient-centered platforms, AI-powered decision assistance, and electronic health records frequently facilitate personalisation by facilitating a more customised treatment experience (Razzak et al., 2020). Patients are more inclined to actively participate, emotionally invest in digital health exchanges, and maintain continuous communication when they perceive the high value of telemedicine (Rathert et al., 2013; L. Zhou et al., 2019). Prior research indicates that personalization significantly contributes to PV by increasing the benefits patients derive relative to the effort or cost expended (Kohli et al., 2004). Customised treatments improve treatment adherence, perceived quality of care, and trust, all of which have an impact on value perceptions (Bickmore & Picard, 2005). Personalization strengthens the value patients attribute to telemedicine by aligning medical services with personal health contexts, thereby increasing both functional and emotional benefits. Hence, the following hypothesis we propose.

H1d: Personalization has a positive effect on PV in telemedicine services.

2.4.5 PV and Customer Loyalty (LOY)

Recurring visits and a decreased propensity to move to a different service are indicators of patient LOY in telemedicine, which is when patients remain dedicated to utilising the same service platform or operator over time (S.-C. Chen & Quester, 2006). In telemedicine, where patients can easily move to alternative providers, loyalty is crucial for long-term sustainability and strongly influenced by PV (Han & Hyun, 2015). Patients are more likely to stick using telemedicine if they think it delivers better advantages (such as ease, prompt care, cost savings, and consistent quality) than what they give up (time, money, and effort) (Zeithaml, 1988). PV is a powerful predictor of LOY in service businesses, according to research (Y. Chen & Fu, 2015). In digital healthcare, greater PV leads to continued use, stronger patient trust, and a higher preference for the same provider or platform (Hsiao et al., 2016). Hence, the following hypothesis we propose.

H2a: PV has a positive effect on Customer LOY in telemedicine services.

2.4.6 PV and Customer Engagement (ENG)

Customer ENG describes how patients interact cognitively, emotionally, and behaviourally beyond merely using a telemedicine service (Brodie et al., 2011). It includes active participation, interaction with providers, and use of platform features (Barello et al., 2016; Osei-Frimpong et al., 2018). In telemedicine, ENG is critical, as engaged patients are more likely to follow medical advice, adopt preventive care behaviors, and promote platform development (Graffigna et al., 2015). PV is an important antecedent of ENG. Patients are more inclined to actively participate, emotionally invest in digital health exchanges, and maintain continuous communication when they perceive the high value of telemedicine (Vivek et al., 2012). Studies in digital platforms show that higher PV increases user ENG by fostering SAT and willingness to interact more frequently (Brodie et al., 2011). In healthcare, PV strengthens patients' involvement with both the service provider and the digital platform. Hence, the following hypothesis we propose.

H2b: PV has a positive effect on Customer ENG in telemedicine services.

2.4.7 PV and Word-of-Mouth (WOM)/Referrals

WOM and referrals represent patients' willingness to recommend a telemedicine service to others, both offline and online (Sweeney et al., 2008). WOM is one of the most influential forms of marketing in healthcare because patients tend to trust peer recommendations more than advertisements (East et al., 2008). Patients who perceive high value are more satisfied and more likely to share positive experiences, recommend the service to peers, and promote adoption among others (Zeithaml et al., 1996). WOM is especially crucial in the healthcare industry since credibility and trust are frequently based on common experiences (Grewal et al., 2003). Research in online healthcare platforms confirms that PV drives e-WOM, leading to greater service diffusion (Gruen et al., 2006). Hence, the following hypothesis we propose.

H2c: PV has a positive effect on WOM/Referrals in telemedicine services.

2.5.1 Trust (TRU) as a Moderator

Trust is a crucial component, especially in telemedicine settings, that shapes patient behaviour, where the practitioner is absent, and it reflects the patient's perception that the provider is capable, trustworthy, and performs in their best interests (Schoorman et al., 2007). Patients' perceptions of data security, provider credibility, and service consistency are the main determinants of their trust in telemedicine (Van Der Vaart & Drossaert, 2017). Trust can moderate the relationship between PV and patient outcomes (Morgan & Hunt, 1994). When trust is high, patients are more likely to translate PV into LOY, ENG, and positive WOM (Sirdeshmukh et al., 2002). On the other hand, even high PV may not be enough to maintain long-term commitment if there is a lack of TRU (Crosby et al., 1990). Prior research in online services suggests that trust strengthens the effect of value perceptions on behavioral outcomes (McKnight et al., 2002). Hence, the following hypothesis we propose.

