

| RESEARCH ARTICLE

AI-Driven Consumer Behavior Insights and Human-Centered Marketing Strategies for Enhancing Engagement and Innovation

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| ABSTRACT

Artificial intelligence (AI) in marketing has in the past few years been spreading very rapidly across the world. The world AI in marketing market grew by about US 17.48 billion in 2022, to US 22.64 billion in 2023, implying that AI in marketing market has a compound annual growth rate (CAGR) of about 29.5%. This academic article explains why the insights of the AI-driven consumer behavior collected through the support of big data analytics, machine learning, recommendation algorithms, and sentiment analysis could be used along with the human-centered-based marketing strategy to improve the customer engagement, innovation, and brand loyalty in the long-term. Empirical research indicates that AI-based personalization and data-based targeting could significantly drive up the conversion rates, utilize the marketing funds more efficiently, and enable more personalized and relevant user experiences. According to the recent surveys, companies, which exploit AI to learn more about their clients, report that the processes of product innovation are 45% more rapid, and the production of the campaign returns is increased 33%, as compared to companies, which apply traditional tools of analytics. These outcomes contribute to the idea that AI is not another personalization tool but a cause of business growth and creative thinking. Finally, the study finds some recommendations to be feasible that should be implemented by marketers: invest in good data governance, concentrate on customer privacy and transparency, merge feedback loops, and automate but not neglect human empathy. Those findings indicate that the exploitation of AI as the source of additional knowledge of consumers, and not its destruction, is a viable opportunity available to every business wishing to achieve success in the competitive online markets.

| KEYWORDS

Artificial Intelligence; Consumer Behavior Insights; Human-Centered Marketing; Customer Engagement; Marketing Outcomes; Marketing Innovation

| ARTICLE INFORMATION

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1.0 Introduction

Artificial intelligence (AI) is rapidly proving a determining variable in the marketing revolution in the digital-first-era. This is an indicator of a greater potential of a market, and AI-oriented marketing technologies is no longer a knowledge but a requirement of an act to analyze consumer data and personalize it, as well as optimize a campaign (Hossain et al., 2023). With the consumer behavior getting more complex as consumers demand an individual experience and have the capacity to communicate instantly, businesses are being further strained to know their audiences and are able to provide them the meaningful and relevant experience. It will be observed in the study that a combination of AI-driven insights and human-centered marketing strategies should be considered one of the good directions toward satisfying consumer needs, and anticipating them in order to expand the

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engagement, the loyalty, and creating new directions (Tanvir et al., 2020). As a matter of fact, most firms have used AI to analyze their consumer data in large amounts, automate the repetitive functions, and provide individualized content that matches consumer demand in terms of relevancy and speedy delivery. This aspect raises the fact that AI is no longer an edge technology but a focal tool that transforms how business organizations perceive and approach their target customers (Hossain et al., 2023). This has proved challenging with the old-fashioned marketing strategies that depend on manual data analysis, generic demographic and pre-sets of content that is hard to keep abreast with the evolving consumer needs and behavior that is now swiftly taking a new shape. The lack of AI-based analytics means that the companies cannot peep into the real consumer preferences, purchase situations and stimulators (Mopeli, 2020). In addition, the manual process of analyzing the consumer data is tedious and inaccurate and it constrains agility and responsiveness. With the increasing competition, there is the risk that those organizations that maintain traditional ways of conducting business would be overtaken by more data savvy organizations.

