Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 4 Issue 3 (2024)

Role of Artificial Intelligence (AI) in Effective Implementation of CRM in online Retailing Sector: An Empirical Study

Viresh Chandravadan Shah ,
Managing Director - iBase-t India Software Pvt Ltd ,
Research Scholar , GLS University ,Ahmedabad.

Dr. Asma Farooque,
Professor
Department of Business Management
Integral University, Lucknow

Dr. Neera Pal
Assistant Professor
Department of Commerce
University of Lucknow

Dr. Santosh Kumar
Professor,
Department of Computer Science
Era University
Mail-id- sanb2lpcps@gmail.com

Abstract
Customer Relationship Management (CRM) in India's online retailing industry is greatly improved by artificial intelligence (AI). Artificial intelligence (AI)-powered CRM systems examine enormous volumes of client data to anticipate consumer behaviour, personalise shopping experiences, and make customised product recommendations. For online retailers who are up against fierce competition, this personalisation increases customer happiness and loyalty. AI-driven chatbots and virtual assistants provide immediate customer service by answering questions and addressing problems around-the-clock. In addition to increasing customer service effectiveness, this frees up human resources for more difficult jobs. Additionally, AI systems find trends in customer evaluations and feedback, which aids merchants in resolving issues and improving their products. AI also helps inventory management by forecasting demand patterns, guaranteeing that popular products are always available, and minimising overstock of less well-liked ones. Cost reductions and improved resource allocation result from this. Online merchants in India may simplify processes, build better customer relationships, and keep a competitive edge in a market that is changing quickly by using AI into CRM systems. A sample of 257 was collected from respondents working in retail sector. The factors that identify the Role of Artificial Intelligence (AI) in Effective Implementation of CRM in online Retailing Sector are Predictive Analytics, Automated Customer Service, Enhanced Customer Engagement, and Improved Data Management.

Keywords: Customer Relationship Management (CRM), Artificial Intelligence (AI), Online Retailing Industry, Personalisation, AI-powered Chatbots, Customer Service Efficiency, Inventory Management.

Introduction

The online retailing sector in India has witnessed a considerable improvement in customer engagement and loyalty due to the revolutionary use of Artificial Intelligence (AI) in CRM system installation. In terms of sophisticated data analytics, Bedi et al. (2022) claim that AI technologies facilitate a better comprehension of consumer preferences and behaviours. AI-powered CRM systems are able to prepare customised marketing campaigns and forecast purchasing trends by analysing customer data. Customisation, which is frequently accomplished by "machine learning" and "natural language processing," makes shopping more enjoyable and increases consumer happiness and loyalty. In the fiercely competitive

Indian retail sector, recurring purchases are essential for fostering long-term client connections. By utilising AI, online retailers may provide more personalised incentives and recommendations that enhance the shopping experience.

AI greatly affects the customer journey in the digital age by playing a crucial role in user engagement and conversion. AI tools like as chatbots and virtual assistants offer immediate and customised customer care, improving the user experience as a whole, according to Bag et al. (2022). Making the consumer journey more efficient and smooth, these "intelligent agents" can respond to a range of customer enquiries, promote products, and even help with the purchasing process. Moreover, AI solutions are able to monitor consumer interactions via many touchpoints, offering insights into their preferences and behaviour. When creating strategies to improve consumer engagement and increase conversion rates, this information is essential. Artificial intelligence (AI) ensures that customers receive prompt and relevant support, strengthening the bond between the retailer and the client. It also increases operational efficiency by automating repetitive processes and offering real-time assistance.

Promising outcomes in terms of revolutionising the customer experience have been observed in the Indian retail sector through the early deployment of AI. In Indian retail, early adopters of AI have been able to maintain an advantage over competitors by providing creative and effective CRM solutions, as mentioned by Seranmadevi & Kumar (2019). Retailers can respond to market changes and customer needs more efficiently because to AI's speedy processing and analysis of massive amounts of data. Customer satisfaction is increased because of this proactive approach's ability to spot possible problems before they become more serious. By forecasting demand and adjusting stock levels appropriately, AI-powered CRM systems can also improve inventory management. This guarantees that consumers find the products they want when they want them and lowers the expenses related to overstocking or stockouts. In the online retailing industry in India, the "predictive analytics" skills of AI therefore help to improve the whole customer experience by making the supply chain more efficient.

