Critical Analysis on Artificial Intelligence and Sustainable Marketing Practices of FMCG Goods

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Abstract

Artificial intelligence and its tools are the business aggregators for search engine optimization in light of digital business. At present the digital customers are gaining more importance for societal marketing. For social media analytics and digital marketing AI plays a significant role for assessing potential customers there by generating revenue for the business. For the global business and sustainable marketing practices digital media and digital Platforms are prerequisites for sustainable marketing practices. Every international customer is interested to know digital KYC, past self-trend and marketing strategies of the exciting customers of the FMCG industry. AI tools help to ensure just in time delivery of FMCG Goods for the Global customers. In this research study, the researcher has used secondary data for data analysis and interpretation. The statistical tools such as t-test for data analysis on the basis of which conclusion is drawn.

Keyword: Artificial Intelligence, Sustainable Marketing Practices, FMCG Goods, Search Engine Optimization, Global Customer, Digital KYC, Digital Business

INTRODUCTION

Artificial Intelligence (AI) has transformed various industries, and the fast-moving consumer goods (FMCG) sector is no exception. As sustainability becomes a priority for businesses, AI-driven marketing practices have emerged as a powerful tool in achieving sustainable goals. FMCG companies are increasingly integrating AI technologies to enhance consumer engagement, optimize global customer reach, improve cost efficiency, ensure digital data security, boost search engine optimization (SEO) performance, and reduce environmental impact. These AI-driven strategies not only contribute to the sustainability agenda but also offer competitive advantages by aligning with the evolving expectations of environmentally conscious consumers.

Consumer engagement is a critical component of FMCG marketing, and AI has the potential to revolutionize how brands interact with their customers. Through advanced data analytics and machine learning algorithms, AI enables companies to deliver highly personalized content, predict consumer preferences, and offer tailored recommendations. This enhanced engagement leads to stronger relationships with consumers and drives higher conversion rates. AI-powered chatbots, voice assistants, and automated customer service platforms further streamline communication, ensuring that consumers receive timely responses and a seamless experience.

In an increasingly globalized market, global customer reach is vital for the growth of FMCG brands. AI helps companies scale their marketing efforts by analysing vast amounts of data from diverse regions, identifying emerging trends, and customizing campaigns for specific demographics. By leveraging AI, FMCG companies can target global audiences more effectively, ensuring that their

messaging resonates with consumers from various cultural backgrounds, thus expanding their market presence.

Cost efficiency is another key benefit of AI-driven marketing. Traditional marketing campaigns often require significant resources, but AI allows companies to optimize their budgets by automating processes, identifying the most effective channels, and minimizing wastage. Predictive analytics powered by AI can forecast campaign outcomes, enabling brands to allocate resources more effectively and reduce unnecessary expenses. This cost efficiency is especially crucial in sustainable marketing, where reducing the environmental and financial costs of campaigns is a priority.

The use of Digital Know Your Customer (KYC) technologies in FMCG marketing ensures enhanced data security. AI-driven Digital KYC processes allow companies to identify and onboard customers efficiently, while also safeguarding sensitive information through advanced encryption and fraud detection systems. This is particularly important as consumers demand greater transparency and security when sharing personal data.

AI also plays a significant role in improving SEO performance. With search engines continuously evolving, AI tools help FMCG brands stay ahead by optimizing content, identifying relevant keywords, and tracking performance in real-time. This ensures better visibility and higher rankings, leading to increased traffic and engagement.

Finally, AI's ability to reduce the environmental impact of marketing activities, such as energy consumption, is a critical aspect of sustainable practices. By automating energy-intensive processes and optimizing marketing resources, AI contributes to the overall sustainability of FMCG campaigns. As companies look to reduce their carbon footprint, AI emerges as a valuable ally in balancing economic and environmental goals.

In summary, AI has become an essential tool in driving sustainable marketing practices for FMCG goods. From enhancing consumer engagement to improving operational efficiency and minimizing environmental impact, AI-driven strategies are reshaping how FMCG companies market their products and engage with global consumers in an increasingly digital and sustainable world.

REVIEW OF LITERATURE

The integration of Artificial Intelligence (AI) in marketing has revolutionized the way businesses engage with consumers, particularly in the fast-moving consumer goods (FMCG) sector. Brynjolfsson & McAfee (2017) discuss the potential of AI in transforming businesses by automating complex decision-making processes and enhancing operational efficiency. In the context of consumer engagement, AI's ability to personalize marketing efforts significantly improves the interaction between businesses and their customers, as highlighted by Pappas & Pappas (2020), who examine AI applications in marketing and their effectiveness in reaching consumers more accurately.

Loebl & Walter (2018) explore the academic insights and business implications of AI in marketing, underscoring its role in improving customer engagement and driving sustainable marketing practices. These findings are echoed by Kim & Sundar (2018), who examine how intelligent service agents influence consumer experiences, further validating the potential of AI to create personalized, efficient customer interactions.

