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THE ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING CUSTOMER EXPERIENCE AND DROPPING CUSTOMER CHURN IN TAMILNADU TELECOMMUNICATIONS SERVICES

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Abstract

Artificial Intelligence (AI) can be used to improve customer experience and decrease customer churn in Tamil Nadu telecommunications industry. As the use of AI technologies becomes widespread, such as predictive analytics, automated customer support and chatbots, telecom service providers strive to enhance the service efficiency and customer engagementhas been examined in this paper. However, the extent to which AI significantlyinfluences customeroutcomes remains unclear. To address this gap, this study focuses on analyzing the relationships between Artificial Intelligence, Customer Experience, Customer Satisfaction, Customer Loyalty and Customer Churn using Structural Equation Modeling (SEM). Stratified random sampling and Purposive sampling method has been used to collect data from 300 telecom users by structured questionnaire and the obtained data were analyzed through SPSS and AMOS. The artificial intelligence does not have a significant direct role in customer experience, customer satisfaction, and customer churn. It is observed that there is a negative correlation between AI and customer loyalty meaning that excessive automation can decrease emotional engagement and trust, suggesting that pricing, network quality, and competitive services among other external factors in addition to AI alone affect customer churn. These results highlight that AI is an indirect and contingent facilitator and not a direct customer churn determinant. The study conclude that telecom providers should choose an intermediate strategy integrating AI and human centric service strategies to improve unique customer experience and minimize retention rates. The study has a theoretical and practical implication as it redefines the role of AI in the telecom sector and so the necessity of the implementation framework being more comprehensive and customer-focused.

Keywords: Artificial Intelligence, Customer Experience, Customer Satisfaction, Customer Loyalty, Customer Churn, Tele Communications.

Background of the Study

Telecommunications environment today is witnessing rapid transformation due to digital revolution and evolving customer expectations in the competitive markets of Tamil Nadu. Technology is the backbone of growth and customer satisfaction in the telecommunication industry. With customer acquisition costing more than customer retention, service providers are compelled to focus on building long-term relationships and provide quality of service(Li & Deng. 2012). Artificial Intelligence has emerged as a catalyst for technology-led innovation, efficiency and customer-centric service delivery in the industry(Coussement et al., 2014). The technologies that are currently most discussed in the domain of AI are machine learning, natural language processing and predictive analytics(Ahmed & Maheswari, 2017). These technologies process vast amounts of customer data to identify behavioral patterns and deliver customized, real-time services to customers(Seo et al., 2008). There are numerous AI-powered

applications which have brought about paradigm shift in customer interaction. Chatbots and virtual assistants are increasingly being adopted by services providers across the world to provide immediate, reliable and seamless 24/7 customer service through various channels such as social media, messaging apps, web portals and mobile apps(Le et al., 2013). (Eriksson & Vaghult. 2000)clearly indicate that these applications have made it possible for service providers to deliver immediate and ubiquitous services and provided customers seamless omnichannel experience. Moreover, AI has the potential to deliver superior customer experience and boost customer satisfaction by enabling service providers to shift from a reactive to a proactive service model. Predictive maintenance and resolution, proactive service offers and customer engagement are some of the services that AI has made possible in the telecommunications industry. These services are imperative in the current competitive environment where conventional service delivery models are unable to cope up with the emerging challenges of speed, reliability and customer-centricity.

Increased customer experience in pursuit to customer satisfaction has become a competitive priority for companies. Customer turnover in the telecommunications industry has, indeed, been a "thorn in the flesh" affecting revenue and profitability(Daqar & Smoudy. 2019). However, traditional models used for predicting customer churn in the telecommunications sector have proven to be less effective in today's competitive communications market. (Faris et al., 2014) stated that artificial intelligence-powered predictive analytics have become the popular tool for the "telecoms industry to identify potential churners based on unique usage patterns, bill information and other interactions with service." State-of-the-art machine learning algorithms like Random Forests, Support Vector Machines and Artificial Neural Networks have been shown to outperform traditional statistical techniques in predicting churn. Moreover, such a combination of predictive models with customer relationship management system helps companies to design specific retention logic, which in turn may include offering customized promotions and active engagement. In a market like Tamil Nadu, there exists a heterogeneous mass of customers with different profiles, varying levels of digital literacy and intense competition amongst telecom players. It is thus crucial to understand how AI affects customers on the following constructs such as AI adoption, service quality, customer experience, customer satisfaction and customer churn(Senthilselvi et al., 2024; Mustafa et al., 2021). The study aims to examining model that explores the relationship between AI adoption and customer experience, customer satisfaction and customer churn in the telecommunications industry. The study also intend to critically examine the common belief that AI has a positive, direct and homogenous effect on customer experience and customer retention. (Thanam et al., 2024) suggest that the correlation might be indirect, and influenced by service quality and customer perception towards AI. The effect might also vary depending on several contextual variables such as user readiness, trust and organizational readiness. Hence, it is important to come up with empirically-based models that can explain both the direct and indirect effects within a single structural framework. The study thus seeks to make contribution to both theory and practice by investigating how AI is currently used in the telecommunications industry to influence customer experience and retention in Tamil Nadu. Moreover, the study will employ a systematic approach in order to provide an in-depth analysis of how AI-based practices can affect customer perceptions and behavioral intentions leading to customer churn.

