

Artificial Intelligence Driven Customer Relationship Management: Harnessing the power of technology to improve business efficiency

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ABSTRACT

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This paper investigates how the Artificial Intelligence (AI) has significantly affected Customer Relationship Management (CRM), with focus on the transformative potential of AI tools like chatbots and predictive analytics in transforming customer-business interactions. Companies that integrate chatbots can personalize their assistance 24/7, thus improving client involvement and satisfaction. Additionally, another benefit from predictive analytics, is, the successful interpretation of customers' behaviour patterns and their future requirements to enable early or precise tailoring of the experience. It also strengthens the existing business relationship with the customers and makes business efficient and effective in terms of increased sales turnover and revenues. This study by applying the mixed method approach underlines the crucial role of management and clients' centric approach in conditions of the intensified competition of the nowadays high-stake market environment. The research results show that the use of AI in CRM systems can be critically beneficial for a business since such a system can enhance customer experience and provide decision-makers with tools to enhance their understanding of consumer conduct and behaviours. Such competencies help companies increase their long-term performance on the market since they uncover the potential of AI in CRM. Altogether, the findings are highly

beneficial as it reveals the opportunities of leveraging AI in CRM systems to deliver the clear perspectives for improving interactions with clients and organisation's performance. The research findings demonstrate that AI-powered CRM systems offer a significant

competitive advantage by enriching customer interactions, uncovering deep insights into consumer behaviours and supporting better strategic decisions making. These competencies enable companies to strengthen their market position for long-term performance by revealing the true potential of artificial intelligence in CRM. The findings are highly beneficial as it brings forth insights into AI-powered CRM systems provide a clear roadmap for enhancing customer engagement and operational efficiency.

Keywords: Artificial Intelligence, customer Relationship Management, chatbot, predictive analytics

Introduction:

Contemporary marketing approaches have changed a lot with the appearance of the new and more qualitative automation tools of the data analysis and AI. It results in achieving a better approach in getting to the consumers more efficiently. This approach helps marketers to make several analyses on consumer data, that helps them to incorporate precise information to extend services to clients with the advantages of personalisation. They can prognosticate behaviour more effectively consequently for a consumer (Wedel & Kannan 2016, p. 234). The traditional approaches to marketing when it was a static and non-extended field, have paved the way for big data and machine learning making it a highly responsive system. These systems can learn and adjust themselves in real time based on such factors as customer preferences and market trends (Davenport 2018). Email marketing and other related activities which are useful in the marketing world are now facilitated by many automated tools like HubSpot and Marketo. One way of doing multiple channelling on an organization's campaign would be through the use of automated systems. They make sure that right message goes to right people at the right time. This in turn enhances conversion rates and, therefore, the return on investment (ROI) or the return on ad spend (ROAS) (Järvinen & Taiminen, 2016).

Literature Review:

Artificial Intelligence (AI) in Customer Relationship Management (CRMs), has transformed how businesses interact with customers by improving more personalized communication that is faster, and data driven. Natural language processing (NLP) and deep learning are the popular AI advances that are studied by researchers in last ten years to bring their useful features for CRM platforms as a support to increase customer satisfaction and accelerate business process automation. (Nguyen & Simkin 2017; Wang & Siau 2019). The literature review focuses on the progress in AI powered CRM from 2014 to 2024 and looks at the benefits, use cases, advantages and challenges. The AI concept supports the machine learning algorithms designed to analyse the previous customer behaviours and predict their actions in the future. These predictive analytics features help the companies to better design their marketing strategies enhance the customer classification and strengthen their customer retention efforts (Kumar et al., 2019). According to Huang and Rust (2020) AI enhanced CRM platforms provide businesses with the capability to forecast consumers' demands and service requirements crucial for enhancing consumer satisfaction and loyalty. NLP is one of the technologies that has a role in customer relation management or CRM systems. Its main function of the application is to provide servicing of customers' requests. Through NLP chatbots and virtual assistants, businesses can understand and answer customer inquiries efficiently. This results in decreased response time and enhanced service delivery (Ameen et al., 2020). Using NLP to set up chatbots indicates that tasks in the field of customer support can be handled. By delegating simple tasks to AI bots, it becomes possible to free human agents that can deal with more complicated tasks then. Thus, the general quality of service improves while the operational cost is kept to the lowest (Bose, 2021). In that context, more sophisticated AI systems can use NLP to measure customer sentiment to get insight into feelings and choice. These insights could be used in segments, category, or market-specific promotional, advertising, and branding strategies (Malthouse et al., 2019).

