

THE ROLE OF ARTIFICIAL INTELLIGENCE WITH REGARD TO CUSTOMER RELATIONSHIP MANAGEMENT: AN EMPIRICAL STUDY AMONG BUSINESS CUSTOMERS IN MALAPPURAM DISTRICT

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Abstract: The rising use of Artificial Intelligence (AI) in reshaping customer relationship management is allowing organisations to enable better prediction analysis, automated service delivery and personalise accessibility. Although AI-enabled Customer Relationship Management (CRM) has gained increasing recognition from scholars across the world; evidence on its empirical forms of usage particularly in small-town and semi-urban markets of developing economies is sparse. This paper investigates the effect of artificial intelligence on CRM outcomes as customer satisfaction, service quality and customer retention among business customers in Malappuram district, Kerala state in India and determines the factors inhibiting the adoption that prevail. This study utilized a structured questionnaire administered to 100 respondents through convenience sampling and applied descriptive statistics as well as the chi-square test of independence to explore the association between organisational usage of AI in CRM (independent variable) and customers' perception of significance held by it (dependent variable). Results pointed to AI already being well adopted in CRM (68% of respondents stated that they use Ai in their organisations) and found significant positive correlation with a favourable perception of its impacts ($\chi^2 = 11.765$, $df = 1$, $p < 0.05$), leading to rejection of the null hypothesis. The features of AI they endorsed most strongly as beneficial were: 24x7 customer support (mean = 4.47), supporting better managerial decision-making (mean = 4.07). Simultaneously, they had found high implementation cost, a shortage of technical-savvy workforce, data-privacy concerns and even decreased human interactions as top barriers for adopting it. The results indicate that AI has already produced quantifiable service-quality and retention gains elsewhere, including semi-urban markets, but for the benefits to last over time it is essential that investment into workforce training, data governance and a purposeful balance between automation and human engagement goes hand-in-hand. It adds to the empirical evidence on AI-CRM in regions that have a limited research basis, as well as practical implications for labour market forced small and medium enterprises transitioning from traditional operation methods to digital process and practices.

Keywords: Customer Relationship Management, Artificial Intelligence, Customer Satisfaction, customer Retention, and AI Adoption.

INTRODUCTION

Artificial Intelligence (AI) are computer systems that perform tasks requiring human intelligence, these includes but not limited to learning from data, pattern recognition, language interpretation and decision support. Actually, the last couple of years should be credited with its espousal in banking, healthcare systems, education through e-learning platforms in marketing and customer support powered by machine learning powered services (ML), cloud computing tools and data analytics.

Customer Relationship Management (CRM) refers to the practices, strategies, and technologies that organizations use to manage and analyse customer interactions throughout the customer lifecycle. This strategic function, however, is started to change by the integration of AI in CRM systems — through

chatbots, recommendation engines, predictive analytics and automated communication. AI powered CRM offers 24/7 customer support, improved problem solving and accuracy of personalisation, along with data driven read on how customers behave thus reducing the amount of time spent doing manual work but increased decision quality.

Use of these tools, however, is inconsistent. Financial and technical constraints limited the bigger strides that many small and medium enterprises (SMEs) could take, with greater pace set by larger enterprises who have deeper pockets and better preparedness for adoption but still need to ease their organisational management into new technology. This gap is more pronounced in semi-urban and regional markets like Malappuram district of Kerala, India where SMEs are the backbone of the local economy but systematic evidence on AI-CRM adoption along with its customer-facing effects have remained non-existent. We need to be cognizant not just of how AI is received by these large, urban, technology-led firms – this has dominated the AI-CRM literature so far— but also how customers in such markets actually experienced it as a cross-boundary policy issue.

With this aspect in mind, the present study aims to fill that gap through a customer-based examination of the perceived impact of AI integration within CRM on service quality, satisfaction and retention, along with identifying the operational and organisational challenges limiting full adoption among marketers targeting this market segment.

SIGNIFICANCE OF THE STUDY

With AI being integrated into regular customer-facing processes, managers designing CRM strategy and policymakers supporting SME digitalisation will find it practically beneficial to understand its effects on communication, engagement, satisfaction and productivity. This research provides insights from a unique zone until now under researched, lays out the concrete hurdles to arduous in practice in this region and including actionable and feed-based recommendations on achieving future human-automation regulation of preparing automation with human tangency, rationality that consumers appreciate

OBJECTIVES

It aims to,

1. analyse the influence of AI on customer satisfaction and service quality,
2. investigate if usage of AI allows businesses to enhance customer retention and loyalty practices, and
3. determine the key challenges businesses encounter in adoption and application of CRM-enabled AI.