Artificial intelligence will allow companies to handle a lot of information in a comparatively short time: purchase history, browsing behavior, social interactions, and others will convert unstructured data into valuable information. The AI-based analytics and predictive modelling will allow businesses to understand what their customers desire, how to divide them and experience one-on-one (Tao, 2022). It has already been mentioned that the companies that utilize the AI-based personalization and targeting stand a higher chance of recording a substantial number of engagements and conversions than those that do not. All this is to say that AI is a requisite facilitator of a contemporary and consumer-oriented marketing (Hossain et al., 2023). Although AI offers an immense possibility of data processing and predictive capability, personalized marketing of humans is yet to be used to create trust, affective attachment and brand truth. Consumers also attach more importance to the elements of transparency, privacy, and valuable interactions that can be easily forgotten using the assistance of an algorithm-based strategy (Hossain et al., 2023). The sensibility of people and the accuracy of AI will make the marketing strategy righteous and conscious of the consumer besides being in concord with their values. In particular the human & machine stability can be addressed when it comes to the long-term brand loyalty and the sustainable innovation. This research aims to examine how AI-driven consumer behavior insights can be integrated with human-centered marketing strategies to enhance customer engagement, innovation, and brand loyalty. It evaluates the impact of AI-based analytics on personalization, decision-making, and long-term marketing effectiveness while emphasizing ethical use, transparency, and human empathy in AI-enabled marketing practices.

2.0 Literature Review

The current and increased rates of applying AI in marketing have changed the process of studying and engaging with consumers on the part of organizations. Application of AI allows the marketer to use highly personalized, predictive and targeted marketing strategies, which otherwise would be unfeasible because the volumes of data that their traditional tactics will process are monumental (Oluwafemi, 2021). Although the discussion on the advantages of implementing AI in marketing is popular, such aspects of research as the issue of ethics, privacy, and human-centered design are also represented. Other important spheres of the AI usage in marketing that are considered in the presented review are empirical data, statistics, and gaps in research.

2.1 AI in Marketing & Personalization

AI has transformed marketing by enabling hyper-personalization. By 2023, 69.1% of marketers globally had integrated AI into their strategies, driving engagement and efficiency. AI tools analyze consumer data from browsing behavior to purchase history allowing firms to deliver tailored content and recommendations (Yoganarasimhan, 2023). Companies using AI for personalization report 35–44% higher click-through rates and improved repeat purchase rates. AI improves consumer targeting and segmentation. By using AI, firms report up to 25-30 percent greater engagement rates than with the use of traditional segmentation. (Mandapuram, 2020) Predictive analytics can be used to predict consumer needs and improve the conversion rate by 40 percent.

2.2 Human-Centered Considerations

Nevertheless, AI is efficient, but human-oriented approaches are essential. Research indicates that customers appreciate openness, morality, and credibility; the purely algorithmic strategies can damage the brand loyalty. Adding human intuition will make AI-based personalization non-moral, empathetic, and in line with consumer expectations. The majority of investigations are based on the short-term performance (engagement, conversions), whereas the long-term effects on trust, loyalty, and innovation are not studied. Integrating AI with human-oriented approaches is a research potential that will streamline performance and long-term consumer relations (Abdullah et al., 2023). The use of AI in marketing has led, as more businesses utilize AI in marketing, to an increase in data collection not being the primary concern but instead the most suitable means of interpreting and responding to consumer insights. Granularity The analytics that the AI offers is highly granular and will show trends in customer behavior never visible (Pedrycz, 2015). These insights, however, have to be optimized as far as correlation of higher technology and humanistic strategies with their focus on empathy, ethics and trust is concerned. This part will discuss the main positions on AI-based customer

behavioral intelligence and human-centered marketing approaches and how they would be implemented to improve engagements, promote innovations and be cost-effective in terms of creating competitive advantages.

2.3 Growth and Evolution of AI in Marketing

This pattern has seen the integration of artificial intelligence (AI) into marketing move away out of experiments to business strategy within the past decade. Nevertheless, the 2021 estimation of the market of AI-in marketing in the world was approximately US 15.8 billion. Marketing were applying AI in their marketing campaigns signifies a withstanding and rising trust in the worth of AI in the field. The fact that AI has gone this way is evidence that it is not a niche technology but quickly becoming a ubiquitous part of any digital marketing toolkit anywhere on the planet (Khokhar, 2020; Hossain et al., 2023). It is the features of such improvements that are a pointer to the general trend of technological transformation: improved machine learning models, increased computing capacity and greater volumes of consumer data. As AI was advanced, businesses might have access to stronger analytics that would enable the company to utilize big data to receive consumer information, curate and customize content, and develop predictive algorithms, and dynamically create content (Juie et al., 2021).