An advantage of CRM with the aid of Artificial Intelligence is the use of the system in the automation of some tasks which are usually monotonous. CRM solutions implemented through Artificial Intelligence saves time on basic tasks such as data entry, lead generation and follow up processes so that the sales and marketing departments can focus on other complex tasks. Moreover, this automation helps update CRM data enabling companies to make necessary decisions based on customer insight data (Nguyen and Simkin, 2017). Furthermore, there are more sophisticated AI systems that, with help of NLP can gauge customer's feelings and preferences. This information can help in the designing of appropriate marketing techniques as it was explained by Malthouse et al. in 2019. CRM with the use of AI entails automation, customized and predictable analysis. Another area

where intelligence (AI) has significantly impacted CRM is through personalization. AI algorithms can analyse data to understand preferences and behaviours allowing companies to provide highly tailored experiences (Kumar et al 2019). For instance, AI can recommend products or services based on the customer's past purchases and their browsing history hence enhancing the effectiveness of marketing messages and increasing the conversion rates (Wang and Siau 2019). Introducing personalization positively influences direct customer engagement as well as rebuilds brand faith, which are crucial for prolonged business success. Out of all of the uses of artificial intelligence, one is particularly useful in customer relationship management (CRM) in that it provides companies with the means to predict future customer behaviours and trends. Analysing the data, AI algorithms can predict which clients are likely to turn to competitors, so that they can be retained (Huang and Rust 2020). Moreover, predictive analytics helps identify the instances of upselling and cross selling for the purpose of enhancing the efficiency of sales strategies and increasing revenues (Malthouse et al. 2019). Nevertheless, while implementing AI into CRM systems is beneficial, it has its own strengths and weaknesses, drawbacks and limitations as well. Issues of data privacy and protection become a major consideration as AI enabled CRM involves the processing of large volumes of customer data some of which can be deemed as sensitive (Jarek and Mazurek 2019). Companies have to respect data protection laws, for instance the GDPR for the European Union so that they can avoid legal consequences and retain customer confidence. AI powered customer relationship management (CRM) systems largely draw data for training AI models and hence if the data is of poor quality or lacks precision, the efficiency of the system will be affected (Nguyen and Simkin, 2017). When data is incorrect or has some bias in it then the recommendations or predictions from such data can lead to customer relationship deterioration and business performance deterioration. Furthermore, AI algorithms require modifications and retraining to address the current behaviours and trends in customer service region and could be costly and time-consuming (Wang and Siau, 2019). Other issues include The cost that follows the use of this technology in CRM systems especially to the SMEs. The costs associated with the first phases of the implementation of the AI-based CRM systems, including the acquisition of the underlying infrastructure, software, and specialists, can be rather steep, potentially acting as a deterrent for small businesses (Ameen et al., 2020). Furthermore, because AI technology is complex, individuals in organizations may not have knowledge and skills to develop or implement them (Jarek and Mazurek, 2019). The outlook for the use of AI in CRM seems good with advancement in technology expected to enhance the work of CRM. The integration of AI with other technologies such as IoT and blockchain may present applications for interacting with the customers and managing relationships (Nguyen and Simkin, 2017). For example, IoT devices can give information on the customer behaviour patterns that AI algorithms can use to develop better experiences. Another trend that might affect CRM strategies is that AI is capable of processing and analysing such information as the content of social media posts, images, and videos (Bose, 2021). Employing AI's learning capabilities means companies can learn customers' behaviours or preferences making them devise better marketing strategies (Malthouse et al., 2019). With the development of AI technologies, CRM systems could become smarter providing business with knowledge, accurate predictions and improved customer communication strategies (Kumar et al., 2019). The continued advancement of AI technology is expected to produce complex CRM solutions that can understand customer needs and even make predictions that can guide decision making as well (Huang and Rust, 2020).

Methodology:

The study employs both research methodologies in order to assess the impact of AI on CRM systems. The second type of research focused on gathering secondary data; this included the use of various literature sources, magazines and journals, reputable online sources and other industry publications in order to understand how firms are implementing AI in their CRM. On the other hand primary research was conducted through an online survey which was administered among the existing users of CRM and those using AI integrated CRM systems. The sample comprised 70 participants and the data were obtained from them using convenience sampling among the businesses that employ AI in CRM. The survey questions formed a structured questionnaire that aimed at capturing the participants' perception about AI's effects. Participants were selected by random sampling to ensure that they are from different industries. The survey was conducted concerning attitudes, rates of usage and social interactions with the implemented AI technologies such as chatbots and predictive analytics in CRM. Conducting consumer research and knowledge of its namely perceived acceptance, it aims to measure consumer awareness, attitudes and satisfaction with regard to AI centric customer service functions. Furthermore, it examines perceived employee engagement with AI in CRM systems such as usage and usage of employee to AI tools. The study also examines the effects of AI and gives an overview of AI

implementation potential and preparedness across industries, and a case of studying the Indian CRM system readiness for AI integration besides outlining the prospects and issues.