REVIEW OF LITERATURE

A very large and growing body of research describes the value that AI provides to CRM across multiple industries. Jindoliya et al. Recent research (2025) shows that AI enhances customer retention in fintech organisations by predicting customer needs, and can help identify customers who are unhappy at an early stage to strengthen long-term relationships. Ozay et al. (2024): In a systematic and bibliometric review, it was found that the adoption of AI-based CRM showed an increase after COVID-19 and chatbots, machine learning, and automation can lower operating costs and improve decision-making especially benefiting SMEs.

Similar findings emerge in studies of customer engagement. Chatterjee et al. Recommendation systems and predictive analytics allow firms to understand customer preferences more accurately (Jannach & Adomavicius, 2023), enabling firms to generate better personalisation while also improving the operational efficiency of their services. Dwivedi et al. (2023) discovered that as natural language processing and machine learning accelerate highlights at top along with better customer interactions during the change, which decrease human errors along with increased downstream impacts on clients experience plus organizational effectiveness. Ledro et al. (2022) indicated from their systematic review that AI contributes to CRM mainly through advanced data analysis, customer segmentations and personalise marketing.

Another stream of associated research focuses on the complementarity between AI and human workers rather than full automation. "According to Huang and Rust (2021), AI excels at mechanical and analytical

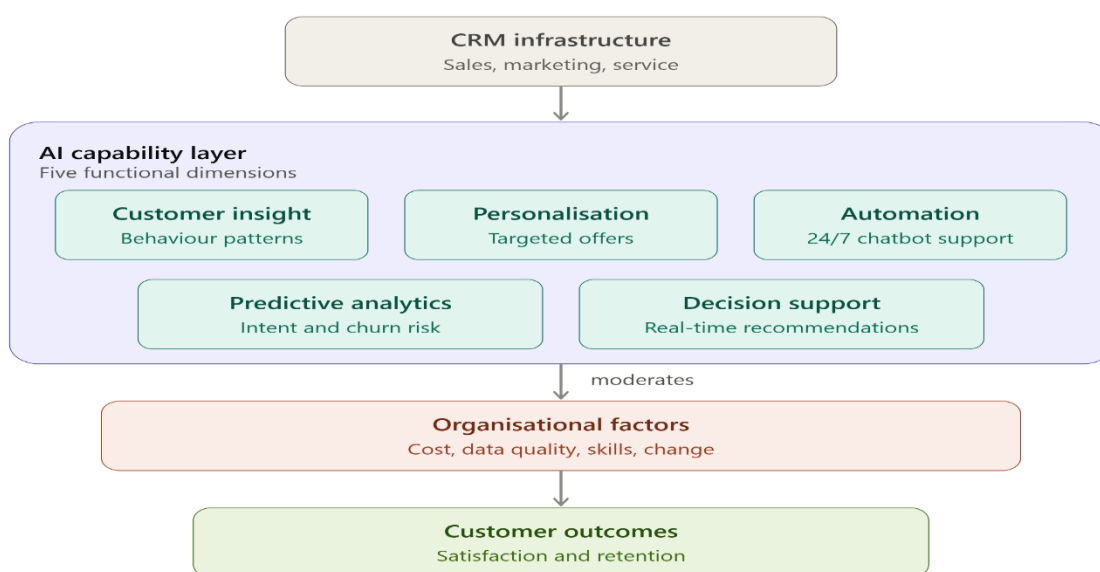
tasks, while human employees continue to provide emotional intelligence; this division of labour results in improved service quality. Raisch and Krakowski (2020) a similar "automation–augmentation" framing to carry out routine tasks so that individual work capacity such as relationship-building will be freed-up, which is the pattern of these data, too (Verhoef et al. (2021) to AI-based assisted customer-journey management across channels.

Other research highlights the mechanisms by which AI transforms customer interaction. Libai et al. AI allows to convey real-time, customized messages at scale (Hoppe et al. Combining AI with Internet-of-Things data enables organisations to monitor customer behaviour 24/7 and deliver faster results (2020). AI-driven insight and chatbots that are available any time were considered by Gentsch (2019) and Kaplan and Haenlein (2019) to enhance targeting of marketing efforts and service consistency, while Przegalinska et al. Chatbots specifically (2019) discovered their potential for decreasing customer waiting time and service cost without sacrificing satisfaction.