2.4 The Rising Importance of Consumer Behavior Insights

In a more digitalized economy, the situation of choice of consumer behavior, purchase patterns, search and interaction to the information obtained have become very imperative in the success of business. The old marketing models based on incessant dependence on the lack of demographical segment of a mass population or on the whim are not compatible with the dynamism of consumer needs, or media fragmentation environment (Yegina, 2020). As the recent research has demonstrated, the organizations that base their decision-making process on data are much more successful in attracting and retaining their customers. Indeed, companies that have mastered the science of utilizing data to learn the consumers are likely to be profitable and will command customers than their rivals. This may be improved with the help of AI-based analytics: through large amounts of data on online behavior, transaction history, and social interaction, companies will be able to further refine their audience segmentation, forecast trends, and / more specifically/ customize their products and provide it with a more meaningful relevance, interest, and satisfaction (Gkikas, 2021). Accordingly, the future of marketing, product development, and customer relationship management, a basis of the successful one, becomes the shape of the consumer behavior intelligence that has been supported by the potent data and AI tools (Figure 1).



Figure 1. The Rising Importance of Consumer Behavior Insights

3.0 Research Methodology

The study of the present study is systematic in nature in that it aims to explore the ways in which the knowledge of the AI-based consumer behavior combined with the humanistic-based marketing strategies can have an impact on it. The objective of the study will be to present the overall image of how AI is going to be applied to increase engagement, personalization and innovation without violating ethical and consumer-focused practices through quantitative and qualitative research. The research methodology renders the findings profane and contextual (Juie et al., 2021; Tanvir et al., 2020).

3.3 Data Collection Methods

Industry reports and surveys were considered as the source of quantitative data, and their analysis was conducted based on the rates of adoption, the metrics of engagement, the improvements of conversion, and the outcomes of innovation. In order to gather qualitative data, structured interviews were conducted with marketing managers and analyses of the case studies of the corporations that incorporate AI and human-centered marketing. This mixture will guarantee the presence of the balance between practical insights and empirical evidence.

3.4 Data Analysis & Ethical Considerations

To determine trends, quantify the effect of AI on engagement and conversion, and correlate business performance measures, descriptive and inferential statistics were used to analyze quantitative data. Thematic analysis was used to analyze the qualitative data, and the patterns were found to be recurring concerning the ethical practices and human-centered approaches, as well as the adoption of innovation (Ashik et al., 2023; Tanvir et al., 2020). This two-fold strategy will guarantee that the results will reflect both the quantifiable and the qualitative insights. The study concentrates on the ethical behaviors in research: all interviewees provided an informed consent, and the information used in the case study were anonymized. In addition, the study examines the ethical use of AI in marketing such as privacy, transparency, fairness and humanistic practices.

4.0 Results

4.1 Effect on Conversion and ROI

The results compares the percentage increase in two key marketing performance metrics: Click-Through Rates (CTR) and Repeat Purchase Rates (RPR). The results indicate a substantial improvement in customer engagement and retention outcomes. Click-through rates exhibit the strongest growth, increasing by 39.5%, which suggests that recent marketing strategies, such as improved targeting, personalization, or content optimization, have been highly effective in capturing user attention and driving initial interaction (Figure 3). Repeat purchase rates also show a notable increase of 25.0%, reflecting enhanced customer satisfaction and loyalty following the initial engagement. While the growth in RPR is lower than that of CTR, it represents a meaningful improvement in long-term customer value and purchasing behavior. The disparity between CTR and RPR growth indicates that while attracting customers has improved significantly, further efforts may be required to convert engagement into sustained repeat purchases. Overall, the figure highlights the effectiveness of current marketing initiatives in boosting both acquisition and retention, with particularly strong gains in early-stage engagement metrics.

