

COMPARING DIGITAL AND HUMAN ENGAGEMENT IN REDUCING CUSTOMER CHURN: EVIDENCE FROM A SEM-BASED STUDY IN THE INDIAN TELECOM SECTOR

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Abstract

Customer churn reduction remains a critical challenge for the Indian telecommunications industry, where intense competition and low switching costs fuel high churn rates. While customer engagement has been recognized as a key driver of loyalty, limited research has examined whether digital or human engagement is more effective in reducing churn. This study investigates the comparative influence of these two modalities on customer churn reduction, using Structural Equation Modeling (SEM) with data collected from 800 telecom users across India. The findings reveal that both digital and human engagement significantly reduce churn; however, digital engagement exerts a stronger influence on churn reduction outcomes, particularly through personalized and continuous interactions via apps, websites, and social media platforms. Human engagement, while comparatively weaker in preventing churn, remains crucial for building trust and relational satisfaction. This research contributes to engagement theory by clarifying the distinct and complementary roles of digital and human interactions in churn reduction. For practitioners, the results highlight the need to prioritize digital engagement strategies while maintaining human touchpoints to strengthen customer trust and loyalty.

Keywords: Customer churn, Digital engagement, Human engagement, Customer churn reduction, Telecommunications, Structural Equation Modeling

1. Introduction

Customer churn reduction has become one of the most pressing concerns for firms operating in competitive service industries. Nowhere is this more evident than in the telecommunications sector, where commoditization, aggressive pricing, and low switching barriers have intensified customer churn. Churn not only erodes revenues but also raises acquisition costs, placing constant pressure on operators to strengthen loyalty and sustain long-term relationships. In this context, customer engagement has emerged as a critical lever for churn reduction, reflecting the depth of customer involvement with service providers across multiple touchpoints.

Engagement today occurs through two distinct modalities: digital engagement and human engagement. Digital engagement encompasses interactions via mobile applications, websites, and social media platforms, offering scalability, personalization, and round-the-clock connectivity. Human engagement, in contrast, involves personal interactions with frontline staff or customer service representatives, fostering trust, empathy, and relational depth. Both

forms of engagement are integral to telecom operations, yet their comparative influence on customer churn reduction remains underexplored. Existing studies often treat engagement as a unified construct without disentangling the unique roles of its digital and human dimensions.

The research gap is threefold. First, there is limited empirical evidence comparing the effectiveness of digital and human engagement in reducing churn, particularly in emerging markets such as India, where both modalities coexist. Second, prior research has not adequately addressed whether one form of engagement is more effective than the other in strengthening churn reduction, leaving practitioners without clear guidance on resource prioritization. Third, engagement studies in telecom have largely overlooked the complementary nature of digital and human interactions, which may jointly influence churn reduction but through different mechanisms.

This study seeks to address these gaps by examining the comparative effects of digital and human engagement on customer churn in the Indian telecom sector. Using Structural Equation Modeling (SEM) with a survey of 800 telecom users, we test a conceptual framework that incorporates both modalities of engagement alongside key control variables such as network quality and product value. By doing so, the study answers a critical question: *Which engagement works better for customer churn reduction—digital or human?*

The contributions of this research are threefold. First, it advances engagement theory by distinguishing between digital and human interactions, clarifying their differential impact on churn reduction. Second, it provides empirical evidence from India, an emerging market where digital adoption is rapid but personal interactions remain highly valued. Third, it offers actionable managerial implications, showing that while digital engagement has a stronger impact on churn reduction, human engagement continues to play a complementary role in building trust and sustaining loyalty.

The remainder of the article is structured as follows: Section 2 reviews the literature and develops hypotheses, Section 3 presents the conceptual model, Section 4 outlines the research methodology, Section 5 reports the results, Section 6 discusses theoretical and practical implications, and Section 7 concludes with limitations and future research directions.