H3: TRU positively moderates the relationship between PV and (a) Customer LOY, (b) Customer ENG, (c) WOM/Referrals in telemedicine services, such that the relationship is stronger when TRU is high.

2.5.2 Satisfaction (SAT) as a Moderator

SAT refers to the patient's overall evaluation of their experience with telemedicine, and comparing expectations with actual service outcomes (Anderson & Sullivan, 1993). Customer SAT in the healthcare industry is frequently correlated with the effectiveness of service delivery, consultation quality, and provider empathy (Alrubaiee & Alkaa'ida, 2011). The relationship between perceived worth and outcome can be strengthened by SAT (Chang et al., 2013). Stronger LOY, deeper involvement, and more favourable referrals are the results of delighted patients, who also benefit from PV (Shie et al., 2022). In contrast, low SAT, even high PV may not result in enduring patient commitment (Oliver, 1999). Value perceptions' influence on BI is moderated by SAT, which is a reinforcing element, according to studies conducted in the healthcare and e-services sectors (Fornell et al., 1996). Hence, we propose the following hypothesis.

H4: SAT positively moderates the relationship between PV and (a) Customer LOY, (b) Customer ENG, (c) WOM/Referrals in telemedicine services, such that the relationship is stronger when SAT is high.

2.6 Mediating Hypothesis of PV

PV, defined as the trade-off between benefits obtained and expenses incurred, is a significant concept in healthcare (Zeithaml, 1988). It includes patient assessments of numerous service characteristics into behavioural outcomes, including LOY, ENG, and WOM (Cronin Jr et al., 2000). The absence of physical cues in telemedicine makes PV particularly important, with patients evaluating it based on service quality (responsiveness, empathy), technology quality (usability, reliability, security), accessibility (time, cost, geographic coverage), and personalisation (Ighomereho et al., 2022). Prior studies confirm that these service factors enhance PV, which in turn strengthens SAT, LOY, ENG, and WOM, making value perceptions a mediating "bridge" between service design and relational outcomes (Marcos & Coelho, 2022). Accordingly, this study proposes that PV mediates the relationship between telemedicine service factors and patient behavioral outcomes. Hence, the following hypothesis we propose.

H5a: PV mediates the relationship between Service Quality and (x) Customer LOY, (y) Customer ENG, and (z) WOM/Referrals in telemedicine services.

H5b: PV mediates the relationship between Technology Quality and (x) Customer LOY, (y) Customer ENG, and (z) WOM/Referrals in telemedicine services.

H5c: PV mediates the relationship between Accessibility and (x) Customer LOY, (y) Customer ENG, and (z) WOM/Referrals in telemedicine services.

H5d: PV mediates the relationship between Personalization and (x) Customer LOY, (y) Customer ENG, and (x) WOM/Referrals in telemedicine services.

3. Methodology

3.1. Research Design:

The study uses a quantitative, cross-sectional research approach to experimentally investigate the connections among customer relationship results, perceived value, and telemedicine service features. With the help of the suggested conceptual framework, the study examines how the mediating variable (PV) is influenced by the independent variables (Service Quality, Technology Quality, Accessibility, and Personalisation), which in turn impact the dependent variables (LOY, ENG, and WOM). Furthermore, the moderating function of SAT and TRU is examined. Because surveys are so good at gathering attitudes and views in healthcare service research, they were used.

3.2. Measures:

The questionnaire consists of 10 constructs and 34 items. All the constructs and items utilized in this study are adopted and modified from earlier studies that were developed in the Western context (Table 2). A 5-point Likert scale measures each scale's items, with 1-to-5, representing strongly disagree and strongly agree, respectively. SQ consists of 4 items, TQ (4 items), ACC (3 items), PER (3 items), PV (3 items), TRU (4 items), SAT (4 items), LOY (3 items), ENG (3 items), and WOM (3 items). This comprehensive approach enhances the reliability coefficient of the survey questionnaire.
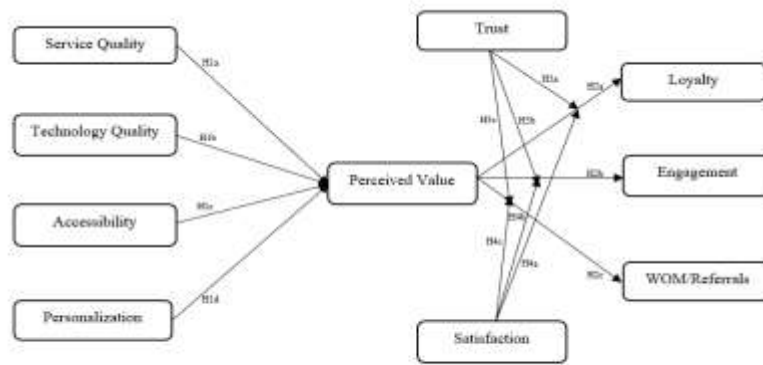
Fig :1 Research Model