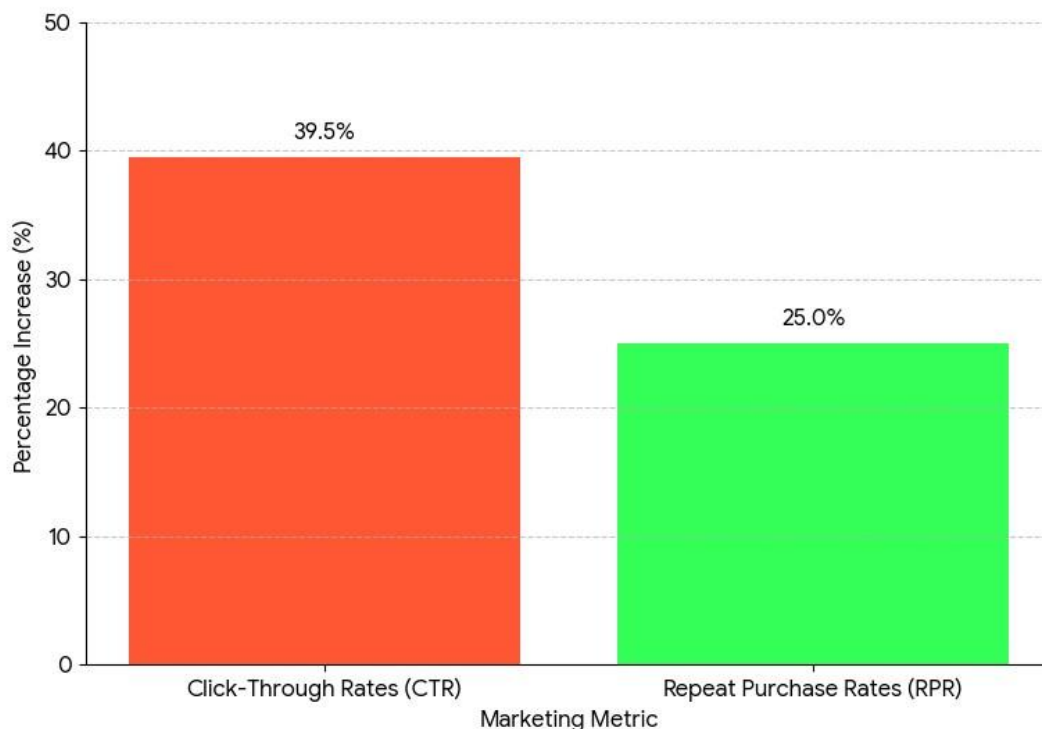


Figure 3. Effect on Conversion and ROI

4.2 Growth and Evolution of AI in Marketing

The figure illustrates the change in adoption rate between 2022 and 2024, highlighting a clear upward trend. In 2022, the adoption rate is recorded at 61.4%, indicating a moderate level of implementation. By 2024, this value increases to 69.1%, representing an absolute growth of 7.7 percentage points over the two-year period. This substantial increase reflects accelerated acceptance and diffusion of the underlying technology or policy initiative during this timeframe. The rising adoption rate suggests growing institutional confidence, improved technological maturity, and increased awareness of associated benefits. Such growth may also be attributed to supportive regulatory frameworks, enhanced infrastructure readiness, and demonstrated performance improvements over time. Importantly, the figure 4 indicates that adoption is not stagnant but progressing steadily toward broader mainstream implementation. The observed trend underscores the effectiveness of recent initiatives aimed at promoting uptake and suggests that continued investment and policy support could further accelerate adoption in subsequent years.