Review of Literature

Artificial Intelligence (AI) is a disrupting technology in the telecom sector, as it makes it possible to automate several processes, gain insights from forecasting analytics and make intelligent decisions. In order to become more competitive, Telecom operators are adopting AI technologies such as Machine Learning, Natural Language Processing and big data analytics for making their operations more efficient

and to deliver better customer experience through intelligent interactions. The main application of AI in telecom sector is dynamic resource planning, fault detection, and predictive maintenance to enhance the efficiency of the network and the speed of service delivery(Patil et al., 2025). Furthermore, it has also enabled the adoption of artificial intelligence (AI) powered systems such as chatbots and virtual assistants which have the capability to provide instantaneous, instantaneous, and cost-effective customer support 24/7, dealing with a large volume of interactions. Empirical evidence reveals that AI-based automation is significantly contributing to enhance quality of customer interactions, and reducing the costs of operations.

Telephone services are very much a service industry and as such customer satisfaction must be a high priority. The introduction of AI technology in the telecommunications industry has enabled a much higher quality of service to be delivered to customers than was previously possible(Ranaweera & Prabhu, 2003). By processing large amounts of customer data AI technology is able to identify trends and, importantly, deliver customized services to customers; an innovation that is perceived by customers as adding value to their service.Research has revealed that AI-based automation enhances the efficiency of services by minimizing latency, network downtime, and service delivery uniformity (Sangeetha & Subatra, 2023).Also, AI-based chatbots make a contribution to the quality of the service by providing 24/7 customer care, multilinguality, and accelerated problem-solving.These changes are in line with the SERVQUAL dimensions, especially the responsiveness and assurance which are paramount to customer satisfaction.Moreover, predictive analytics helps telecom providers to preempt service interruptions and preclude customer problems in advance, which increases reliability and trust.Such an active model is a change in the old reactive service models to a predictive and preventive service management model (Gurung et al., 2024).

The concept of customer experience is the totality of perception of the customers in regards to their interaction with a service provider.Customer experience in telecommunication is one of the main factors that influence the high service quality (Chang et al., 2024).AI technologies can help customers experience a seamless, personalized and consistent interaction with the company, across a variety of touchpoints.According to the research, AI-powered personalization is able to significantly improve customer experience, as the services are now adjusted to their preferences and usage patterns (Eklof et al., 2020).An example of this is that recommendation systems and usage-based plans enhance the perceived value and that AI-based customer support is fast and responsive in answering customer questions.Also, the use of AI in the omnichannel between mobile applications, websites, and social media platforms forms a consistent and integrated customer experience (Wu, 2024).This frictionless customer experience omnichannel approach increases overall experience.The fact that AI can process real-time data and give context-sensitive solutions also reinforces its importance in enhancing customer experience.

A very important consequence of the positive customer experience is customer satisfaction.It shows how the expectation of the customers is satisfied or surpassed.AI technologies impact on the satisfaction indirectly by increasing the quality of the services and customer experience (Balaji & Senthilkumar. 2024).Empirical research shows that AI-based services, in particular, chatbots and personalized recommendations, have a positive effect on customer satisfaction through better perceived usefulness and ease of use (Ahmed & Kumar. 2025).All these aspects of the Technology Acceptance Model that describes how users adopt technology depending on the perceived benefits and usability.Additionally, AI-based systems decrease the queuing time, increase the quality of issues resolution, and offer a good level of service quality, which in turn leads to increased customer satisfaction rates (Babu & Durai,

2025).Emotional engagement and perceived value increase even further with the possibility of AI to provide personalized and context-aware services, which results in more significant customer satisfaction.

In the telecommunications sector, customer retention is one of the key performance indicators and customer churn has a direct impact on revenue and profitability.Satisfied consumers are less willing to change service providers thereby customer satisfaction is an important factor of retention (Kunal et al., 2023).Studies have pointed out that service quality, pricing, and customer interaction during service are some of the factors that impact customer churn (Venkatesh & Jeyakarthic, 2023).AI has a central role in minimizing churn by facilitating proactive customer treatment and predictive analytics (Yamini et al., 2024).Machine learning algorithms such as the Random Forest and Support Vector Machines have proven to be accurate in predicting at-risk customers who can be targeted to be retained by the companies through specific retention strategies.Moving on from customer analytics, for organisations that want to take the next step with their customers, AI-powered Customer Relationship Management systems not only aid in predicting a potential risk or a chance to retain a customer but also translates that into action thereby enhancing the retention process (Seethalakshi & Varsha, 2024). Telecom service providers can leverage such systems to offer personalisation, proactively address customer concerns, foster relationships, expand engagement, and promote loyalty – all leading to higher retention rates and lower churn in the long run, as has been depicted in research (Banik & Sinha, 2020).