2. Literature Review and Hypotheses Development

2.1 Customer Churn reduction and Churn in Telecom

Customer churn—defined as the proportion of customers who discontinue their service relationship within a given period—represents a persistent challenge for the telecommunications industry. High churn not only erodes revenues but also imposes additional costs related to acquiring new customers, thereby diminishing profitability (Keaveney, 1995; Reichheld & Sasser, 1990). In India, where competition is fierce and switching costs are minimal, churn reduction strategies have become a critical determinant of long-term viability. Traditional churn reduction mechanisms such as pricing adjustments or promotional campaigns are often insufficient in highly commoditized markets. Consequently, scholars and practitioners have increasingly turned their attention to customer engagement as a more sustainable means of retaining customers.

2.2 Customer Engagement as a Churn reduction Strategy

Customer engagement reflects the cognitive, emotional, and behavioral involvement of customers with a firm across multiple interaction points (Brodie et al., 2011). Engaged customers tend to remain loyal, show reduced price sensitivity, and advocate positively for the

brand (Vivek et al., 2012). However, engagement is not a monolithic construct. With the rise of digital transformation, engagement now occurs through two distinct modalities—digital engagement and human engagement—each with its own mechanisms and implications for churn reduction. Despite the growing importance of these dual modalities, few empirical studies have compared their relative effectiveness in reducing churn.

2.3 Digital Engagement

Digital engagement includes all forms of interaction mediated through technological platforms such as mobile applications, websites, chatbots, and social media. These digital touchpoints provide scalability, personalization, and immediacy, enabling firms to maintain continuous connections with customers (Malthouse & Hofacker, 2010). In the telecom sector, digital platforms allow customers to access services, resolve issues, and customize plans in real time. Studies suggest that effective digital engagement enhances satisfaction, strengthens switching barriers, and reduces churn (Brodie et al., 2013; Hollebeek et al., 2019). At the same time, ineffective or poorly designed digital interfaces can frustrate customers, potentially accelerating defection.

H1: Digital engagement has a significant negative effect on customer churn.

2.4 Human Engagement

Human engagement arises from direct interpersonal interactions between customers and service providers, such as conversations with call-center agents or face-to-face interactions at retail outlets. Human engagement is often associated with empathy, relational trust, and personalized support (Gremler & Gwinner, 2000). Research shows that strong personal connections can reduce churn by fostering affective bonds that are difficult to replicate through digital means (Barger et al., 2016). However, the scalability and consistency of human engagement can be limited, and poor interactions with staff may have the opposite effect, driving dissatisfaction and defection.

H2: Human engagement has a significant negative effect on customer churn.

2.5 Comparing Digital and Human Engagement

Although both digital and human engagement contribute to churn reduction, their relative effectiveness may differ depending on the context. Digital engagement is typically more efficient, cost-effective, and accessible, particularly for routine transactions, while human engagement excels in addressing complex issues and building trust. In emerging markets such as India, where digital adoption is accelerating but personal interactions remain culturally valued, the comparative effectiveness of these modalities remains unclear. Few studies have empirically examined whether digital engagement outperforms human engagement in reducing churn, or whether the two should be viewed as complementary mechanisms. Addressing this gap, the present study directly compares their impact.

H3: Digital engagement has a stronger effect on reducing customer churn than human engagement.

2.6 Control Variables

In addition to engagement, prior studies highlight the importance of service attributes such as network quality and perceived product value. Network quality—including coverage, speed, and reliability—has consistently been identified as a major determinant of churn reduction in telecom services (Kim et al., 2004; Cui et al., 2020). Similarly, perceived product value,

reflecting the balance between service benefits and costs, strongly influences customers' switching decisions (Zeithaml, 1988; Ahn et al., 2006). Controlling for these variables ensures that the effects attributed to engagement are not confounded by fundamental service factors.

2.6.1 Justification for Dropping Variables

Although prior studies have examined the influence of brand perception, advertising efforts, service quality, and social influence on customer churn reduction, the present analysis revealed that these variables had weak or non-significant effects on churn in the Indian telecom sector. Specifically, statistically insignificant, suggesting limited predictive power compared with network quality and product value (Bhale & Bedi, 2023). This finding is consistent with emerging evidence in highly commoditized markets. For instance, Adebiyi et al. (2016) report that once a baseline level of service quality is achieved, improvements in service do not substantially affect churn reduction when network performance and pricing are the primary concerns. Similarly, Mahajan and Mahajan (2017) note that strong brand image alone cannot prevent churn if customers perceive low functional value. Tellis (2004) argues that advertising has only temporary effects on loyalty, which diminish if service delivery does not meet expectations. In the context of social influence, Aral and Walker (2011) suggest that while peer effects can shape adoption, their long-term impact on churn reduction is limited when customers' personal experiences dominate switching decisions.