Literature Review

Retailers may significantly enhance their understanding of and interactions with their customers by integrating AI-driven business analytics into Customer Relationship Management (CRM) systems, claim Kumar et al. (2023). Large-scale data sets are analysed by AI algorithms, including social media interactions, browsing habits, and past purchases made by customers. AI has the amazing ability to forecast future purchasing patterns and inclinations by analysing and understanding this enormous volume of data. With the help of this predictive ability, businesses may better understand their clientele and develop marketing strategies that are more suited to their needs. For example, AI can spot patterns and trends that traditional data analysis techniques would miss at first glance. This makes it possible for merchants to craft highly customised promotions and deals that speak to specific consumers and improve their buying experience. Additionally, decision-making in real-time is made possible by the integration of AI with CRM systems. AI-powered CRM systems can offer quick insights and recommendations in response to changing market conditions and client demands, enabling retailers to quickly modify their business plans. In the fast-paced retail climate of today, when market dynamics and customer expectations are always shifting, this agility is essential.

According to Behera et al. (2024), AI also changes "customer engagement" in e-marketing. Artificial intelligence (AI) tools like chatbots, virtual assistants, and personalised recommendation engines are transforming retail in the "Retail 4.0" age. The whole shopping experience is improved by these AI-driven solutions, which offer real-time query resolution, 24/7 customer service, and personalised product recommendations. For example, chatbots with AI capabilities can respond quickly and accurately to multiple consumer enquiries at once, cutting down on wait times and raising customer satisfaction. Additionally, cross-selling and up-selling products are made easier with the aid of AI-driven personalised recommendations that are based on past interactions and customer preferences, which increases sales and fosters customer loyalty.

The impact of AI applications on CRM was highlighted by Kaur et al. (2020) in their assessment of the retail industry. Retailers may more effectively segment their consumer base and develop focused marketing efforts because to AI's capacity to collect and analyse massive datasets. This degree of "customer segmentation" makes it possible to send more relevant and personalised communications, which boosts marketing efficacy and enhances the customer experience overall. AI also

supports "sentiment analysis," which helps merchants assess client views and feedback from several online platforms—an essential task for preserving a positive brand image. Indian internet merchants may improve their operational efficiency and establish deeper, more meaningful interactions with their customers by utilising AI for CRM.

Retailers may now obtain greater insights into the behaviour, preferences, and purchase patterns of their customers thanks to artificial intelligence (AI) technologies like machine learning and natural language processing, claim Malik et al. (2022). This makes it possible to implement highly tailored marketing strategies that might improve client loyalty and satisfaction. As an example, "predictive analytics" allows shops to provide personalised product suggestions by predicting future purchasing behaviours based on prior purchases. This focused strategy increases the effectiveness of marketing efforts by concentrating on the most relevant products for each individual, which in turn drives sales and boosts revenue. It also enhances the shopping experience for customers.

AI has completely changed how online merchants handle support and consumer relations. Virtual assistants and chatbots driven by AI are now essential parts of CRM systems, as noted by Lari et al. (2022). Without the need for human participation, these systems can respond instantly to a wide range of consumer enquiries and problems, offering solutions without delay. By guaranteeing availability around-the-clock, cutting down on wait times, and improving the quality of information given, "conversational AI" improves the whole customer support experience. AI-driven CRM systems can also assess sentiment from social media and other platform interactions with customers, giving shops the ability to proactively resolve possible problems and raise customer happiness. Long-term loyalty is fostered and better client relationships are strengthened by this proactive strategy.