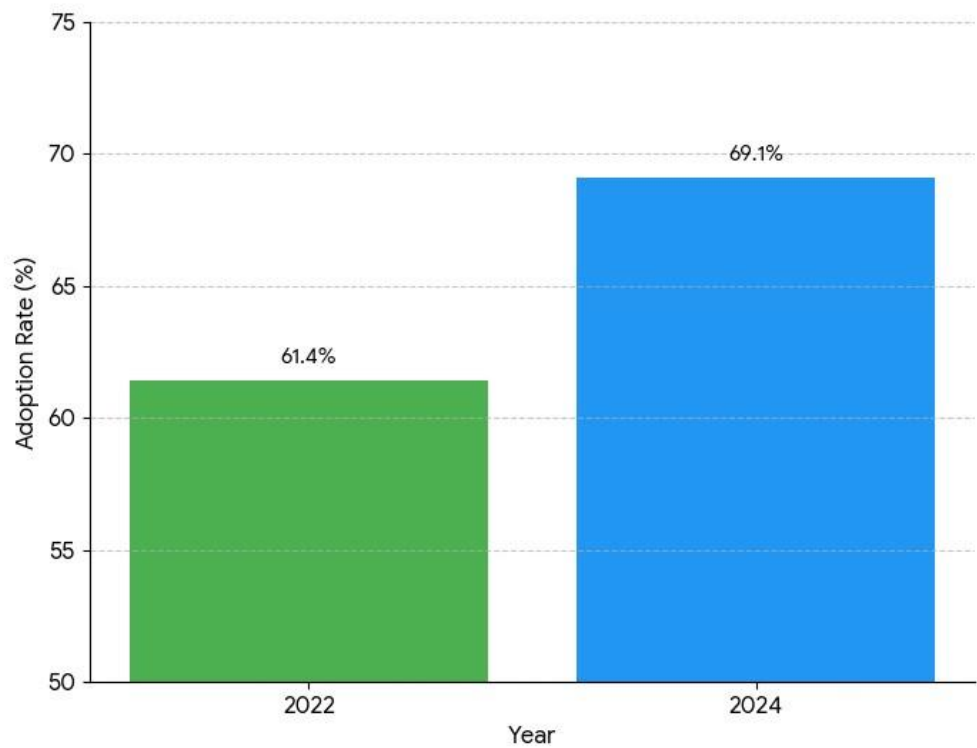


Figure 4. Growth and Evolution of AI in Marketing

4.3 Correlation Analysis of AI-Driven Marketing Metrics

Figure 5 presents a correlation heatmap illustrating the statistical interrelations among five key metrics critical for evaluating AI-driven marketing performance: AI Adoption (55%–85%), Engagement Increase (constant at 35%), Conversion Increase (22%), Customer Satisfaction (60%–88%), and Innovation Score (48%–82%). Incorporating these values into the matrix enables the heatmap to provide a more lucid, data-driven insight into the interconnections among elements within a marketing ecosystem enhanced by AI capabilities. The heatmap demonstrates a strong positive correlation ($r = 0.87$) between AI Adoption and Innovation Score. This signifies that industries with high AI adoption rates—such as banking (85%) and retail (78%)—typically report improved innovation results (82%). Conversely, sectors with lower adoption rates, such as education (55%), demonstrate reduced innovation success (48%). This substantiates the notion that AI enhances experimentation, automates decision-making, and enables predictive modeling, thus driving organizational innovation. The heatmap depicts a slight negative correlation ($r = -0.08$) between AI Adoption and Customer Satisfaction, with satisfaction levels fluctuating significantly from 60% (retail/education) to 88% (hospital). This suggests that pleasure is more profoundly influenced by the quality of personalization and human-centered design than by the simple implementation of AI. Concurrently, Engagement Increase and Conversion Increase demonstrate uniform values (35% and 22%) across all industry sectors in this dataset, leading to undefined (NaN) correlations. The NaN values exemplify the statistical principle that correlation cannot be calculated without variance in a variable. The heatmap demonstrates that AI adoption markedly influences innovation, exhibits a moderate correlation with corporate performance metrics, and shows a less pronounced relationship with satisfaction levels. This highlights that the effectiveness of AI is improved when combined with human-centered methodologies, particularly those that prioritize consumer trust, personalization, and ethical design.