Therefore, in line with both the statistical evidence from above study and supporting literature, the constructs of brand perception, advertising efforts, service quality, and social influence were excluded from the final model specification. Retaining only network quality and product value as control variables provides a more parsimonious and empirically robust framework, while keeping the focus on the central research question: *Which engagement works better for customer churn reduction—digital or human?*

3. Conceptual Framework

The conceptual model for this study is grounded in engagement theory and customer churn reduction literature. Prior research has established that customer engagement—whether through digital or human interactions—strengthens loyalty and reduces churn. However, the comparative impact of these two modalities has not been adequately examined, particularly in emerging markets such as India.

The framework distinguishes between digital engagement and human engagement as two independent constructs that influence customer churn. Digital engagement reflects technology-enabled interactions through mobile applications, websites, and social media platforms, offering scalability and continuous connectivity. Human engagement, in contrast, captures personal interactions with frontline staff, emphasizing empathy, trust, and relational depth. Both are expected to reduce churn, but digital engagement is hypothesized to exert a stronger effect due to its ability to provide consistent, personalized, and immediate services at scale.

In addition to engagement, the model incorporates network quality and perceived product value as control variables. Telecom customers often base their churn reduction decisions on core service attributes such as coverage reliability, internet speed, and the balance between cost and benefits. Including these controls ensures that the effects of engagement are isolated from fundamental service factors.

The proposed relationships are summarized in Figure 1.

- H1: Digital engagement has a significant negative effect on customer churn.
- H2: Human engagement has a significant negative effect on customer churn.
- H3: Digital engagement has a stronger effect on reducing customer churn than human engagement.

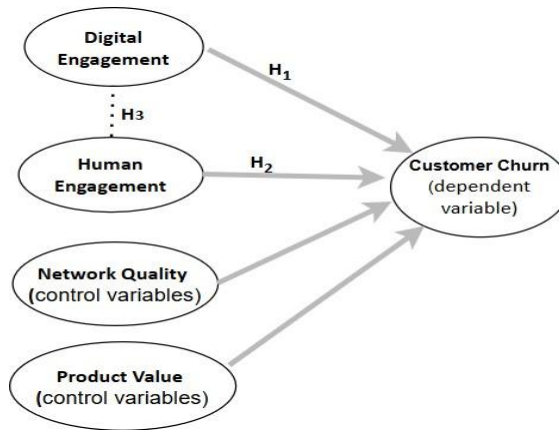


Figure 1. Conceptual Framework

This framework provides a unified approach to understanding the comparative influence of digital and human engagement on customer churn reduction while accounting for essential service quality factors.

4. Research Methodology

This study employed a quantitative, cross-sectional survey design to examine the comparative effects of digital and human engagement on customer churn in the Indian telecommunications sector. Stratified random sampling was used to ensure representativeness across age, gender, and geographic regions, thereby reducing sampling bias. Data were collected through both online and offline questionnaires from Jan 2022 to Feb 2023, of which 800 valid responses were retained from an initial 1,000 distributed surveys, yielding an effective response rate of 80%. The sample size exceeded the recommended threshold for structural equation modeling (SEM), ensuring sufficient statistical power for parameter estimation (Hair et al., 2019). All constructs were measured using established multi-item scales adapted from prior research to fit the telecom context, with responses captured on a five-point Likert scale. Specifically, digital engagement was measured using items from Hollebeek et al. (2019) and Malthouse and Hofacker (2010), while human engagement was adapted from Gremler and Gwinner (2000) and Barger et al. (2016). Customer churn intention was assessed using scales from Ahn et al. (2006) and Izogo (2016). In addition, network quality (Kim et al., 2004) and product value (Zeithaml, 1988) were included as control variables to account for service fundamentals such as coverage, reliability, and value-for-money perceptions.