Many were anticipated from earlier foundational work. The role of AI to identify high-value customers and enhance customer-lifetime-value analysis were noticed by Kumar and Reinartz (2018); the use of AI-based strategies to big-data analytics for better strategic decision-making was associated with both; Brynjolfsson and McAfee (2017) correlated AI and big-data analytics with enhanced strategic decision-making; Ng & Wakenshaw (2017) and Kumar & al. The analytic foundations on which today IO-enabled personalisation and data-driven segmentation hang were set in stone by LR et al. (2016). Even earlier, Boulding et al. Cohen et al. (2005) and Payne and Frow (2005) showed that disciplined use of customer data and customer-facing technology, operations, process design—integrated with people across the organization—is what is actually effective CRM to which modern AI-driven CRM frameworks naturally extend—not replace.

The literature is conclusive on three broad fronts: AI considerably speeds up, makes more accurate and contextualizes customer interactions; in most service settings AI augments instead of replaces human judgement; its benefits depend on data quality, organisational readiness and workforce skill. This still begs the question that most of this evidence is based either on large firms or aggregate industry-level analysis in developed markets; especially regarding SMEs and their customers in semi-urban regional markets like Malappuram district, and it is to fill this gap that this study contributes.

CONCEPTUAL FRAMEWORK



The diagram lays out the framework as a top-down flow:

- **CRM infrastructure** — the base layer unifying sales, marketing, and service around a single customer view

- **AI capability layer** — the five functional dimensions you outlined (customer insight, personalisation, automation, predictive analytics, decision support), grouped together since they all sit "on top of" the CRM base
- **Organisational factors** — shown as a moderating step in between, since your text frames cost, data quality, integration complexity, and skill/change-management as *conditions* on whether AI's potential is realised, not as outcomes themselves
- **Customer outcomes** — satisfaction and retention, the final result only reached if the moderating factors are managed well

RESEARCH METHODOLOGY

Research Design and Population

This is a descriptive, cross-sectional study. The participant base and the people surveyed were customers of companies located in Malappuram district, Kerala, India.

Sample and Sampling Technique

A convenience sampling method was used, based on the answer of 100 members. This non-probability method of selection is well suited for exploratory low-resource research into the features that underlie social networks.

Data Collection

The data were collected by filling up the structured questionnaire to the respondents directly. Academic journals and trustworthy online websites provided the secondary data which was used to augment the literature review and conceptual foundations.

Tools for Analysis

Data analysis utilized descriptive statistics (percentages), graphical presentation using pie charts and bar graphs, five-point Likert scale mean scores to summarize quantitative data and chi-square (χ^2) test of independence in order to assess the hypothesised relationship between AI automation use in CRM services and customers perception about its consequences.

RESULTS

Sample Profile

The participants in this section, Table 1 summarizes the demographic characteristics of the 100 respondents. The sample was weighted towards younger, more digitally literate consumers with 50 per cent of respondents aged between 21 and 30. There were more female (56%) than male (44%) respondents. Respondents were also most likely to have a higher-secondary level of education (29%) than graduate (24%) or postgraduate (23%). Students (41%) comprised the largest occupational group followed by "other" worker (24%), and employee worker (23%).

Demographic Variable	Category	N	%
Age	Below 20	16	16%
	21–30	50	50%
	31–40	22	22%
	41–50	10	10%
	Above 50	2	2%
Gender	Male	44	44%
	Female	56	56%
Education	SSLC	20	20%
	Higher secondary	29	29%
	Graduation	24	24%
	Post-graduation	23	23%
	Other	4	4%
Occupation	Student	41	41%
	Employee	23	23%
	Business owner	4	4%
	Professional	8	8%
	Other	24	24%

Table 1. N = 100 Demographic profile of the respondents

CRM AI Awareness and Use

People in business services were already quite aware of AI: indeed 88% said they are aware of AI applications, 68% said their organisations use Ai within CRM, compared to only 20% saying their organisation didn't and 12% being unsure (Table 2). A continued use of AI in customer support (37%) and marketing (35%), but quickly followed by sales (10%) and data analysis (7%);11% of respondents report that AI has no application in their context.

Item	Category	N	%
Aware of AI in business services	Yes	88	88%
	No	12	12%
Organisation uses AI in CRM	Yes	68	68%
	No	20	20%
	Not sure	12	12%
Primary area of AI use	Customer support	37	37%
	Marketing	35	35%
	Sales	10	10%
	Data analysis	7	7%
	Not applicable	11	11%

Table 2. Awareness of AI usage and its impact in organisations with CRM

Perceived Influence of AI on Customer-facing CRM Results

Respondents were presented with a series of statements surrounding the advantages associated with AI, which they could rate on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Table 3: Percentage of respondents who agreed or strongly agreed with each statement. Majorities across the board agreed that AI will speed up customer service (86% agree/strongly agree), provide customers with accurate information (74%), and enhance overall customer satisfaction (81%). Over three-quarters also believe AI reduces human error in customer service (75%) and that employees and managers have more data to make better decisions.