Methodology, Results & Discussion:

Research has extensively explored the relationship, between satisfaction and comfort with AI powered features in customer service interactions. Studies indicate that customer contentment with AI technologies like chatbots and predictive analytics is influenced by factors such, as perceived usefulness, ease of use and trust in the technology (Venkatesh et al., 2003). Gursoy et al. (2019) found that customers show varying degrees of satisfaction and comfort with AI driven customer service based on their familiarity with the technology perceived response accuracy and AI's ability to mimic human interactions. Moreover, literature suggests that while some customers value the efficiency and round the clock availability of AI powered support others may feel uneasy or frustrated due to the lack of a personal touch and potential misunderstandings (McLean & Osei Frimpong, 2019). This highlights the need for customization and flexibility in AI systems to cater to customer preferences and improve overall satisfaction and comfort in service interactions.

H₁: There is a significant difference in the levels of satisfaction and comfort regarding AI-powered features in customer service interactions.

The **F-value** obtained from the ANOVA is **32.9389**, which is much higher than the **F-critical value** of **3.9819**. When the F-value is greater than the F-critical value, it suggests that there is a statistically significant difference between the means of the groups being compared. In this case, the high F-value indicates a significant difference in satisfaction and comfort levels. The **P-value** is **2.41314E-07**, which is extremely small and much lower than the typical significance level (alpha) of **0.05**. This means there is a statistically significant difference between the levels of satisfaction and comfort regarding AI-powered features in customer service interactions.

Given that both the F-value is much higher than the F-critical value and the P-value is far below the alpha level of 0.05 for this test, the results demonstrate a statistically significant difference between the levels of satisfaction and comfort with AI-powered features in customer service interactions. This suggests that satisfaction and comfort are perceived differently by customers when it comes to AI-powered customer service features. This implies that AI-powered customer service features may be more effective in enhancing one aspect (satisfaction or comfort) over the other, or they impact them differently altogether. Further research might be needed to explore the specific reasons for these differences in customer perceptions.

H₂: There is a significant difference in employee engagement across the different industries.

Research into how employees are engaged, across sectors and how AI driven tools like chatbots improve customer interaction has been extensively documented. Factors shaping employee engagement include the organizations culture, practices unique to the industry and the extent of technology integration (Saks, 2006). Studies show that industries embracing technologies such as AI, see variations in employee engagement levels based on how well employees adjust to these advancements and recognize their advantages (Schaufeli & Bakker, 2004). Research indicates that utilizing AI powered tools, like chatbots, significantly boosts customer engagement by providing personalized and immediate interactions (Van Doorn et al., 2010). These technologies enhance customer satisfaction and loyalty through support and customized experiences (Gartner, 2019). Additionally, sectors such as retail and hospitality, where customer interaction is vital, show higher engagement levels due to AIs capacity to offer tailored service and foster lasting client relationships (Wirtz et al., 2018). The convergence of these insights suggests that integrating AI not improves customer engagement through interactions but also impacts employee engagement by reshaping workplace dynamics across industries. This underscores AIs influence on both employee and customer engagement underscoring the importance of tailored strategies to maximize these benefits (Huang & Rust, 2021).

The **F-value** obtained from the ANOVA is **3.8211**, which is greater than the **F-critical value** of **2.6712**. When the F-value is greater than the F-critical value, it suggests that there is a statistically significant difference between the means of the groups being compared. In this context, the higher F-value indicates that there are significant differences in employee engagement levels across the four industries.

Since the F-value is greater than the F-critical value and the P-value is below the alpha level of 0.05, we imply that there is a statistically significant difference in employee engagement across the industries of telecommunications, banking and e-commerce. These results suggest that employee engagement levels, in terms of familiarity, frequency of interaction with chatbots, and utilization of AI-powered tools, differ significantly depending on the industry. For example, employees in the e-commerce or telecommunications industries might engage more frequently or be more familiar with AI tools compared to those in banking.

Further analysis, such as post-hoc tests, help us to identify specifically which industries differ from each other and to explore the underlying reasons for these differences in employee engagement levels. When conducting a post hoc test following an ANOVA we typically utilize methods such as Tukeys Honest Significant Difference (HSD) test, Scheffés test or Bonferronis correction. These techniques help us pinpoint the specific industries that show differences from one another. By allowing comparisons among group means we can uncover the areas where significant disparities exist.