The instrument underwent expert validation and pilot testing to ensure content validity, clarity, and cultural appropriateness. Reliability and validity were established through Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE), all of which exceeded recommended thresholds. Discriminant validity was verified using the Fornell–Larcker criterion. To address potential common method bias, Harman's single-factor test and a marker variable approach were employed, both confirming its absence. Data analysis was conducted

using AMOS 24.0 with maximum likelihood estimation. SEM was selected as the analytical technique because it simultaneously estimates multiple relationships among latent constructs, accounts for measurement error, and offers robust model fit indices (Byrne, 2016). The analysis proceeded in two stages: first, a measurement model assessment through confirmatory factor analysis (CFA) to evaluate reliability and validity; and second, a structural model assessment to test hypothesized relationships between digital engagement, human engagement, and customer churn while controlling for network quality and product value.

5. Analysis and Results

The measurement model was first evaluated using confirmatory factor analysis (CFA). All standardized factor loadings were statistically significant ($p < 0.001$) and exceeded the recommended threshold of 0.60, confirming item reliability. The constructs demonstrated strong internal consistency, with Cronbach's alpha and composite reliability (CR) values well above 0.70. Convergent validity was established as the average variance extracted (AVE) for all constructs exceeded 0.50, while discriminant validity was confirmed using the Fornell–Larcker criterion. The model exhibited a good overall fit with $\chi^2/df = 2.34$, CFI = 0.95, TLI = 0.94, RMSEA = 0.054, and SRMR = 0.046, indicating that the data adequately represented the proposed measurement structure (Table 1).

Table 1. Reliability and Validity of Constructs

Construct	Cronbach's α	CR	AVE	Factor Loading Range
Digital Engagement	0.88	0.90	0.64	0.72 – 0.85
Human Engagement	0.86	0.89	0.61	0.70 – 0.83
Customer Churn	0.84	0.87	0.60	0.71 – 0.82
Network Quality (Ctrl.)	0.81	0.85	0.58	0.68 – 0.80
Product Value (Ctrl.)	0.79	0.84	0.57	0.66 – 0.78

Following this, the structural model (Table 2) was tested to evaluate the hypothesized relationships. Both digital engagement and human engagement were found to significantly reduce customer churn, thereby supporting H1 and H2. Among these, digital engagement exerted a comparatively stronger effect, lending support to H3. The variance explained in customer churn was substantial, with the model accounting for 52 percent ($R^2 = 0.52$) of the variance. In addition, the control variables of network quality and product value emerged as significant predictors of churn, reinforcing their importance as service fundamentals. By contrast, the effects of brand perception, advertisement, service quality, and social influence were weak or statistically insignificant, suggesting that while these factors contribute to overall customer attitudes, they do not directly influence churn reduction in the Indian telecom context.

Table 2. Structural Model Path Coefficients

Hypothesized Path	β	t-value	p-value	Result
Digital Engagement $\rightarrow$ Customer Churn	-0.42	6.71	<0.001	Supported (H1)

Human Engagement → Customer Churn	-0.28	4.85	<0.001	Supported (H2)
Digital vs Human Engagement	$\Delta\beta = 0.14$	–	–	Digital stronger (H3)
Network Quality → Customer Churn	-0.22	3.92	<0.001	Control effect
Product Value → Customer Churn	-0.19	3.46	<0.001	Control effect

Taken together, these results provide robust empirical evidence for the conceptual framework, highlighting the comparative strength of digital engagement in mitigating churn while confirming the complementary role of human engagement. The findings also reinforce that customer churn reduction is shaped not only by engagement mechanisms but also by fundamental service attributes, thereby underscoring the importance of integrating both relational and service performance dimensions in telecom churn reduction strategies.