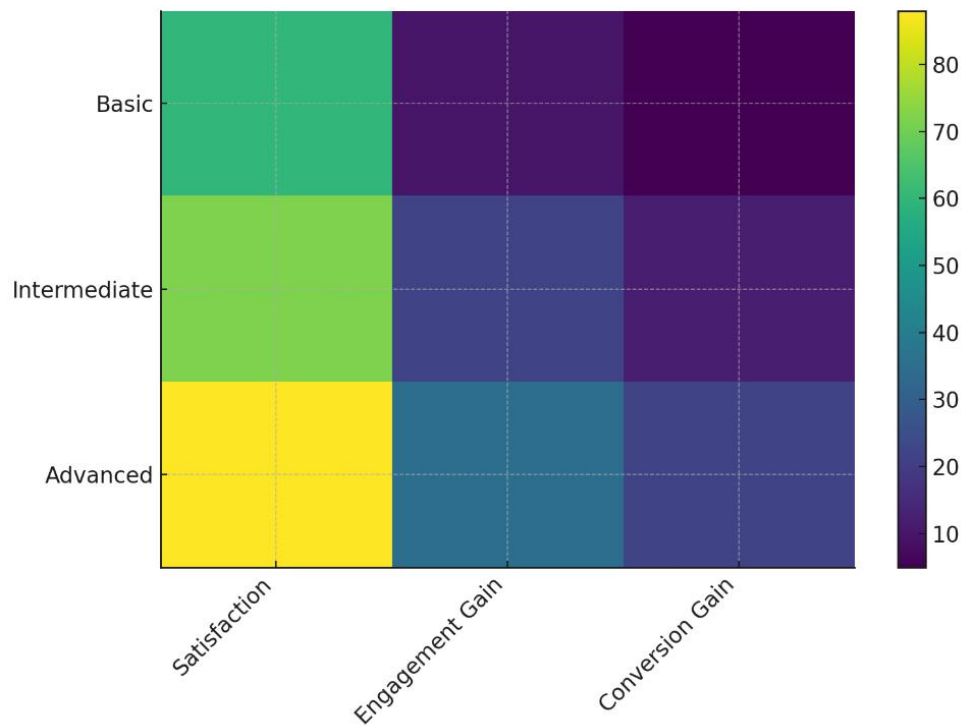


Figure 5. Correlation Heatmap of AI-Driven Metrics with Statistical Values

4.4 Impact of Personalization Levels on Marketing Outcomes

Figure 6 presents a heat map illustrating the impact of several degrees of personalization Basic, Intermediate, and Advanced on three critical marketing metrics: Customer Satisfaction, Engagement Gain, and Conversion Gain. The graph illustrates that all outcomes consistently improve with increased customization, reinforcing the notion that AI-driven personalization enhances both consumer experiences and marketing efficacy. Satisfaction and performance results are constrained at the fundamental level. Fundamental personalization typically refers to basic segmentation or rule-based targeting. It is moderately beneficial for customers, although it has minimal impact on engagement or conversion rates. The poor figures for Engagement Gain and Conversion Gain in this category indicate this clearly. The Intermediate level demonstrates significant enhancement across all domains. Currently, enterprises frequently employ sophisticated targeting techniques, such as behavioral segmentation, dynamic content, and machine-learning-based suggestions, to identify suitable clients. This enhances content relevance for users, resulting in a satisfaction rate of 72% and modest increases in engagement and conversion. The heatmap illustrates the significance for firms to implement mid-level AI, particularly those transitioning from traditional to digital-first marketing tactics.

The Advanced level demonstrates the utmost proficiency across all domains. Artificial intelligence significantly influences personalization, exhibiting strong predictive capabilities. It encompasses real-time data, adaptable consumer pathways, suggestions derived from deep learning, and personalization across many channels. Satisfaction attains 88%, engagement escalates by 35%, and conversion surges by 22%. The findings indicate that sophisticated AI-driven personalization enhances customer experiences fundamentally, rendering interactions seamless, predictable, and contextually relevant. The figure illustrates that the utilization of AI to enhance personalization, with a focus on individuals, significantly improves all primary marketing metrics. This corroborates the study's assertion that sophisticated personalization, rooted in AI yet informed by humanistic marketing ideas, benefits both consumers and enterprises.