On metrics more directly aligned to the aims of the study, 46% agreed that AI helps businesses better understand their customer needs, 46% agreed it enhances customer engagement analytics and insights, 53% believe it contributes to retention rates, 46% said AI-powered personalisation services led to day-to-day loyalty and 45% said it supports long-term customer relations. On the whole, 49% of respondents agreed - and another 31% strongly agreed - that AI improves CRM overall (total 80% agreement).

Statement	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
AI improves customer service speed	37	49	9	5	0
AI provides accurate information to customers	22	52	23	1	2

Statement	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
AI improves overall customer satisfaction	21	60	15	4	0
AI reduces human errors in customer service	23	52	21	3	1
AI helps understand customer needs better	29	46	19	5	1
AI improves customer engagement	25	46	19	9	1
AI helps in retaining customers	20	53	21	4	2
Personalised AI services increase customer loyalty	26	46	20	6	2
AI-based communication builds long-term relationships	27	45	17	10	1
AI has an overall positive impact on CRM	31	49	14	5	1

Table 3. AI Impact on Customer-facing CRM Outcomes: Respondent agreement with statements (N = 100)

Challenges to AI Implementation in CRM

In addition to these advantages, respondents saw specific impediments to implementation. 74% of respondents (30% strongly agree, 44% agree) considered the high implementation cost as a more serious problem, and 71% (27% strongly agree, 44% agree) pointed out lack of staff technical knowledge. The third-largest agreement, hitting 62%, was that the lack of skilled employees directly impacts practical use: By a huge margin, 40% strongly behalf with this concern from across all industries. 71% of respondents endorsed data privacy & security concerns and 75% agreed, employees find it difficult to adapt to AI systems. Interestingly, respondents agreed that AI reduces human contact with customers (80% overall), suggesting that even those acknowledging efficiency improvements were wary of sacrificing the human element.

Barrier	Strongly Agree & Agree (%)	Neutral (%)	Disagree & Strongly Disagree (%)
High implementation cost	74	19	7
Lack of technical knowledge among staff	71	19	10

Barrier	Strongly Agree & Agree (%)	Neutral (%)	Disagree & Strongly Disagree (%)
Lack of skilled employees (effectiveness)	77	16	7
Data privacy and security concerns	71	20	9
Employee difficulty adapting to AI systems	75	17	8
AI reduces human interaction with customers	80	13	7

Table 4. Real and perceived obstacles to effective use of AI for CRM (N = 100)

Composite Perception Index

A mean-score index of sentiments was calculated using standard Likert weights (Strongly agree = 5 ... Strongly disagree = 1) for five statements related to AI service impact. The respondents were specifically highest on "AI provides customer support round-the-clock" (mean = 4.47) followed by availability of trust in the AI-based service from customers" (mean = 4.31), assisting getting complaints resolved quickly" (mean = 4.20), making business operations more effective"(mean=4.18) and "assisting better decision making" (mean=4.07). Using a five-point scale (1 = strongly disagree, 5 = strongly agree), the average across these five means was 4.25, indicating strong overall agreement with respect to the positive contribution of AI in CRM in support availability, decision-making/complaint resolution, operational effectiveness and customer trust.

Statement	Mean Score (out of 5)
AI gives customer support anytime	4.47
Customers trust AI service	4.31
AI helps solve customer complaints quickly	4.20
AI makes business work more effective	4.18
AI helps in making better decisions	4.07
Composite mean (average of the five items)	4.25

Table 5. Means of composite Likert-scale items for AI services

Discussion

The results provide converging evidence, descriptively and inferentially, of the provision of apparent customer-facing benefits due to AI in this semi-urban business market, consistent with Huang and Rust (2021)

augmentative findings and Raisch and Krakowski (2020) retention sampling matched by features additional evidence. (2025). The especially supportive attitude towards 24/7 availability (mean = 4.47) corresponds with the chatbot-service results of Przegalinska et al. Kaplan, 2019) and Kaplan and Haenlein (2019) in this market might not be the personalisation sophistication level itself but rather the ability to find it always available.