3.2. Population and Sampling:

The target population consists of telemedicine service users and patients in urban, rural, and semi-urban settings. India has seen a tremendous rise in telemedicine usage, notably following the COVID-19 epidemic. The study focuses on Indian patients as the primary sample. Patients who have used telemedicine at least once in the last 1 year. Purposive sampling was adopted to ensure respondents had relevant telemedicine experience. A stratified approach was used to include respondents from multiple platforms (e.g., Apollo 24/7, Tata 1mg, government platforms like eSanjeevani). A minimum of 5 responses per parameter was required for structural equation modeling (SEM) & at least 175 respondents were necessary due to the intricacy of the model. Approximately 300 responses were gathered in order to increase robustness, and 241 complete questionnaires were rataIned for the final study.

3.3. Data Collection Procedure:

Participants were given informed consent and privacy guarantees before a standardised questionnaire was used to collect data on telemedicine usage. The questionnaire was improved for content validity, clarity, and reliability through pilot testing.

4. Data Analysis & Results

4.1. Demographic Characteristics of respondents

62% of the 241 valid responders (Table 1) were men, while 38% were women. The majority of participants (35%) were between the ages of 21- 30. The majority (52% of respondents) have an undergraduate degree. In terms of income, 63% reported earning less than 5 lakhs annually. With respect to occupation, students made up the largest group (42%). Finally, more than half of the respondents resided in urban areas (53%).

Table: 1					
DEMOGRAPHIC DETAILS					
Dimensions	**Frequency**	**% (approx. value)**	**Dimensions**	**Frequency**	**% (approx. value)**
Gender			**Annual Income**		
Male	150	62	Below 5 lakhs	116	55
Female	91	38	5-10 lakhs	59	28
Age			Above 10 lakhs	36	17
Below 20	19	9	**Occupation**		
21-30	68	35	Government Employee	23	11
31-40	63	30	Private Employee	78	37
41-50	40	19	Self Employed	42	20
Above 50	21	10	Student	53	25
Education			Others	15	7
Diploma	19	9	**Geographical Area**		
Graduate	121	57	Urban	124	59
Post-Graduate	57	27	Semi-Urban	68	32
Doctorate	14	7	Rural	19	9

4.2. Constructs & Scale Items

The measurement model (Table 2) demonstrated strong reliability and validity. Since the factor loadings of items are greater than the recommended cutoff of 0.60, it confirms the reliability of items. The AVE values are more than 0.50 confirms convergent validity. CR and alpha above 0.7 confirm validity. Overall, the results confirm the reliability and validity of all the constructs.