In order to satisfy the high expectations of a wide range of customers, Dixit (2022) addresses how artificial intelligence (AI) might improve inventory management and streamline supply chain operations. AI systems are better at predicting inventory requirements, which helps businesses minimise surplus inventory while guaranteeing that popular products are always available. By lowering the possibility of stockouts and delayed delivery, this effective inventory management directly affects the customer experience. AI can also assist businesses in identifying "customer churn" threats through the analysis of engagement levels and purchasing patterns, enabling them to put customised retention plans into place. Online merchants in India can provide a seamless shopping experience that matches their customers' changing expectations while also increasing operational efficiency and cutting costs by utilising AI in these areas.

By leveraging detailed information analytics and machine learning algorithms, Chatterjee and Chaudhuri (2023) claim that AI-driven CRM systems dramatically increase customer involvement and happiness. Online businesses can anticipate client behaviour, analyse large volumes of data, and customise marketing campaigns with the help of these "AI-powered tools". Retailers can more effectively and precisely focus their marketing efforts by using "predictive analytics," which allows them to anticipate client wants and customise their goods accordingly. Moreover, AI enables "real-time customer support" by means of chatbots and virtual assistants, guaranteeing precise and timely answers to client queries. This lowers operating expenses while simultaneously enhancing the client experience. AI integration with CRM systems facilitates "customer segmentation," which lets companies group customers according to a range of factors like preferences, past purchases, and demographic data. This segmentation increases client loyalty and allows for more individualised interactions. Using AI into CRM processes is essential for obtaining a competitive edge, raising client retention rates, and promoting overall business growth in India's cutthroat online retailing market.

Objective

To identify “Role of Artificial Intelligence (AI) in Effective Implementation of CRM in online Retailing Sector”

Study’s Methodology

257 respondents are considered for this study which was collected from respondents working in retail sector. Random sampling method was used to collect data and examined by “Explanatory Factor Analysis” for results.

Findings of the Study

Below table shows demographic details of participants it shows that 52.14% are male, and 47.86% are female participants. Regarding age of the respondents, 32.30% are between 30 to 35 years, 37.74% are 35 to 40 years, and 29.96% are above 40 years of age. About Retail department, Sales department are 40.08%, Customer care is 28.40%, and Manufacturing are 31.52%.

Details of Participants

Variable	Participants	% age
Gender of Participants		
Male	134	52.14%
Female	123	47.86%
Total	**257**	**100**
Age in years		
30 to 35	83	32.30%
35 to 40	97	37.74%
Above 40	77	29.96%
Total	**257**	**100**
Retail department		
Sales department	103	40.08%
Customer care	73	28.40%
Manufacturing	81	31.52%
Total	**257**	**100**

"Factor Analysis"

"KMO and Bartlett's Test"

"Kaiser-Meyer-Olkin Measure of Sampling Adequacy"		.778
"Bartlett's Test of Sphericity"	"Approx. Chi-Square"	4362.483
	df	91
	Significance	.000

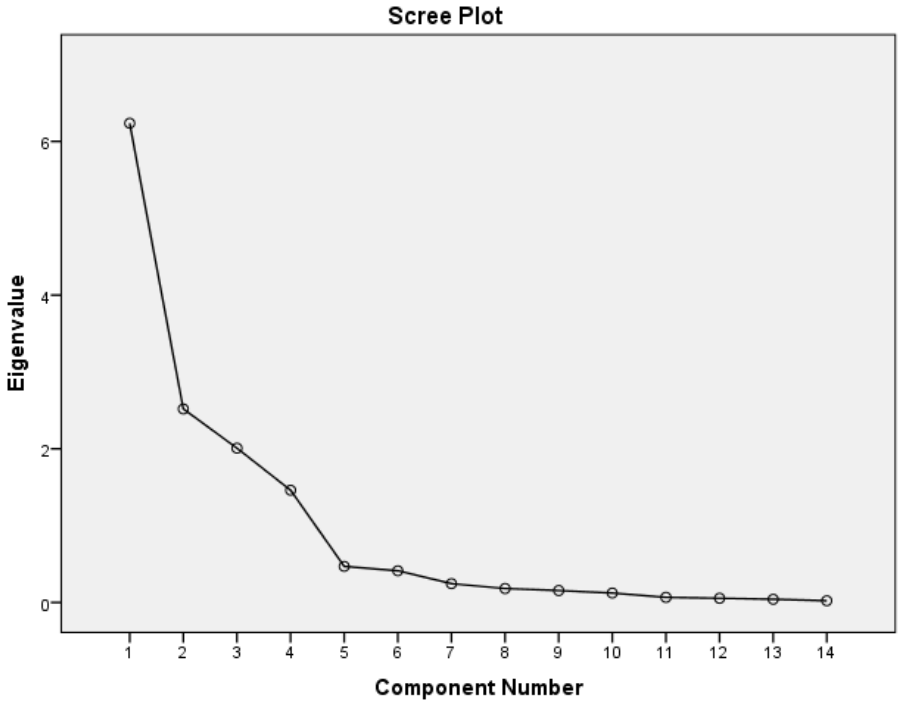
"KMO and Bartlett's Test", value of KMO is .778