The literature that was reviewed validates a chronological and interconnected model that connects AI technologies with customer retention outcomes.AI is the enabling tool which improves the quality of service by automating, personalizing, and predicting.Better service quality, in its turn, results in the better customer experience, as it guarantees efficient and smooth interactions (Fujo et al., 2022).Customer satisfaction leads to retention and reduces churn, which is achieved by a positive customer experience.This causal route is aligned with the current theoretical frameworks, which highlight the importance of technology in the formation of customer perceptions and behavior.Although empirically, there is a lack of empirical validation of this integrated framework in regional settings like Tamil Nadu despite its strong theoretical support.This demonstrates the importance of local research to learn how AI-based service innovations affect customer behavior in a particular market.

Research Methodology

This study investigates the effect of Artificial Intelligence (AI) on enhancing customer experience and reducing customer churn of telecommunication services in Tamil Nadu. As the AI is increasingly adopted by businesses, its outcome is evaluated through users' perception, which is measured using systematic survey techniques similar to the previous empirical studies on technology adoption and customer relationship management. This study targets the business individuals who are consumers of telecom services in different districts of Tamil Nadu as they are more exposed to AI-powered applications and services. Time-Location Sampling (TLS) is applied to collect data from the mobile and heterogeneous telecom services users in Tamil Nadu, as it is an appropriate method to collect data from a wide geographic area by identifying specific places and times at which target respondents are likely to be available. In this study, critical professional locations (such as five business centers, shops, restaurants, malls, IT parks, office spaces, etc.) in and around major cities of Tamil Nadu were visited at specific timings to achieve maximum coverage with minimum scope for sampling bias. Structured questionnaires were developed from previously validated scales on AI adoption, service quality, customer experience and churn behavior to collect primary data for this study.

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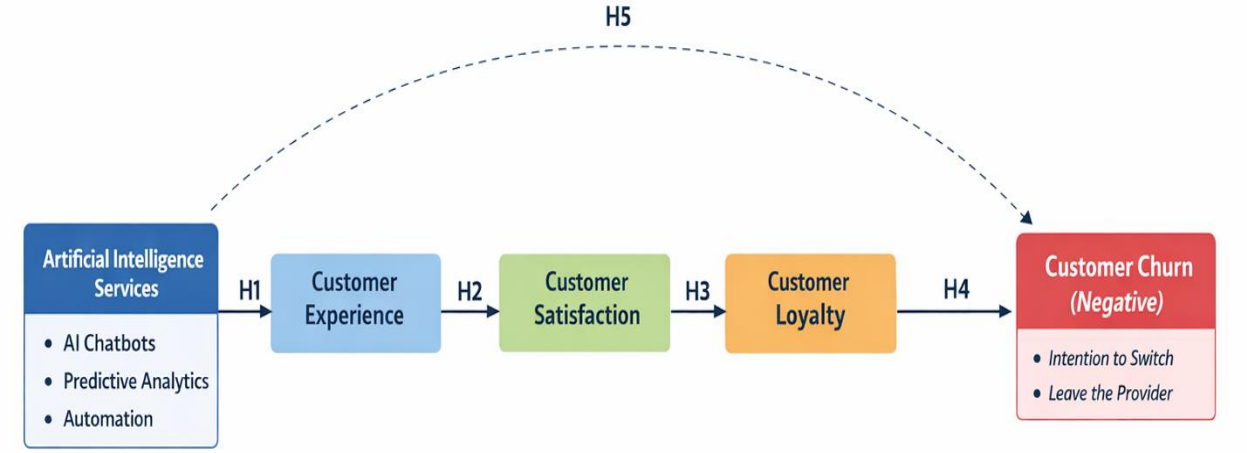


Figure 1: Hypothesized Model

The instrument assessed the main constructs on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), such as AI technologies (chatbots, predictive analytics, personalization), service quality (reliability, responsiveness, assurance), customer experience, customer satisfaction, and customer retention (churn intention).I pre-tested the questionnaire to achieve content validity and clarity, which is a recommended practice of a survey-based research.After screening of the data, 300 valid responses were received and this meets the minimum sample size requirements of multivariate statistical analysis.The analytical model assesses the sequential channel between AI technologies and service quality, customer experience, customer satisfaction and eventually customer retention in agreement with modern AI-CRM integration models within telecommunications studies.Ethics were taken into account strictly, which provided voluntary participation, informed consent, and anonymity of respondents.In general, the methodology employed represents a combination of a well-established research practice and a sample design grounded on a particular setting, which increases the reliability, validity, and generalizability of the results.