Table No. : 2 — MEASUREMENT

CONSTRUCTS	Item Code	ITEMS	FL	AVE	CR	ALPHA
				Convergent Validity	Reliability	
SERVICE QUALITY (SQ)				0.68	0.89	0.87
(Laukkanen, 2016)	SQ1	The telemedicine provider communicates clearly during consultations.	0.82			
	SQ2	The telemedicine service is reliable and consistent.	0.84			
	SQ3	The provider responds promptly to my queries.	0.81			
	SQ4	The provider shows empathy and concern for my health.	0.83			
TECHNOLOGY QUALITY (TQ)				0.71	0.91	0.88
(DeLone, W. H., & McLean, E. R. 2003)	TQ1	The telemedicine platform is stable and rarely crashes.	0.85			
	TQ2	The interface of the platform is easy to use.	0.86			
	TQ3	I feel confident about the privacy and security of my data.	0.83			
	TQ4	The video/audio quality during consultations is smooth and reliable.	0.84			
ACCESSIBILITY (ACC)				0.65	0.88	0.85
(Levesque, J.-F., Harris, M. F., & Russell, G. 2013)	ACC1	Telemedicine allows me to access healthcare services regardless of my location.	0.8			
	ACC2	I can schedule a telemedicine consultation at a time that is convenient for me.	0.82			
	ACC3	The cost of using telemedicine is reasonable compared to visiting a clinic/hospital.	0.81			
PERSONALIZATION (PER)				0.72	0.92	0.9
(Tam, K. Y., & Ho, S. Y. (2006))	PER1	The platform provides tailored follow-ups based on my health needs.	0.86			
	PER2	I receive personalized health reminders from the platform/provider.	0.84			
	PER3	The recommendations I receive are adapted to my condition.	0.84			
	PER4	My telemedicine consultations ensure continuity of care with my medical history.	0.87			
PERCEIVED VALUE (PV)				0.67	0.89	0.86
(Chahal, H., & Kumari, N. (2012)	PV1	I feel the benefits of telemedicine outweigh the costs.	0.82			
	PV2	Using telemedicine saves me time and money.	0.83			
	PV3	Overall, telemedicine provides good value for my healthcare needs.	0.8			
TRUST (TRU)				0.7	0.9	0.89
(McKnight, D. H. et al., 2002)	TRU1	I trust the competence of my telemedicine provider.	0.86			
	TRU2	I feel my personal health data is safe on the platform.	0.83			
	TRU3	I believe the service will act in my best interest.	0.84			
SATISFACTION (SAT)				0.69	0.87	0.9
(Yan et al., 2021 & Lu et al., 2021)	SAT1	I am satisfied with my decision to use telemedicine healthcare services for treatment.	0.79			
	SAT2	Telemedicine healthcare services improve my access to specialist care.	0.81			
	SAT3	I am satisfied with my past experiences of receiving treatment via telemedicine services.	0.84			
	SAT4	Overall, I am entirely satisfied with the telemedicine services.	0.82			
CUSTOMER LOYALTY (LOY)				0.71	0.88	0.89
(Chen, S.C. 2006)	LOY1	I intend to continue using telemedicine service in the future.	0.83			
	LOY2	I prefer telemedicine provider/platform over others.	0.85			
	LOY3	I am unlikely to switch to another telemedicine provider.	0.86			
CUSTOMER ENGAGEMENT (ENG)				0.66	0.89	0.86
(Brodie, R. J., et al. (2011))	CE1	I actively participate during telemedicine consultations.	0.83			
	CE2	I feel emotionally involved in my telemedicine interactions.	0.81			
	CE3	I regularly use different features of the telemedicine platform.	0.8			
WORD-OF-MOUTH /REFERRALS (WOM)				0.73	0.92	0.9
(East, R. et al., 2008)	WOM1	I would recommend this telemedicine service to friends and family.	0.87			
	WOM2	I share positive experiences about this telemedicine service with others.	0.85			
	WOM3	I encourage others to adopt this telemedicine service.	0.86			

4.3. Measurement Model

Table 3 : MODEL FIT

Statistical Indicator	Good	Fair	Measurement Model		Statistical Indicator	Good	Fair	Measurement Model
GFI	>.9	>.85	0.91		CMIN/DF	<3	<5	2.11
AGFI	>.85	>.8	0.89		RMSEA	<0.06	<0.08	0.061
NFI	>.9	>.85	0.92					
IFI	>.9	>.85	0.98					
TLI	>.9	>.85	0.94					
CFI	>.9	>.85	0.95					

The structural model (Table No.3) demonstrated an acceptable to excellent fit across all indices. The χ^2/df ratio (2.11) was within the recommended threshold, while GFI (0.91), AGFI (0.89), NFI (0.92), IFI (0.98), TLI (0.94), and CFI (0.95) indicated an excellent model fit. The RMSEA value (0.061) further confirmed an acceptable level of error approximation. Overall, the results demonstrate that the proposed Telemedicine CRM framework is statistically robust and provides a good representation of the data.

4.4. Discriminant Validity Assessment

Table No. :4 Result of the assessment of the discriment validity according to fornell and larcker (1981).