"Total Variance Explained"

"Component"	"Initial Eigenvalues"			"Rotation Sums of Squared Loadings"		
	"Total"	"% Of Variance"	"Cumulative %"	"Total"	"% Of Variance"	"Cumulative %"
1.	6.236	44.544	44.544	3.728	26.629	26.629
2.	2.519	17.993	62.537	3.698	26.412	53.041
3.	2.008	14.343	76.879	2.508	17.914	70.954
4.	1.461	10.435	87.314	2.290	16.360	87.314
5.	.470	3.356	90.670			
6.	.413	2.951	93.622			
7.	.245	1.752	95.373			

8.	.182	1.299	96.672			
9.	.156	1.113	97.785			
10.	.123	.878	98.663			
11.	.067	.478	99.141			
12.	.055	.395	99.535			
13.	.042	.300	99.835			
14.	.023	.165	100.000			

All the four factors are making contribution in explaining total 87.314% of variance. The variance explained by Predictive Analytics is 26.629%, Automated Customer Service is 26.412%, Enhanced Customer Engagement is 17.914%, and Improved Data Management is 16.360.



ScreePlot

"Rotated Component Matrix"

S. No.	Statements	Factor Loading	Factor Reliability
	Predictive Analytics		**.957**
1.	AI models predict future sales trends based on historical data, enabling retailers to plan inventory	.954	
2.	AI models help in marketing strategies, and resource allocation more effectively	.893	
3.	AI helps predict future customer actions, such as likelihood to purchase or churn	.882	
4.	Provide personalized product suggestions by predicting future purchasing behaviors	.872	

	Automated Customer Service		**.969**
1.	AI-powered chatbots provide instant customer support	.958	
2.	It handles routine inquiries, and guide users through purchasing processes	.927	
3.	It improves response times and customer satisfaction	.911	
4.	AI-driven customer service tools operate around the clock, customer queries are addressed promptly	.909	
	Enhanced Customer Engagement		**.880**
1.	Analyzes customer behavior to enhance engagement strategies, improve overall customer experience	.905	
2.	AI can automate and optimize email campaigns, push notifications, and social media posts	.848	
3.	Ensures timely and relevant communication with customers	.826	
	Improved Data Management		**.834**
1.	AI integrates data from various sources to provide a unified view of the customer	.926	
2.	AI tools help in cleaning and maintaining high-quality data	.924	
3.	It is essential for accurate analysis and decision-making	.654	

Factors and the associated variables

The first factor of the study is Predictive Analytics, the variables included under this factor are AI models predict future sales trends based on historical data, enabling retailers to plan inventory, AI models help in marketing strategies, and resource allocation more effectively, AI helps predict future customer actions, such as likelihood to purchase or churn, and provide personalized product suggestions by predicting future purchasing behaviors. Second factor is Automated Customer Service, it includes factor like AI-powered chatbots provide instant customer support, it handles routine inquiries, and guide users through purchasing processes, it improves response times and customer satisfaction, and AI-driven customer service tools operate around the clock, customer queries are addressed promptly. Enhanced Customer Engagement is the third factor of study, its variables are Analyzes customer behavior to enhance engagement strategies, improve overall customer experience, AI can automate and optimize email campaigns, push notifications, and social media posts and ensures timely and relevant communication with customers. Last and fourth factor is Improved Data Management, it includes variables like, AI integrates data from various sources to provide a unified view of the customer, AI tools help in cleaning and maintaining high-quality data, and it is essential for accurate analysis and decision-making.