Result and Discussion

The demographic analysis shows that there is an equal gender balance with females (48.7) slightly in the majority compared to males (47.7).The balance is also supported by the histogram that shows a symmetrical distribution (Mean = 1.56, SD = 0.566), which means that there is no gender bias within the data.The consistency in both the Table and Figure 1 validates the sample size and its representation to offer AI-enhanced telecommunication services to both genders equally. As mentioned earlier, the objective of including gender was to establish the applicability of AI-based engagement strategies and their adoption, perceived value, etc. across both genders. However, it is interesting to note that gender is not a strong influencer for adoption of AI-based telecom services, etc. The age group of 2030 years (43.3%) was the largest respondents' base, followed by 3040 years (18.3%). As seen in the Histogram (Fig. 2), the sample was young but very diverse with an average of 2.63 years (SD = 1.202). The positive skewness indicates a moderate dispersion. The respondents who engaged with AI-based telecom services comprised of private employees, students, and those from other backgrounds. This is consistent with the findings that users of new technologies, especially AI-powered, are young and are enabled to utilize these technologies efficiently. As mentioned earlier, being accustomed to AI-powered chatbots, mobile apps, and automated customer support systems makes them engage better with such

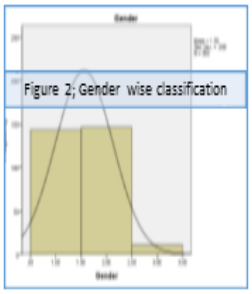
services. They demand these services to be fast, convenient, and efficient which will result in high customer satisfaction and less attrition. This finding is strategic for telecom ecosystems as they will need to focus on enabling digitally savvy users in future. In terms of occupational background, the respondents were private employees (43.3%), students (28.7%), etc.The respective histogram (Mean = 2.45, SD = 1.06) shows that there was a near-normal distribution, which represented diversity within occupational groups.This is an indication that telecom services are designed to serve a very diverse market with diverse professional needs.Given the emphasis placed on busy and active individuals, there is a great need for reliable and efficient telecom services. Features such as AI-powered predictive and automated responses, as well as personalized suggestions, can help to increase levels of customer satisfaction by saving time and delivering a better service experience. These benefits could in turn generate lasting customer loyalty and create a long-term relationship with the customer.Consumer behavior is further placed in the context of income distribution with a large percentage of the respondents between Rs.20,001-40,000 (35.7) and below Rs.20,000 (31.7) income distribution.The histogram (Mean = 2.14, SD = 1.013) shows that there is a concentration in the lower- and middle-income groups.

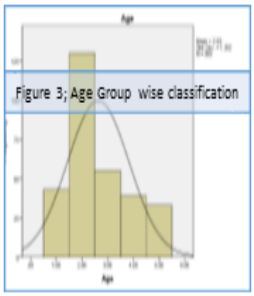
Table 1; Summary of Respondents' Demographic Characteristics Including Gender, Age, Income Level, Telecom Service Provider, and Duration of Service Usage (N = 300)

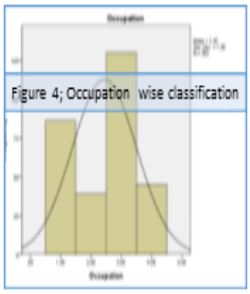
Demographic Profile	Frequency (N=300)	Percent	Demographic Profile	Frequency (N=300)	Percent
Male	143	47.7	Below 20,000	95	31.7
Female	146	48.7	20,001–40,000	107	35.7
Others	11	3.7	40,001–60,000	58	19.3
Below 20 years	43	14.3	Above 60,000	40	13.3
20-30 years	130	43.3	Reliance Jio	126	42.0
30-40 years	55	18.3	Bharti Airtel	81	27.0
40-50 years	39	13.0	Vodafone Idea	56	18.7
Above 50 years	33	11.0	BSNL	37	12.3
Student	86	28.7	Lessthan 1 year	61	20.3
Government Employee	39	13.0	1-3 years	112	37.3
Private Employee	130	43.3	3-5 years	79	26.3
Business	45	15.0	Morethan 5 years	48	16.0