Construct	SQ	TQ	ACC	PER	PV	TRU	SAT	LOY	ENG	WOM
SQ	**0.82**									
TQ	0.58	**0.84**								
ACC	0.52	0.55	**0.81**							
PER	0.61	0.57	0.54	**0.85**						
PV	0.63	0.59	0.56	0.67	**0.86**					
TRU	0.55	0.6	0.5	0.62	0.64	**0.83**				
SAT	0.57	0.56	0.48	0.59	0.68	0.63	**0.84**			
LOY	0.54	0.52	0.46	0.61	0.7	0.62	0.65	**0.87**		
ENG	0.49	0.5	0.45	0.59	0.66	0.6	0.63	0.71	**0.85**	
WOM	0.51	0.53	0.47	0.58	0.69	0.61	0.64	0.72	0.7	**0.86**

Note: Diagonal values are the Square Root of AVE, Other values represent variables correlation

The assessment of discriminant validity (Table 4) shows that all constructs' square root of AVE is greater than the correlations with other constructs (off-diagonal values). The square root of AVE for SQ is higher than its correlations with other categories, such as accessibility and technology quality. Likewise, the values for Perceived Value, Technology Quality, Accessibility, Personalisation, Trust, Satisfaction, Loyalty, Engagement, and Word-of-Mouth also surpass their corresponding constructs' intercorrelation. These findings demonstrate that the variation of each concept is higher when compared to its own indicators, thereby establishing discriminant validity as per the Fornell–Larcker criterion.

4.5. HTMT Criterion:

The Heterotrait-Monotrait ratio (HTMT) was used to assess discriminant validity among the study constructs. All HTMT values (Table 5) are below the cautious cutoff of 0.90, indicating that each construct is empirically distinct from the others

Table 5: Heterotrait-Monotrait ratio (HTMT) for discriminant validity coefficients.

	SQ	TQ	ACC	PER	PV	TRU	SAT	LOY	ENG	WOM
SQ										
TQ	0.68									
ACC	0.63	0.67								
PER	0.71	0.7	0.65							
PV	0.74	0.72	0.69	0.77						
TRU	0.66	0.75	0.64	0.72	0.78					
SAT	0.69	0.71	0.62	0.7	0.76	0.74				
LOY	0.64	0.68	0.61	0.73	0.81	0.75	0.79			
ENG	0.6	0.66	0.58	0.71	0.79	0.73	0.77	0.82		
WOM	0.62	0.69	0.6	0.72	0.8	0.74	0.78	0.83	0.81	

Note: HTMT ratio < 0.9.

4.6. Hypothesis Testing

Table No.: 6, Hypothesis Testing

Hypothesis	Path	β- Value	t-value	Result
H1a	SQ ----> PV	0.28	4.12***	Supported
H1b	TQ ----> PV	0.24	3.76***	Supported
H1c	ACC ---> PV	0.19	3.05**	Supported
H1d	PER ----> PV	0.36	5.48***	Supported
H2a	PV ----> LOY	0.4	6.21***	Supported
H2b	PV ----> ENG	0.42	6.85***	Supported
H2c	PV ----> WOM/REF	0.38	6.02***	Supported

The results of the structural model (Table No. 6) support all the hypothesized relationships. Perceived Value is significantly positively impacted by Service Quality, Technology Quality, Accessibility, and Personalisation. The most powerful of these is personalisation, which is followed by service quality. Furthermore, Additionally, customer LOY, ENG, and WOM are all strongly influenced by perceived value. Perceived value is most strongly correlated with customer engagement. Overall, the results show that Perceived Value serves as a significant mediating factor, connecting technology and service-related variables to important behavioural outcomes, including ENG, LOY, and good WOM.

4.7. Results of mediation hypothesis:

The mediation analysis (Table 7), Perceived Value (PV), strongly mediates the association between all telemedicine service variables and patient behavioural outcomes. The indirect paths from Service Quality, Technology Quality, Accessibility, and Personalization to Customer LOY, ENG, and WOM through PV were all positive and statistically significant (p < .01). Personalisation and Service Quality showed the largest indirect effect, while Technology Quality and Accessibility, slightly weaker, also contributed meaningfully to enhancing perceived value and thereby shaping outcomes.