“Reliability Statistics”

“Cronbach's Alpha”	“Number of Items”
.895	14

Total reliability of 14 items that includes variables for Role of Artificial Intelligence (AI) in Effective Implementation of CRM in online Retailing Sector is 0.895

Conclusion

In summary, artificial intelligence (AI) plays a revolutionary role in the successful use of customer relationship management (CRM) in India's online retailing industry. By analysing enormous volumes of customer data to forecast preferences and behaviours, artificial intelligence (AI) technologies like machine learning and natural language processing allow merchants to provide highly personalised experiences. Customer happiness and loyalty are raised by this personalisation, which eventually results in more sales and profitability. Additionally, regular duties like customer

assistance and enquiries are automated by AI-powered CRM systems, which lowers operating expenses and boosts productivity. Retailers may optimise marketing tactics, inventory control, and customer interaction initiatives by making data-driven decisions with the use of real-time analytics. For internet merchants hoping to succeed in the cutthroat Indian market, AI-driven CRM systems are therefore not only an improvement but also a requirement. Retailers can remain competitive, grow over the long run, and adjust to shifting consumer needs by integrating AI into their CRM systems. The factors that identify the Role of Artificial Intelligence (AI) in Effective Implementation of CRM in online Retailing Sector are Predictive Analytics, Automated Customer Service, Enhanced Customer Engagement, and Improved Data Management.

References

1. Bedi, K., Bedi, M., & Singh, R. (2022). Impact of artificial intelligence on customer loyalty in the Indian retail industry. In Adoption and implementation of AI in customer relationship management (pp. 26-39). IGI Global.
2. Bag, S., Srivastava, G., Bashir, M. M. A., Kumari, S., Giannakis, M., & Chowdhury, A. H. (2022). Journey of customers in this digital era: Understanding the role of artificial intelligence technologies in user engagement and conversion. Benchmarking: An International Journal, 29(7), 2074-2098.
3. Seranmadevi, R., & Kumar, A. (2019). Experiencing the AI emergence in Indian retail–Early adopters approach. Management Science Letters, 9(1), 33-42.
4. Kumar, S., Karn, A., Chauhan, A., & Singh, M. (2023). Role of Business Analytics in Effective CRM Implementation in Retail Sector: A Cross Sectional Research. Journal of Informatics Education and Research, 3(2).
5. Behera, R. K., Bala, P. K., Rana, N. P., Algharabat, R. S., & Kumar, K. (2024). Transforming customer engagement with artificial intelligence E-marketing: an E-retailer perspective in the era of retail 4.0. Marketing Intelligence & Planning.
6. Kaur, V., Khullar, V., & Verma, N. (2020). Review of artificial intelligence with retailing sector. Journal of Computer Science Research, 2(1), 1-7.
7. Malik, R., Jindal, T., & Sharma, A. (2022, April). Role of Artificial Intelligence in Reshaping Retail. In 2022 2nd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE) (pp. 660-664). IEEE.
8. Lari, H. A., Vaishnava, K., & Manu, K. S. (2022). Artifical intelligence in E-commerce: Applications, implications and challenges. Asian Journal of Management, 13(3), 235-244.
9. Dixit, S. (2022). Artifical intelligence and crm: A case of telecom industry. In Adoption and Implementation of AI in Customer Relationship Management (pp. 92-114). IGI Global.
10. Chatterjee, S., & Chaudhuri, R. (2023). Customer relationship management in the digital era of artificial intelligence. In Digital Transformation and Industry 4.0 for Sustainable Supply Chain Performance (pp. 175-190). Cham: Springer International Publishing.