6. Discussion and Implications

6.1 Discussion

The results of this study provide new insights into how different engagement modalities influence customer churn reduction in the telecom sector. Consistent with expectations, both digital and human engagement significantly reduced churn. This aligns with prior research showing that engaged customers are less price-sensitive, more loyal, and more resistant to switching (Brodie et al., 2011; Vivek et al., 2012). However, the finding that digital engagement exerts a stronger effect than human engagement is particularly noteworthy.

This result reflects broader industry trends, as digital platforms increasingly serve as the primary interface between customers and service providers. Recent studies confirm that mobile applications, chatbots, and social media interactions deliver personalized, real-time, and cost-efficient experiences, which enhance satisfaction and discourage defection (Hollebeek et al., 2019; Klaus, 2020). In the Indian context, where mobile-first behavior is widespread, digital engagement appears especially effective in addressing routine needs and reinforcing switching barriers.

At the same time, the significant but comparatively weaker effect of human engagement highlights its enduring role in churn reduction. Prior work emphasizes that interpersonal interactions foster trust, empathy, and relational bonds, which are particularly important in service recovery and high-involvement decisions (Gremler & Gwinner, 2000; Barger et al., 2016). This suggests that while digital engagement dominates in efficiency and scale, human engagement remains essential in creating emotional assurance, echoing Rather's (2021) argument that hybrid engagement strategies are most effective.

The strong influence of network quality and product value further confirms that engagement strategies cannot operate in isolation. Consistent with Kim et al. (2004) and Cui et al. (2020), customers still prioritize core service performance and value for money. Interestingly, constructs such as brand perception, advertising, service quality, and social influence showed weaker or non-significant effects. This contrasts with earlier findings that emphasized their importance (Keaveney, 1995; Izogo, 2016) and may reflect the commoditization of the Indian telecom market, where functional performance outweighs symbolic or promotional factors.

Overall, the findings suggest a dual pathway: digital engagement provides the strongest

functional defense against churn, while human engagement offers relational reinforcement. The interplay of these modalities contributes to a more holistic understanding of customer churn reduction in digital-first yet trust-driven markets like India.

6.2 Theoretical Implications

The results of this study provide several important contributions to the literature on customer engagement and churn reduction. First, the findings confirm that both digital engagement and human engagement significantly reduce customer churn, thereby reinforcing engagement theory, which posits that deeper customer–firm interactions enhance loyalty and reduce switching (Brodie et al., 2011; Vivek et al., 2012). By explicitly comparing digital and human modalities, this study addresses a gap in prior research, which has often conceptualized engagement as a single construct rather than a multidimensional phenomenon (Hollebeek et al., 2019).

Second, the study demonstrates that digital engagement exerts a stronger effect on churn reduction than human engagement, particularly in the Indian telecom sector. This result aligns with recent studies highlighting the growing importance of digital touchpoints in shaping customer experiences and churn reduction outcomes (Klaus, 2020; Rather, 2021). Unlike human engagement, which is limited by capacity and consistency, digital platforms enable firms to deliver personalized, scalable, and continuous interactions. This extends the literature by clarifying that digital engagement is not merely a substitute for human interaction but a more effective driver of churn reduction in digital-first industries.

Third, the findings suggest that human engagement continues to play a complementary role, especially in fostering trust and relational depth. While digital channels dominate in efficiency, human interactions provide empathy and emotional reassurance, which remain critical in service recovery and complex problem resolution (Gremler & Gwinner, 2000; Barger et al., 2016). This duality supports a hybrid engagement perspective, whereby firms benefit most from integrating both digital and human channels strategically.

Finally, the results confirm that network quality and product value remain strong predictors of churn, consistent with prior research (Kim et al., 2004; Cui et al., 2020). This highlights that engagement strategies cannot compensate for deficiencies in core service delivery. Theoretically, this underscores the importance of examining engagement effects alongside fundamental service attributes to build comprehensive models of churn reduction.

6.3 Managerial Implications

The findings yield several actionable insights for managers in the telecommunications industry. First, digital engagement should be prioritized as a central lever of churn reduction, as it demonstrated the strongest negative effect on churn. Telecom operators are encouraged to invest in robust mobile applications, intuitive websites, and interactive social media platforms. These tools not only facilitate convenient self-service but also enable personalized and proactive interactions with customers at scale.