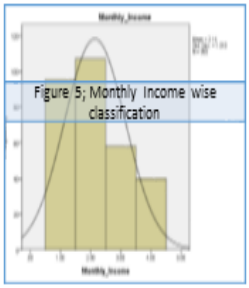
The result illustrates the price sensitivity of the telecom market in Tamil Nadu, where affordability and value of money are key factors that determine customer satisfaction.Here, AI-based customization and cost reduction become critical measures to be taken by service providers.Telecom companies can improve the perceived value and maintain customers that are extremely sensitive to price changes through customization, pricing optimization, and the provision of specific offers.The market structure of telecom service providers shows that the market is dominated by the private service providers with Reliance Jio (42.0) taking the lead, Bharti Airtel (27.0), Vodafone Idea (18.7), and BSNL (12.3) as the leading players.Even though not explicitly indicated by the histogram, the distribution of the general telecom service satisfaction (Mean = 2.01, SD = 1.1) indicates moderate satisfaction with a slight skewness.It suggests that the quality of services offered by different providers is not the same and that the private operators may use AI technologies in a better way to improve the customer experience.Conversely, less performing providers might not be in a position to address the changing

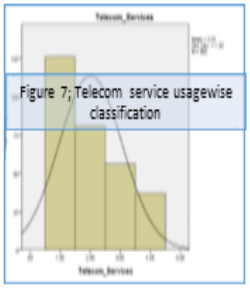
customer expectations, resulting in a difference in the perceived service quality and the risk of churn.Patterns of usage also support the relevance of AI in this respect.Most of the respondents cite 1-3 years (37.3) and 3-5 years (26.3) of service usage, which means average retention level.There is a normal distribution in the history of use frequency (Mean = 2.38, SD = 0.983). This consistent usage pattern is good for AI applications, enabling accurate prediction of customers' needs, proactive service provision and early discovery of the risks of customers' churn.











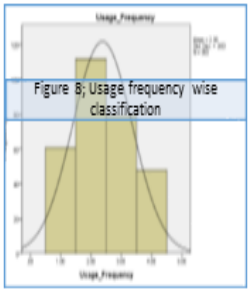


Figure 2–8: Demographic and Usage Profile of Respondents

The combination of demographic and behavioural sources, some key insights come to light about the conditions under which AI is most effective: stable usage, moderate retention and high levels of digital adaptability. The results of the correlation analysis of Artificial Intelligence (AI), Customer Experience (CX), Customer Satisfaction (CS), Customer Loyalty (CL) and Customer Churn (CH) reveal that, while there is a high level of internal consistency in the way AI is conceived, the correlation with customer experience, customer satisfaction and customer loyalty is lower. This suggests that AI is more of an indirect enabler of customer outcomes rather than a direct determinant. The relationship between customer churn and customer loyalty appears to be cascading and influenced by other factors. The results also suggest that the integration of AI with wider service delivery practices needs to be more pronounced in order to have a real impact on customer experience.

Although preliminary, initial evidence indicates strong internal consistency, reliability, and validity for all five measurement constructs, as well as satisfactory factor loadings. However, certain constructs—namely Customer Experience and Customer Churn—appear to be particularly problematic in terms of

internal stability, with both exhibiting low reliability according to benchmark criteria. Consequently, until more stable measures can be established, further research should focus on Customer Satisfaction and Customer Loyalty, which demonstrate greater reliability and promise for advancing the field.

Table 2; Results ofMeasurement Model: Exploratory Factor Loadings, Reliability, and Validity Statistics

	Component				
	Artitificial Intelligence	**Customer Experience**	**Customer Satisfaction**	**Customer Loyalty**	**Customer Churn**
AI1	.918				
AI2	.933				
AI3	.943				
AI4	.940				
AI5	.941				
AI6	.925				
CS1			.938		
CS2			.949		
CS3			.938		
CS4			.942		
CS5			.942		
CX1		.947			
CX2		.933			
CX3		.930			
CX4		.930			
CX5		.933			
CL1				.956	
CL2				.929	
CL3				.932	
CL4				.920	
CL5				.942	
CH1					.919
CH2					.926
CH3					.932
CH4					.920
Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.900, df:300, Sig.: 0.000					
Eigenvalue	5.698	4.498	4.325	4.104	3.315
Cronbach's Alpha	.971	.969	.964	.966	.944
AVE	0.846	0.839	0.853	0.858	0.808
√AVE	0.920	0.916	0.923	0.926	0.899

Factor analysis and validity statistics provide strong support to the robustness of the measurement model (Table 2).The Rotated Component Matrix indicates that all the variables are well clustered into five different constructs; Artificial Intelligence, Customer Experience, Customer Satisfaction, Customer Loyalty, and Customer Churn.The AI item (0.918-0.943) factor loadings are remarkably high, which means that the convergence is high, and customers can perceive multiple AI functions, including