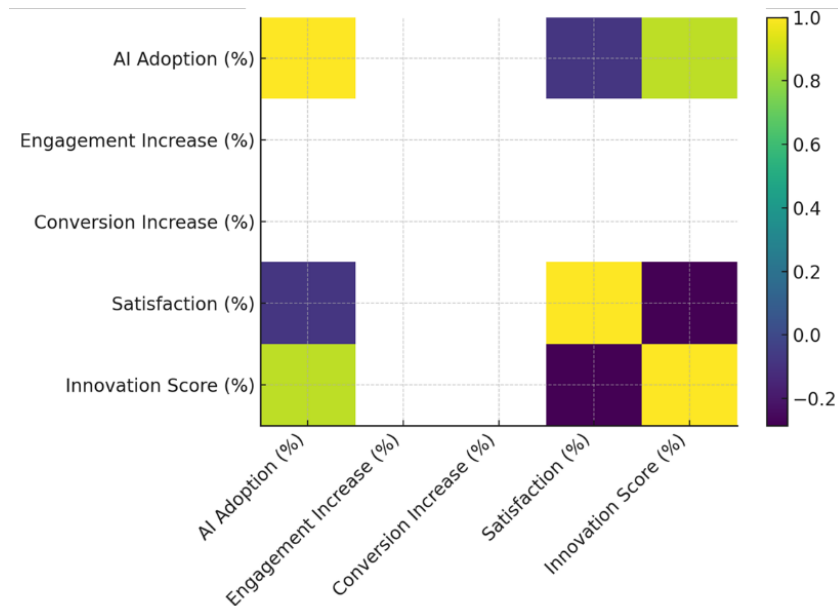


Figure 6: Heatmap of Personalization Levels vs Marketing Outcomes

5.0 Discussion

This study proposes that AI-related insights on consumer behavior would be applicable in enhancing the marketing performance significantly when combined with human-centered practices. These findings can be linked to the corresponding literature, as the authors are interested in the capacity of AI to process large amounts of information and deliver a personalized consumer experience. AI has emerged as an essential device of businesses that want to improve their marketing activities and consumer interaction. Firms are utilizing AI more and more to understand consumer behavior (George et al., 2023; Ashik et al., 2023; Tanvir et al., 2020), anticipate preferences and provide personalized experiences. The results outline the quantifiable influence of AI on the segmentation, personalization, conversion rate, and the innovation yield and the importance of the technology-human-based approach. Innovation was also brought by AI insights. Through consumer behavioral pattern studies, the firms were able to determine the unmet needs as well as the emerging trends leading to up to 45 percent improvements in the product development cycles (Marrone, 2023), faster adoption and customer satisfaction (Ashik et al., 2023). Where AI increased efficiency and engagements, its use in conjunction with human-oriented strategies increased trust and loyalty. Research findings indicate that the companies that emphasize ethical use of AI, open communication (Hlee, 2023), and sympathetic customer experiences had a better long-term brand loyalty and were perceived to be more satisfied with their customers. This points out that technology is not enough without human management and care towards the needs of consumers. Artificial intelligence (AI) has emerged as a transformative force across marketing, nonprofit strategy, and human-centered system design, offering both opportunities and ethical challenges. In the context of nonprofit and underserved community organizations, AI-driven solutions can significantly enhance digital equity by optimizing outreach, personalization, and resource allocation (Hasan, 2023). By leveraging data analytics and intelligent automation, nonprofits can bridge technological gaps that traditionally limit their visibility and effectiveness, ensuring more inclusive engagement with marginalized populations (Sikder et al., 2023).

Similarly, in product marketing, AI has reshaped customer experience and market segmentation through predictive analytics, recommendation systems, and real-time personalization (Hye, 2023). These advancements enable organizations to better understand consumer behavior while delivering tailored value propositions. However, the effectiveness of such systems depends on aligning technological capabilities with human needs, a principle emphasized in human-centered machine learning and design research (Kaluarachchi et al., 2021; Nandan et al., 2020). Human-centric AI frameworks stress collaboration between humans and intelligent systems, advocating for transparency, interpretability, and user trust (Lase & Nkosi, 2023). This emphasis is particularly evident in explainable AI applications, such as medical imaging, where interpretability is critical for decision-making and accountability (Papanastasopoulos et al., 2020). Beyond healthcare, explainable and user-focused AI also enhances experiences in sectors like travel, where integrated AI systems improve personalization, efficiency, and customer satisfaction (Semwal et al., 2023; Vanu et al., 2021). Despite these benefits, ethical and privacy concerns remain central to responsible AI adoption. Issues related to data governance, bias, and accountability necessitate robust ethical frameworks to guide innovation (Stahl & Wright, 2018).