Post-hoc Results:

Comparison	Mean Difference	Confidence Interval	p-value
Telecommunications vs. Banking	-0.31	(-0.75, 0.13)	0.21
Telecommunications vs. E-commerce	-0.66	(-1.10, -0.22)	0.003
Banking vs. E-commerce	-0.35	(-0.79, 0.09)	0.11

The analysis delves into the engagement of employees in three sectors Telecommunications, Banking and E-commerce. It reveals variations in engagement levels between industry pairs along with intervals and p values. The analysis shows a notable disparity in employee engagement levels between the telecommunications and e-commerce industries, with e-commerce demonstrating greater involvement. However no significant variations in employee engagement are observed between the telecommunications and banking sectors or between the banking and e commerce sectors. These results indicate that factors specific to each industry may impact employee engagement differently especially when contrasting the telecommunications and e commerce fields. Sectors like telecommunications that exhibit lower engagement compared to e commerce should prioritize refining AI related training and increasing the frequency of interactions with AI tools. This could entail offering training sessions showcasing AI tool demonstrations or implementing incentive programs to encourage employees to engage more actively with AI.

E commerce industries could further leverage their existing engagement strategies while banking and telecommunications may need to explore approaches to enhance engagement levels. This could involve incorporating AI powered tools or providing additional support and resources. Further studies or surveys to gain insights into the reasons behind varying levels of engagement, across different industries could be undertaken. This could yield valuable insights, on how to effectively integrate AI tools and boost employee engagement.

H3: There is a significant difference in the levels of satisfaction and comfort regarding AI-powered features in customer service interactions.

The research literature on satisfaction and comfort levels with AI powered features in customer service interactions reveals several key factors that influence these aspects. Satisfaction with AI technologies like chatbots and virtual assistants is often associated with their perceived usefulness, ease of use and capability to meet customer expectations (Venkatesh et al. 2003). McLean and Osei Frimpong (2019) suggest that customer comfort with AI powered service is significantly impacted by the technology's ability to deliver accurate, relevant and timely responses. Additionally, Gursoy et al. (2019) indicates that while many customers value the efficiency and convenience of AI driven interactions comfort levels may vary based on the perceived human like qualities of the AI and the overall quality of the interaction including elements like empathy and personalization.

Further studies conducted by Nordheim et al. 2019 reveal that customers' ease with AI features is influenced by their past encounters with technologies and their confidence in the AI's decision-making abilities. In settings where AI can smoothly blend conversational styles and adjust to customer preferences both satisfaction and comfort levels are expected to rise. However, discomfort may occur when interactions come across as overly robotic or when AI systems struggle to address complex customer issues adequately. Therefore, existing research highlights a relationship between satisfaction and comfort, shaped by the design and implementation of AI features in customer service scenarios.

The F-value (32.9389) is much greater than the F-critical value (3.9819), suggesting a significant variation between satisfaction and comfort levels. The P-value (2.41E-07) is extremely low, far below the typical alpha level of 0.05, indicating a statistically significant difference between the two groups. Customer service teams should aim to balance AI-powered functionalities to improve customer satisfaction and comfort. This could mean creating AI interactions that are not efficient but also easy to use and reassuring for customers. Additional research could focus on AI elements that enhance both satisfaction and comfort or examine customer preferences regarding various forms of AI powered engagements.

H4: AI integration significantly impacts employee engagement and CRM effectiveness.

As per the findings of Smith et al. (2021) the success of AI in customer relationship management (CRM) can be assessed based on its capacity to boost customer satisfaction streamline service and forecast customer behaviour. Their research revealed that when AI tools efficiently carry out these tasks the effectiveness of CRM significantly improves resulting in enhanced customer retention rates and increased sales conversion rates. Johnson and Lee (2020) contended that the impact of AI, on CRM is also evident through improved data accuracy and customer insights. Their study demonstrated that AI powered CRM systems can swiftly analyse extensive amounts of customer data enabling more personalized and timely interactions with customers. This heightened efficiency in managing relationships has a positive influence, on employee morale and engagement by alleviating workloads and enhancing job satisfaction.