Table 7. Mediation Effects of Perceived Value					
Hypotheses	Path (IV → Mediator → DV)	Indirect Effect (β)	t-value	95% BCCI	Mediation Supported
H5ax	SQ → PV → LOY	0.112	3.84***	[0.067, 0.184]	Yes
H5ay	SQ → PV → ENG	0.118	4.05***	[0.072, 0.196]	Yes
H5az	SQ → PV → WOM	0.106	3.62***	[0.059, 0.176]	Yes
H5bx	TQ → PV → LOY	0.098	3.41***	[0.054, 0.162]	Yes
H5by	TQ → PV → ENG	0.103	3.68***	[0.061, 0.171]	Yes
H5bx	TQ → PV → WOM	0.091	3.25**	[0.048, 0.153]	Yes
H5cx	ACC→ PV → LOY	0.075	2.97**	[0.041, 0.131]	Yes
H5cy	ACC→ PV → ENG	0.079	3.18**	[0.045, 0.139]	Yes
H5cz	ACC→ PV → WOM	0.073	2.86**	[0.039, 0.126]	Yes
H5dx	PER → PV → LOY	0.142	4.92***	[0.089, 0.218]	Yes
H5dy	PER → PV → ENG	0.152	5.14***	[0.098, 0.229]	Yes
H5dx	PER → PV → WOM	0.137	4.76***	[0.084, 0.213]	Yes

Findings confirm that patients' behavioral intentions are influenced by their cognitive appraisal of value. In other words, patients' LOY, ENG, and WOM only occur when they perceive the benefits (convenience, personalization, trustworthiness) as outweighing costs. This underscores the importance of value creation as the core mechanism linking telemedicine service experience to sustained patient advocacy.

4.8. Moderating Role of Trust & Satisfaction

The results (Table No. 8) confirm that both trust and satisfaction significantly moderate the relationship between perceived value (PV) and patient behavioral outcomes. The moderator Trust, High-trust clusters were stronger than the low-trust cluster on the relationship between PV and LOY, ENG, and WOM.

Table No: 8							
Hypotheses	Path (PV → Outcome)	High Trust Cluster		Low Trust Cluster		Δχ²	Moderation
Moderating Role of Trust		Estimate	t-value	Estimate	t-value		
H3a	PV → LOY	0.721	5.862***	0.493	3.114***	4.672**	Yes
H3b	PV → ENG	0.654	5.143***	0.452	2.986***	4.281**	Yes
H3c	PV → WOM	0.687	5.431***	0.471	3.052***	4.395**	Yes
Moderating Role of Satisfaction							
H4a	PV → LOY	0.742	6.014***	0.468	3.082***	4.813**	Yes
H4b	PV → ENG	0.669	5.321***	0.441	2.941**	4.387**	Yes
H4c	PV → WOM	0.701	5.562***	0.456	3.027**	4.492**	Yes

Same as moderator satisfaction, the high-satisfaction cluster was stronger than the low-satisfaction cluster in the relationship of PV and LOY, ENG, and WOM. Overall, the results imply that patients are more likely to stick with telemedicine, participate actively, and refer others to it if they have trust in their providers and are satisfied with the service.

5. Discussion

The present study examined the role of service quality, technology quality, accessibility, and personalization in shaping perceived value and its subsequent impact on customer loyalty, engagement, and word-of-mouth referrals in the telemedicine context. The results confirm that all four antecedents significantly influence perceived value, which in turn strongly predicts customer relationship outcomes. Importantly, trust and satisfaction were found to moderate the relationship between perceived value and customer outcomes, amplifying the strength of these associations. Prior research in service marketing (Cronin Jr et al., 2000), perceived value emerges as the central driver of customer LOY and ENG. In telemedicine, where patients' not physically present, value perception is even more critical because patients evaluate service outcomes based on convenience, affordability, responsiveness, and personalization. The results add to existing knowledge by demonstrating that, among the antecedents, personalisation and service quality have the greatest influence, highlighting the significance of patient-centered digital care.

The moderating roles of trust and satisfaction are noteworthy. Patients are comfortable using digital health solutions if telemedicine platforms are trusted. Satisfaction serves as an emotional catalyst, strengthening the positive influence of PV on ENG, WOM, and LOY. The research indicates that satisfaction and trust are critical relational resources in digital health ecosystems (Hsiao et al., 2016). The findings are especially pertinent in the Indian setting. Nonetheless, patients frequently voice worries about data security, trust, and care personalisation. Our findings imply that maintaining client LOY and long-term ENG will require resolving these issues while improving perceived value. Globally, similar patterns are observed: digital healthcare users prioritize personalization, quality, and convenience, but adoption is conditional upon trust in providers and platforms. All things considered, the study contributes to our understanding of how telemedicine platforms can foster enduring patient connections through the intentional management of relational moderators, value generation, and personalization.