chatbots, predictive analytics, automation, and fraud detection as a single technological experience.It is indicative of the maturity of AI integration into the telecom industry, where they are no longer perceived as a single innovation, but rather a part of an unified digital ecosystem.Equally, Customer Satisfaction (0.938-0.949), Customer Experience (0.930-0.947), Customer Loyalty (0.920-0.956), and Customer Churn (0.919-0.932) constructs all have high factor loadings, thus, high internal consistency and conceptual clarity.The Kaiser Meyer Olkin (KMO) value of 0.900 reveals that the sampling is adequate and Bartletts Test (p = 0.000) shows that the data is suitable to perform factor analysis.The fact that all constructs have Eigenvalues greater than 1 also confirms the five-factor model, as each construct has a significant amount of variance.These findings are supported by reliability analysis whereby Cronbachs Alpha values are in the range of 0.944-0.971 indicating excellent internal consistency of all constructs.It also has a good convergent validity with the Average Variance Extracted (AVE) of 0.808 to 0.858 which is higher than the suggested value of 0.5.The square root of AVE (0.899 0.926) supports the discriminant validity, which means that each of the constructs explains more variance of its indicators instead of error of measurement.All of these findings support the validity and dependability of the measurement model.

Table 3; Structural and Measurement Model Estimates Including Standardized Regression Weights, Standard Errors, Critical Ratios, and Significance Levels

Measured Indicators		Latent Variables	Estimate	S.E.	C.R.	P
Cu_Exp	<---	Art_Int	-.049	.064	-.820	.412
Cu_Loyal	<---	Cu_Exp	.025	.060	.427	.669
Cu_Satis	<---	Art_Int	.037	.064	.614	.539
Cu_Satis	<---	Cu_Exp	.006	.060	.096	.924
Cu_Loyal	<---	Art_Int	-.125	.065	-2.105	.035
Cu_Churn	<---	Art_Int	-.036	.061	-.597	.551
Cu_Churn	<---	Cu_Satis	-.080	.057	-1.327	.185
Cu_Churn	<---	Cu_Loyal	.044	.056	.719	.472
Cu_Churn	<---	Cu_Exp	.030	.057	.504	.614
AI6	<---	Art_Int	.915	.033	29.209	***
AI5	<---	Art_Int	.932	.035	28.864	***
AI4	<---	Art_Int	.931	.035	28.717	***
AI3	<---	Art_Int	.932	.035	28.838	***
AI2	<---	Art_Int	.922	.036	27.827	***
AI1	<---	Art_Int	.901	.039	25.992	***
CX1	<---	Cu_Exp	.939	.031	31.150	***
CX2	<---	Cu_Exp	.919	.033	29.671	***
CX3	<---	Cu_Exp	.908	.034	28.419	***
CX4	<---	Cu_Exp	.910	.034	28.681	***
CX5	<---	Cu_Exp	.915	.033	29.209	***
CS5	<---	Cu_Satis	.931	.030	28.221	***
CS4	<---	Cu_Satis	.927	.034	29.907	***
CS3	<---	Cu_Satis	.921	.033	29.221	***
CS2	<---	Cu_Satis	.940	.032	31.450	***

Measured Indicators		Latent Variables	Estimate	S.E.	C.R.	P
CS1	<---	Cu_Satis	.920	.034	29.114	***
CL1	<---	Cu_Loyal	.953	.032	32.430	***
CL2	<---	Cu_Loyal	.914	.030	30.709	***
CL3	<---	Cu_Loyal	.914	.030	30.772	***
CL4	<---	Cu_Loyal	.897	.032	28.655	***
CL5	<---	Cu_Loyal	.934	.029	33.602	***
CH1	<---	Cu_Churn	.892	.041	23.017	***
CH2	<---	Cu_Churn	.902	.043	23.518	***
CH3	<---	Cu_Churn	.911	.042	24.026	***
CH4	<---	Cu_Churn	.894	.043	23.019	***

Although the measurement model is strong, majority of the hypothesized constructs relationships are non-significant.The correlation between Customer Experience and AI is negative and insignificant (β= -0.049, p = 0.412), meaning that the implementation of AI does not directly affect customer experience.In the same vein, Customer Experience has no significant effect on Customer Satisfaction (β = 0.006, p = 0.924) or Customer Loyalty (β = 0.025, p = 0.669) implying that the experiential perceptions might not be so powerful to impact overall customer outcomes in this case.Customer Satisfaction (β = 0.037, p = 0.539) is not considerably influenced by Artificial Intelligence either, which confirms the idea that technological innovations are not enough to create satisfaction.Moreover, all constructs comprising AI, Customer Experience, Customer Satisfaction and Customer Loyalty do not show a significant direct impact on Customer Churn.This points to the sophistication of churn behavior in the telecom industry that involves a combination of factors which interact non-linearly.It is worth noting that the only statistically significant relationship is between Artificial Intelligence and Customer Loyalty (β = -0.125, p = 0.035) and this correlation is negative.