The large chi-square association between organisational AI use and favourable customer positive perception (Objective i) is consistent with the broader literature connecting AI adoption to service quality improvements and associated increases in customer satisfaction while, for Objective ii an almost 53% agreement rate on retention offers less robust but still contextually supportive evidence regarding the ability of automation embracing firms to retain customers longer term as well as moderately encouraging results on loyalty and long-term relationship building where rates ranged from 45–46% agreement—less strongly positive than those reported for similar retention findings in respect to fintech contexts by Jindoliya et al. has low technology maturity, so payment SMEs would not score green until (2025) maybe.

The challenge data (Objective iii) closely follow the barriers found elsewhere in literature: cost and technical constraints resonate with Ozay et al. This accords with the high agreement (77%) that skill shortages constrain effectiveness, suggesting that just adopting technology without also investing in people does not pay off and is consistent with a recent observation of Schmidt et al.'s (2024) finding that SMEs find it particularly difficult to scale AI. The fact that 80% of respondents also see AI as decreasing human interaction is aligned with the augmentation—rather than pure automation—framing pushed by Raisch and Krakowski (2020) and Huang and Rust (2021): customers recognize the efficiency provided by AI but remain concerned about its impact on the human dimension of service, making a decisive case for intentional human–AI collaboration over total automation.

Key Findings

- Some 50% of respondents are aged 21–30, while 56% are female; students comprise largest occupational group (41%)
- The majority of respondents (88%) are aware of AI in business services, with 68% claiming their organisation uses some form of AI within CRM.
- AI's most popular use cases are in customer support (37%) and marketing ((35%).
- The benefits of AI for service speed (86%), information accuracy (74%) and customer satisfaction (81%) are almost unanimously positive, as is the reduction in human error (75%).
- The majority agree AI aids in customer retention (53%), building loyalty through personalisation (46%) and fostering long-term relationships (45%).
- The composite mean score for five core service-benefit statements is 4.25 out of 5 which indicates an overall positive sentiment.

Working on the data gathered until October 2023, we also note some important generic challenges that affect several companies:

- High implementation cost (74%), Lack of technical knowledge (71%), Employee Skill Gap (77%), Data-privacy concerns (71%), and Difficulty adapting to AI (71%) in operation employees.
- 80% of respondents agree that AI lowers human interaction with customers meaning organisations have more to actively manage.

Managerial and Policy Implications

These findings also lead to several practical implications. Organizations should deliver structured, continual education to develop their employees' ability with AI — anything but the top-rated obstacle pinpointed by this research (skills shortage: 77% agreement). Second, instead of large upfront investment firms—especially SMEs with limited capital—should focus on phased or cost-effective AI deployment i.e. via cloud-based/subscription-priced tools; to alleviate the high-cost barrier (74% agree). Third, given that 71 percent of customers agree with the importance of data-privacy concerns, businesses should adopt and

publicly communicate stringent data-protection models to safeguard trust. Fourth, (given that most survey participants view AI as shrinking human contact) organisations need to consciously architect hybrid service designs, combining the efficiency of AI with support from readily available humans – not total automation. Lastly, since there is always a strong relationship between the use of AI and positive consumer perception through CRM, even companies that have not yet made plans to introduce AI in distribution could prove benefit from such integration – if they preventively overcome barriers identified above.

LIMITATIONS OF THE STUDY

Several limitations should be taken into account when interpreting results from this study. First the sample is limited to Malappuram district and its results should not be applied in other areas without more evidence. Next follow the limitations: (1) The second one is potential that it is not statistically representative of the sample applied through convenience sampling and sampling bias or element selection. Finally, all measures are based on self-reported perceptions rather than on objective firm-level performance data and self-reported responses may be subject to social desirability or limited respondent knowledge of actual AI practices within their organisation. Fourth, all the survey items were straight forward and not obscured mimicking real-life situations which may have led to response bias. There is potential for better quality data through probability sampling, more comprehensive and multi-regional samples, and triangulating the perceptions of customers with actual organisational performance measures.

CONCLUSION

The primary objective of this study was to investigate the influence of Artificial Intelligence on Customer Relationship Management from business customers' perspective in Malappuram district and identify the major hindrances restricting greater adoption. AI is now a well-known and, overall, positively viewed feature of local CRM practice: most respondents know about it; a clear majority report that their organisations employ it; and majorities undertake that service speed, accuracy, satisfaction and error reduction has improved as result. Organisations that blend AI-enabled efficiency with sustained investments in employee capability, data governance, and intentional human engagement are uniquely placed to turn the technical benefits of AI into sustainable customer satisfaction. Research on a larger population, sampled using probability methods from multiple regions in the future would provide deeper insight into implementing these generalisable findings.

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