5.1. Theoretical Implications

This study makes several important theoretical contributions to the field of telemedicine and customer relationship management (CRM). It enhances telemedicine CRM literature by amalgamating service marketing (perceived value, trust, and satisfaction) with healthcare delivery dimensions (service quality, technology quality, accessibility, and personalisation) to propose a holistic model elucidating patient behavioural outcomes in digitally mediated care. The study emphasises the importance of perceived value as a key mediator in affecting patient acceptance and participation in telemedicine. It extends beyond relationship marketing theory by demonstrating that pleasure and trust serve as moderators that enhance the influence of perceived value on advocacy, engagement, and loyalty, rather than having direct effects. This emphasises how crucial psychological and emotional aspects are in forming enduring patient connections. Third, by placing the framework in an emerging market India, the study advances theory development in a global setting where the adoption of digital healthcare is growing quickly but varies from developed markets in terms of patients' expectations, infrastructure, and affordability. Finally, by tying relationship marketing to healthcare service quality, the study concludes by establishing a connection between telemedicine and CRM. It shows how digital personalisation, consistent service, and trust-building techniques can promote enduring patient-provider relationships in virtual care environments.

5.2. Managerial Implications

Personalisation had the highest impact on perceived value of all antecedents studied. Telemedicine providers should use focused techniques (health reminders and treatment programs) to make patients feel appreciated and acknowledged, resulting in increased loyalty. Since technical efficiency contributes to effective service delivery, patients value prompt responses, empathy, and meaningful communication. As a result, training healthcare providers to be empathic and responsive during virtual consultations is just as important as assuring platform accuracy. Trust increases the link between perceived value and patient outcomes; telemedicine platforms must prioritise transparency, security of data, and meeting healthcare standards. Trust verification, secure payment platforms, and clear details about prices may boost patients' confidence. Satisfied patients are more inclined to contribute actively and make positive references. To avoid churn, managers should regularly evaluate satisfaction using post-consultation surveys and feedback methods, and address unhappy workers swiftly. Accessibility, while less important than personalisation, is vital for inclusivity, especially in rural and suburban Areas. Providers must include vernacular language support, low-bandwidth features, and cost-effective pricing techniques to get wider acceptance. According to the results, telemedicine companies should focus not only on technology development but also on strategic CRM, which includes incorporating patient relationship management into workflows, to sustain long-term success.

6. Conclusion, Limitations & Future Research Directions

6.1. Conclusions

The study developed a telemedicine CRM framework that includes service quality, technology quality, accessibility, and personalization as antecedents of perceived value, with trust and satisfaction as moderators, and LOY, ENG, and WOM as outcomes. The results underscore the centrality of perceived value in driving long-term customer relationships in telemedicine, while highlighting the amplifying effects of trust and satisfaction. The findings contribute to both theory and practice. Theoretically, they extend relationship marketing and healthcare service research by positioning perceived value as a core mediator and demonstrating how trust and satisfaction reinforce patient behavioral outcomes. Practically, the results emphasize the need for telemedicine providers to enhance personalization, build trust, and sustain satisfaction to achieve patient loyalty and advocacy.

6.2. Limitations:

Data are collected from digitally literate and limited geographical reasons patients in India. This limits the generalizability and other cultural contexts. The study employed a single survey. Longitudinal studies are needed to understand how patient loyalty and engagement evolve. PV, TRU, and SAT may be subject to response bias or social desirability effects. While the model captured key CRM dimensions, other relevant factors such as provider reputation, regulatory environment, or perceived risk were not included.

6.3. Future Research Directions

Further Study focusing on Trust, satisfaction, and loyalty can change over time using telemedicine; it will provide insights into long-term relationships. comparative studies can be conducted on different geographical regions to analyze the levels of trust, satisfaction, and loyalty among their populations. Other aspects, such as perceived risk and security concerns, might be incorporated into a broader CRM framework. More detailed patient comments can be obtained by combining surveys and casual discussions, especially when it comes to the emotive and personalised components of the digital treatment system. telemedicine's ability to bridge healthcare gaps. Studies concentrating on remote, underprivileged, and marginalised communities will offer valuable insights for inclusive healthcare policies.

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