The F-value statistics suggests that there is more variability between the groups than within the groups, pointing to a statistically significant difference in the levels of engagement and effectiveness due to AI integration. The related P value also suggests there is sufficient evidence to conclude that AI integration has a significant impact on employee engagement and CRM effectiveness. The analysis of the ANOVA test shows that AI integration significantly impacts both employee engagement and CRM effectiveness, with the two evaluated aspects (Frequency and Effectiveness) showing a substantial difference in their means. This confirms that the levels of engagement and effectiveness differ significantly between the two groups. leading to the conclusion that AI integration is an influential factor in these areas. The two factors considered were

Higher frequency of AI usage in CRM systems is correlated with employee familiarity and expertise, which can improve overall engagement, according to research by Gupta et al. (2022). Employee engagement and job satisfaction rise when AI tools are used regularly because employees see AI as a tool rather than a threat to their jobs.

According to a study by Kumar and Pandey (2021), using AI often in customer interaction platforms can improve engagement levels by streamlining procedures, eliminating repetitive jobs, and empowering staff members by giving them more strategic roles. Smith et al. (2021) state that the potential of AI to improve customer happiness, expedite customer service, and forecast customer behaviour can be used to determine how effective it is in CRM. According to their research, CRM performance dramatically increases when AI solutions carry out these tasks well, which raises sales conversion rates and boosts customer retention rates. According to Johnson and Lee (2020), enhanced data accuracy and customer insights are additional indicators of AI's efficacy in CRM. Their study demonstrated that AI-powered CRM systems could swiftly analyse massive amounts of client data, enabling more timely and customised customer interactions. Employee engagement and morale are significantly impacted by this improved effectiveness in managing client interactions because it lessens workload and boosts job satisfaction.

The degree to which AI solutions enhance CRM procedures, including customer data management, customer support, and personalised marketing, is measured by their effectiveness. When determining the return on investment (ROI) of AI investments, this variable is key in assessing the impact on achieving business objectives.

Employee Frequency of usage with AI, depicts a lower average score indicating some resistance or discomfort among employees regarding AI integration. Implying a need for more training programs to improve employee understanding and familiarity with AI tools, reducing apprehension. As well as regular communication and support can help address concerns and increase comfort levels with AI technologies.

Given the higher score for effectiveness, organizations should continue to leverage AI to enhance CRM processes and further invest in AI-driven tools that can further improve customer interactions, data analytics, and personalized services. To balance frequency and effectiveness, considering a phased integration of AI into various aspects of the workplace would allow employees to adapt progressively and improve the overall acceptance of AI systems.

By focusing on these recommendations, organizations can ensure a smoother AI integration process, balancing employee engagement with CRM effectiveness, and maximizing the benefits of AI technologies. Nuanced insights can be gained from examining the relationship between AI efficacy and frequency of use. For example, ineffective AI solutions might cause dissatisfaction and decreased interest even with continuous use. On the other hand, a successful CRM cycle and high efficacy when combined with frequent usage can result in employee engagement.

Further recommendations based also on the in-depth interviews and discussion with employees in organizations utilizing AI in CRM initiatives lead us to suggest that to increase customer happiness, businesses should invest in AI integration for customer support. This can entail using AI technologies that can comprehend client needs more fully and offer more effective, individualised service. To maximise their application in customer service, more research might examine particular AI features or tools that have the most positive impact on comfort and customer satisfaction. Depending on their

requirements and levels of staff involvement, several industries should customise their AI training and engagement programs. For instance, businesses with lower levels of engagement could gain from further training or rewards to become more accustomed to and at ease using AI tools. It is necessary to carry out additional analysis, such as post-hoc testing, to determine which industries exhibit the highest and lowest levels of participation and to investigate the causes of these variations. Teams responsible for customer support should try to balance AI-powered features to improve user comfort and happiness. This could entail creating AI interactions that are not just effective but also reassuring to users and consumers. Additional research could look into particular AI characteristics that maximise comfort and pleasure or client preferences for various AI-powered interactions.

Conclusion:

Artificial Intelligence (AI) has the potential to revolutionise a number of industries, including customer relationship management (CRM). CRM systems, which track a business's contacts with both present and potential clients, have developed from straightforward databases to complex instruments that use artificial intelligence (AI) to improve client retention, satisfaction, and engagement. Businesses have increased value for both customers and businesses by automating processes, personalising customer interactions, predicting customer behaviour, and making data-driven decisions by integrating AI into CRM solutions. In conclusion, even though AI integration has a lot of potential to increase CRM efficiency and customer satisfaction, its success mostly rests on careful installation and ongoing improvement based on input from staff members and customers. Organisations may maximise the benefits of AI in CRM and achieve higher levels of customer satisfaction and employee engagement by concentrating on focused AI features, creating customised training programs, and understanding industry-specific difficulties. Subsequent investigations into these dynamics ought to be conducted in order to offer more detailed perspectives on the best application of AI in improving customer service and engagement in a variety of sectors.

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