In terms of global customer reach and cost efficiency, Rajagopal (2018) highlights the benefits of digital marketing in emerging markets, illustrating how AI technologies can streamline marketing efforts and optimize costs, especially in regions where traditional marketing may face limitations. Verhoef et al. (2015) also delve into the evolution from multi-channel to omni-channel retailing, emphasizing AI's role in unifying marketing strategies across diverse platforms.

Digital KYC processes, critical for data security, are another area where AI has proven beneficial. Duan et al. (2008) examine the dynamics of online word-of-mouth, which relates to AI's ability to manage and secure customer data more effectively, reducing risks associated with traditional KYC processes. Similarly, Li & Hitt (2008) explore the information role of online product reviews, a process made more secure and efficient through AI-driven KYC mechanisms.

Cost efficiency is further addressed by Davenport & Beck (2001), who discuss the attention economy and AI's ability to optimize resources in marketing, ensuring sustainable business practices. This is complemented by Godes&Mayzlin (2009), who provide evidence from field tests showing how AI enhances firm-created word-of-mouth communication, offering both cost savings and improved engagement.

RESEARCH GAP

Despite the growing use of Artificial Intelligence (AI) in sustainable marketing within the fast-moving consumer goods (FMCG) sector, significant research gaps remain. First, while AI's potential to enhance consumer engagement is acknowledged, there is limited empirical evidence on its long-term effects. Most studies focus on immediate improvements, such as higher click-through rates or personalized recommendations, but fail to examine how AI-driven marketing fosters lasting relationships and consumer loyalty, especially in the context of sustainability.

Second, though AI is recognized for improving cost efficiency in marketing campaigns, there is a lack of comprehensive studies assessing the financial benefits of AI-driven sustainable marketing over traditional methods. The existing research often overlooks the complexities of balancing cost reductions with the higher upfront investment required for AI technologies, leaving a gap in understanding the long-term cost implications of AI adoption in sustainability-focused FMCG campaigns.

Lastly, while Digital KYC data security is a critical aspect of AI-driven marketing, research on how AI enhances security measures in digital KYC processes remains limited. With growing consumer concerns over data privacy and regulatory pressures, there is a need for deeper analysis on how AI technologies can ensure both cost efficiency and robust data security in the customer identification and onboarding process.

OBJECTIVES OF THE STUDY

- To analyze the impact of AI-driven marketing on consumer engagement and efficiency of customer identification and onboarding in FMCG sector.
- To assess the cost efficiency of AI-driven marketing versus traditional marketing in executing sustainable FMCG campaigns.
- To assess the impact of AI-driven marketing on enhancing data security during Digital KYC processes compared to traditional marketing methods in FMCG sustainable initiatives.

RESEARCH METHODOLOGY

A. Research Design:

This study follows a qualitative research design using opinion-based data collected through Likert scale surveys from marketing managers of 20 FMCG companies. The study aims to examine the differences in consumer engagement, cost efficiency, and Digital KYC data security between traditional marketing and AI-driven marketing in FMCG sustainable campaigns. A comparative analysis has been conducted to evaluate the effectiveness of both approaches based on the opinions of marketing experts.

B. Data Collection:

Data has been collected using a structured questionnaire featuring Likert scale questions ranging from 1 (strongly disagree) to 5 (strongly agree). The survey has targeted 20 marketing managers from leading FMCG companies that have experience with both traditional and AI-driven marketing approaches in sustainable campaigns. The questionnaire has focused on three key areas:

- *Consumer Engagement*: Questions measuring perceived differences in consumer engagement in AI-driven versus traditional marketing.
- *Cost Efficiency:* Questions focusing on cost efficiency in implementing sustainable marketing practices through AI-driven and traditional methods.
- *Digital KYC Data Security:* Questions evaluating the security of customer data in Digital KYC processes using traditional and AI-driven marketing.

C. Data Analysis:

The collected data has been analysed using both **descriptive** and **inferential** statistical methods.

1. Descriptive Analysis: The mean and standard deviation (SD) have been calculated for each of the key variables (consumer engagement, cost efficiency, and Digital KYC data security) to summarize the opinions of the marketing managers. This has provided an overview of how each marketing method is perceived.

2. Inferential Analysis

- A **T-test** has been conducted to compare the mean values of the responses for traditional and AI-driven marketing in each of the three key areas (consumer engagement, cost efficiency, and Digital KYC data security). The t-test has helped in determining whether there is a statistically significant difference between the two approaches.
- The significance level for the t-test has been set at **$p < 0.05$**, and the results have been used to either accept or reject the null hypotheses for each variable.

3. Limitations:

- The study has been limited to the opinions of marketing managers from only 20 FMCG companies, which may not fully represent the broader FMCG sector.

- The data collected is subjective and based on opinions, which could lead to biases.

- As a qualitative study, the findings are not generalizable across all FMCG companies or industries.