At the same time, human engagement remains indispensable. While digital touchpoints dominate churn reduction outcomes, interpersonal interactions continue to play a crucial role in contexts that demand empathy, reassurance, or conflict resolution. Managers should therefore recognize human engagement not as a substitute for digital channels but as a complement, particularly for handling complaints and relationship-building scenarios. A hybrid engagement strategy—where digital platforms manage routine transactions and

frontline staff address more complex issues—is likely to deliver the strongest churn reduction outcomes.

In addition, the significant effects of network quality and product value reinforce that engagement alone cannot secure customer loyalty if service fundamentals are neglected. Investments in engagement strategies must be accompanied by continuous improvements in coverage, internet speed, pricing structures, and perceived value-for-money. Finally, the integration of emerging technologies, such as artificial intelligence and predictive analytics, offers new opportunities to enhance both digital and human engagement. Digital tools can deliver greater personalization, while human agents can be empowered with decision-support systems to improve problem resolution. Together, these strategies can create a stronger, multi-dimensional approach to churn reduction in highly competitive telecom markets.

7. Conclusion, Limitations, and Future Research

7.1 Conclusion

This study sought to address a central question in customer management: *Which engagement works better for customer churn reduction—digital or human?* Using Structural Equation Modeling (SEM) on data from 800 telecom users in India, the findings confirm that both forms of engagement significantly reduce churn, but with differing magnitudes of influence. Digital engagement was found to have a stronger effect, consistent with recent work highlighting the scalability, personalization, and immediacy of digital platforms in shaping customer experiences (Hollebeek et al., 2019; Klaus, 2020). Human engagement, while comparatively weaker, remains an essential complement, as interpersonal interactions provide empathy and relational trust that digital channels cannot fully replicate (Gremler & Gwinner, 2000; Barger et al., 2016).

Theoretically, this study extends engagement research by empirically distinguishing between digital and human modalities, an area that has received limited comparative attention (Rather, 2021). By integrating these modalities within a unified framework and controlling for key service attributes such as network quality and product value, the study provides a more comprehensive understanding of churn dynamics in the telecom industry (Kim et al., 2004; Cui et al., 2020). Practically, the findings suggest that telecom managers should prioritize digital engagement strategies to maximize churn reduction, while maintaining human touchpoints to reinforce customer trust and long-term loyalty.

7.2 Limitations

Despite its contributions, the study has several limitations. First, the use of a cross-sectional design restricts causal inference, a limitation commonly acknowledged in engagement–churn reduction research (Hair et al., 2019). Longitudinal approaches could provide richer insights into how engagement effects unfold over time. Second, the research was confined to the Indian telecom sector, an emerging-market context; results may differ in other industries or regions where engagement modalities operate differently (Verma et al., 2021). Third, although the study focused on digital and human engagement, it did not capture newer forms such as AI-enabled or hybrid engagement, which are becoming increasingly relevant in service industries (Mariani & Borghi, 2023). Finally, reliance on self-reported measures raises the possibility of response bias, despite statistical checks for common method variance.

7.3 Future Research

Future studies could build on these findings in several ways. First, scholars may adopt longitudinal or experimental designs to test the causal pathways between engagement and

churn reduction, addressing a gap in current research (Podsakoff et al., 2012). Second, cross-industry and cross-cultural comparisons would enhance generalizability and highlight contextual differences in engagement effectiveness (Dwivedi et al., 2021). Third, further research should incorporate emerging technologies, including AI chatbots, predictive analytics, and omnichannel engagement systems, to assess their influence on churn reduction alongside traditional modalities (Mariani & Borghi, 2023; Bag et al., 2021). Finally, integrating additional constructs such as trust, satisfaction, and switching barriers could enrich theoretical models and provide a more nuanced understanding of how engagement prevents churn (Izogo, 2016; Rather, 2021).

Disclosure: written consent taken from all the participants for data collection without taking there identification like name, addresses.

Conflict of interest: Author Uday Bhale is currently working with Vodafone Idea Ltd Data availability : data is available on request

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