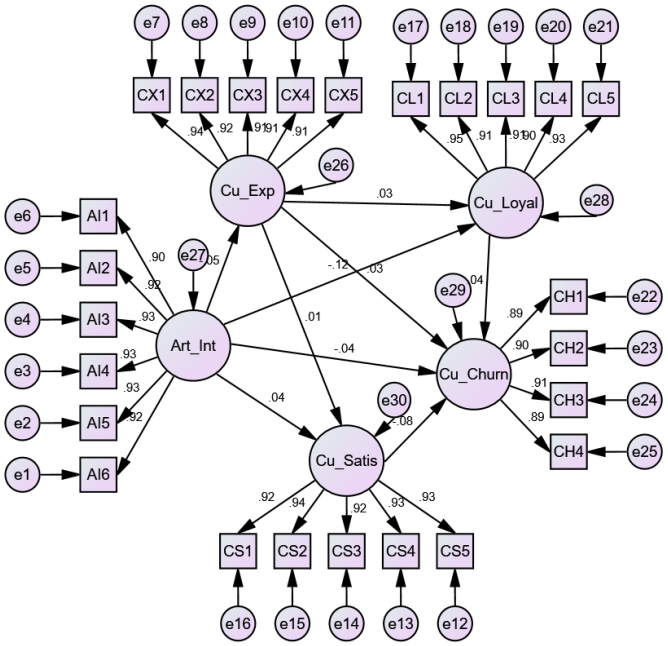


Figure 9; Structural Equation Modelling

AI systems increase the efficiency of operations, over-reliance on the automation process can negatively affect the emotional bond and trust.The excessive automation may also decrease the level of human interaction which can be perceived to have lowered the quality of relationships and, as such, decreased customer loyalty.Overall, the results demonstrate that there is a paradoxical dynamic.Although the measurement model establishes the excellent conceptualization and reliability of AI and customer-related constructs, the structural model shows weak and mostly insignificant relationships between these constructs.It implies that AI, no matter how technologically advanced it is, does not necessarily translate into better customer performance unless it is implemented in a way that it is combined with human-centered approaches to service delivery.This highlights the need to strike a balance between automation and customization in the case of telecom providers in Tamil Nadu.The AI must not be used to substitute the human interaction but should be used to complement it, making the process more efficient and personal.It is only with this kind of integration that AI can meet its potential as a strategic asset to enhance customer experience, build loyalty, and eventually churn in a more competitive telecommunications industry.

Table 4; Testing of Model Fit Indices

Index	Value	Interpretation
Goodness of Fit Index (GFI)	0.945	Excellent fit (≥ 0.90)
Adjusted Goodness of Fit Index (AGFI)	0.934	Good fit (≥ 0.90)
Root Mean Square Error of Approximation (RMSEA)	0.025	Excellent fit (< 0.05)
CMIN/DF (Normed Chi-square / DF)	1.620	Good predictive validity &replicability
Normed Fit Index (NFI)	0.976	Excellent fit (≥ 0.90)
Relative Fit Index (RFI)	0.962	Good fit
Incremental Fit Index (IFI)	0.994	Excellent fit
Tucker-Lewis Index (TLI)	0.994	Excellent fit
Comparative Fit Index (CFI)	0.994	Excellent fit
Parsimony Comparative Fit Index (PCFI)	0.882	Good fit (≥ 0.50)

The results of the model fit indices indicate that the proposed structural equation model fits the data very well as the values of GFI, AGFI, NFI, IFI, TLI, and CFI are high and the value of RMSEA is very low.These findings indicate that the conceptual framework is statistically sound and it presents the relationships between the constructs exactly.Nevertheless, although the model overall fits well, structural paths between variables are weak and have insignificant values that imply that the effect of Artificial Intelligence on customer experience, satisfaction, loyalty, and churn is mediated and depends on other extraneous variables.The observation shows the breadth of customer behavior in the telecommunications industry and demonstrates that an increasingly integrated and customer-focused approach to AI implementation is necessary.

Research Implications

The findings of the present study have significant implications for the telecommunication sector in Tamil Nadu and for the major players such as Reliance Jio, Bharti Airtel, Vodafone Idea and BSNL. Contrary to the managerial belief that AI will produce customer experience, customer satisfaction, customer loyalty and customer churn positive outcomes, the study reports an empirical discrepancy between these outcomes. The findings reveal that AI is an indirect facilitator and has no statistically significant direct influence on the customer outcomes studied. The study also reports a huge perception-behavior disjuncture whereby customers are aware of the AI functionalities and are using them but the

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awareness does not get translated to any desirable behavior. AI cannot be a quick fix or a singular approach to improving the customer service experiences but it has to be part of a larger service ecosystem which is designed to be customer centric. Paradoxically, the study reports a negative correlation between AI and customer loyalty. Over-automation not only fails to enhance customer loyalty but also can be detrimental as it can result in deprivation of human interaction. Thus, the telecommunication companies need to adopt a hybrid services approach to service where they leverage on the efficiency and engagement benefits of AI while not compromising on the critical human element to the service delivery.