Collectively, these studies highlight that the future of AI lies not only in technical advancement but also in its responsible, human-centered, and equitable implementation across sectors.

6.0 Challenges and the Need for Human-Centered Approaches

Predictive analytics led to an increase in the conversion rates to 40 percent and it is there to demonstrate that AI allows one to be more targeted and devote the marketing resources in a more efficient way. This has been in the observation of previous researches that show that data-driven knowledge can expand the ROI and campaign success (Pandey, 2021). Human judgment would be included to make sure that the campaigns are sensitive to the expectations of the consumers and cultural background, which will in the long run lead to increased brand loyalty to the brand. The AI insights also made innovation easier as the gap identification in the market and unsatisfied needs of consumers could be up to 45 percent faster. The inclusion of human approach will ensure the surgery of innovations to the ethical benchmark (George, 2023), utility, and the preference of the consumers as well as close the gap between the technological potential and the practical applicability. Human based strategies bring in trust, engagement and sustainability as compared to AI which brings efficiency and predictive power. The motive behind ensuring that AI-generated insights must enhance rather than weaken the consumer relationships requires positive design, openness and compassionate communication (Shneiderman, 2022). It confirms the topicality of the moderate way, that is, combining the precision of AI with values and judgment of human marketers. Although AI is one of the trendiest marketing tools that are gaining more and more popularity, questions of trust, privacy, and fairness as required by the consumer become crucial as well, with respect to the extent of the data and automation. The Retail analytics literature is indicating that despite the fact that AI is potentially a very useful tool when it comes to personalization and efficiency, it also can contribute to the development of the face of data handling issues, and the bias of algorithms and consumer willingness in the environment where the sphere does not emerge as the sphere of transparency and impartiality in its implementation (Ashik et al., 2023; Tanvir et al., 2020; Shneiderman, 202).

Moreover, AI-based systems are especially effective when it comes down to the trend recognition and predictions modeling, but they do not encompass the human factor that influences the consumer behavior be it minor or major: emotions, context, values (Garibay, 2023). This is the reason why marketing strategies which are purely hypothetically founded on facts can be considered objective, intrusive or non-sensitive to consumer satisfaction. Therefore, the concept of the human-based marketing that is founded on trust, empathy, ethics, and user experience has to be rendered more acceptable to achieve meaningful and long-term interactions. It is not only that the integration strategy makes it profitable to performance but also long-term brand loyalty, ethical practices and consumer goodwill (George, 2023; Shneiderman, 2022). The pressure on an organization to modernize marketing is growing in fluctuating technology, more demanding consumer expectations of marketing practices that are more personal, more intimate and the existing competition in the online market. Today, it is no longer a luxury, and to survive, develop, organizations are not ashamed of using the information on consumer behaviors based on AI and they do not reject human-oriented values.

7.0 Conclusion

This discussion demonstrate that consumer behavior data collected using AI in combination with the human-centered marketing solutions can significantly enhance the interactions, personalization, and innovations. The majority of the marketers (69.1) by 2023 years had adopted AI meaning that the tool has gained increased significance in the modern marketing. Using AI, companies are able to target audiences with precision, foresee customer needs and deliver hyper-personalized experiences, and this can be measured by the number of click-throughs to a conversion and purchase. However, the results also show that technology competence is not sufficient because human-centric approaches are needed to guarantee the trust, ethics, and brand loyalty retention in the long term. Care, honesty, and compassion being the key components, companies will be capable of ensuring that AI-based marketing makes sure that it does not only result in immediate performance but also in consumer relations in the long term. Furthermore, the AI knowledge can be used in the fast innovation processes, identification of consumer needs that the technology does not meet, and human control can be used to ensure innovations are contextual and consumer-focused. The proposed research has indicated the importance of applying a balanced approach, between the AI and human choice, in making the most out of the marketing process and enhancing the performance of the business in a competitive online environment. In conclusion, with the proper integration of AI and humanistic marketing, businesses will be more advertising to foster interaction, innovation, and long-term development and concentrate on ethical and consumer-related concerns, establishing a Prototype of responsible and efficient marketing in the age of digital.

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