Although AI, customer satisfaction and loyalty have little to no impact on churn in the telecommunications market due to the vast array of exogenous factors that affect customer retention (eg pricing, network quality, competitor offerings), potential benefits for retention exist. Automation as well as advanced analytics capabilities could help companies predict churn, segment their customers and design specific retention programs. Moreover, as companies mature and collect more feedback from consumers, particularly in developing regions such as Tamil Nadu, they can make the technological capability keep pace with consumer expectations—one of the main management issues with AI today. While telecom companies are increasingly leveraging AI, their effects on customers are indirect and there is a need to expand the policy framework from promoting the adoption of AI to ensuring that AI is used responsibly and to benefit consumers. Regulatory bodies need to formulate principles around the ethical use of AI including the transparency of automated decision-making, privacy of data and responsibility in the event of an adverse customer outcome through interactions with AI. As the telecom sector is increasingly reliant on AI for delivering services and carrying out complex analytics, protecting user rights and mitigating potential risks become increasingly pertinent. This includes parameters such as how chatbots respond to customer queries, the accuracy of automated processes such as diagnostics and provisioning, and personalisation using data analytics. Policymakers should focus on market dynamics that drive churn and design rules and policies that enhance healthy competition as well as pricing transparency to create a fair marketplace that rewards innovation. Lastly, a series of awareness campaigns targeting middle-income households that are increasing digitally active could encourage the use of AI-based services by enhancing digital literacy in the region. This could involve participation of telecom operators, technology providers, and research institutions in creating context-relevant AI solutions to address challenges in the region.

The study has its advantages and limitations, and some of the limitations provide interesting avenues for future research. First, a longitudinal study design would be valuable, as it would provide more insight in how the impact of AI develops over time. Next to that, the model contains only a few constructs, and interesting variables to add to future studies are for example perceived trust, service quality, price perception, brand image and network performance. Additionally, moderating and/or mediating variables such as digital literacy, age, usage frequency could provide interesting explanatory power to the study. Methodologically, combining quantitative methods with qualitative methods (e.g., interviews or focus groups) would provide more in-depth insight into customers' perceptions of AI-driven services and the accompanying emotions that drive behavioural intentions. In addition to studying AI as a single construct, it could be worthwhile to disentangle the effects of different AI applications, such as conversational chatbots, product and service recommendations and predictive analytics. As AI is increasingly adopted, the significance of ethical considerations for enhancing trust and acceptance of AI-driven services cannot be ignored, and future studies could explore how AI transparency, data privacy and ethics affects customer trust and acceptance.

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Conclusion

This paper reviewed how Artificial Intelligence (AI) can be used to improve customer experience and minimize customer churn in telecommunications services in Tamil Nadu.The results offer a complex interpretation of the interaction between AI and the main customer-focused variables that include customer experience, customer satisfaction, customer loyalty, and customer churn in the highly competitive and digitally developing market.The findings affirm the measurement model to be strong with high reliability, high factor loadings and high validity of all constructs.Moreover, the model fit indices show that the proposed conceptual framework is very good, which proves that it is statistically valid and well-organized.These findings confirm the idea that customers distinctly identify and distinguish AI-enabled services, customer experience, satisfaction, loyalty, and churn as the unique dimensions when evaluating telecom services.But there is a critical observation to be made on the structural model in which most of the relationships proposed by it are weak and statistically insignificant.This indicates that Artificial Intelligence does not have any direct impact on customer experience, satisfaction, and loyalty, and does not substantially decrease churn among customers as it was previously believed.Rather, AI is an indirect and contingent facilitator, the effectiveness of which lies in its integration into the overall service delivery system.A significant finding of the study is the so-called perception-impact gap concerning the powers of AI that customers know about and recognize, as opposed to the impact that this knowledge has on their behavioral performance, i.e. higher loyalty and lower churn, and other customer outcomes. However, customer outcomes are also significantly affected by a number of other factors, including service quality, price, network performance and competitive services.Another issue, which has been pointed out in the study, is that excessive dependence on AI can come with other undesirable outcomes, including the loss of human interaction and emotional bond, which may adversely affect customer loyalty.This highlights the need to embrace a hybrid service strategy whereby the AI complements human interaction instead of substituting it.Moreover, the results show that the churning of customers in the telecom industry is very dynamic and multidimensional, and cannot be effectively managed by implementing AI.The research in the context of Tamil Nadu establishes that even young, digitally literate, and middle-income population cannot ensure any positive results of the adoption of AI.This disputes the belief that digital readiness is automatically associated with greater satisfaction and loyalty, and telecom providers have to ensure that technological innovations meet changing customer expectations.

Data availability: Data will be available on request by contacting the corresponding author
Conflicts of Interest: The authors declare no conflict of interest.

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