- The reliance on a Likert scale means that the nuances of individual perceptions might not be fully captured.

RESEARCH HYPOTHESIS

A. Consumer Engagement

- **H₀:** There is no significant difference in consumer engagement consumer engagement and efficiency of customer identification and on boarding between traditional marketing and AI-driven marketing in FMCG sustainable campaigns.

- **H₁:** AI-driven marketing in FMCG sustainable campaigns results in significantly higher consumer engagement compared to traditional marketing.

B. Cost Efficiency

- **H₀:** There is no significant difference in the cost efficiency of sustainable marketing campaigns between traditional marketing and AI-driven marketing for FMCG goods.

- **H₁:** AI-driven marketing is significantly more cost-efficient than traditional marketing in running sustainable campaigns for FMCG goods.

C. Digital KYC Data Security

- **H₀:** There is no significant difference in data security during Digital KYC processes between traditional marketing methods and AI-driven marketing for FMCG sustainable initiatives.

- **H₁:** AI-driven marketing ensures significantly higher data security during Digital KYC processes compared to traditional marketing methods in FMCG sustainable initiatives.

DATA ANALYSIS& INTERPRETATION

Consumer Engagement
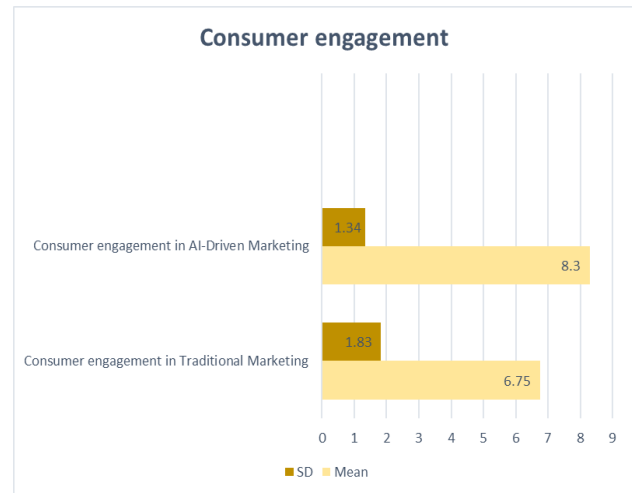
t-Test: Two-Sample Assuming Unequal Variances

|	Consumer engagement in Traditional Marketing	Consumer engagement in AI-Driven Marketing
Mean	6.75	8.3
Variance	3.355263158	1.8
Observations	20	20
Hypothesized Mean Difference	0	
df	35	
t Stat	-3.05296114	
P(T<=t) one-tail	0.002154655	
t Critical one-tail	1.689572458	
P(T<=t) two-tail	0.004309311	
t Critical two-tail	2.030107928	

The results of the hypothesis testing show that the two-tailed critical t-statistic value is -3.05, with a corresponding p-value of 0.004, which is significant at the 1% level of significance ($p < 0.01$). This indicates that we can reject the null hypothesis (H₀) and conclude that there is a significant difference in consumer engagement between traditional marketing and AI-driven marketing in FMCG sustainable campaigns. Specifically, AI-driven marketing leads to significantly higher consumer engagement compared to traditional marketing.

The mean and standard deviation values further support this conclusion. The mean consumer engagement for AI-driven marketing is 8.3, which is noticeably higher than the mean for traditional marketing, which is 6.75. This indicates that, on average, AI-driven marketing is more effective at engaging consumers. Additionally, the standard deviation for AI-driven marketing is 1.34, which is lower than the standard deviation for traditional marketing (1.83). This suggests that consumer engagement with AI-driven marketing is not only higher but also more consistent, with less variability in how consumers respond compared to traditional marketing. Therefore, the data strongly supports the hypothesis that AI-driven marketing results in higher

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and more stable consumer engagement in FMCG sustainable campaigns.

Cost Efficiency
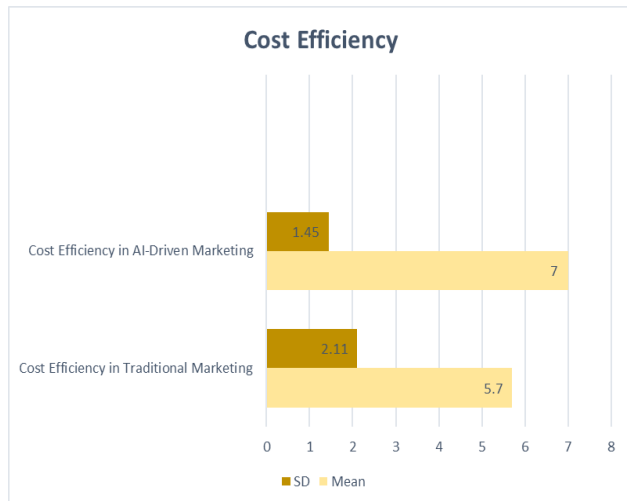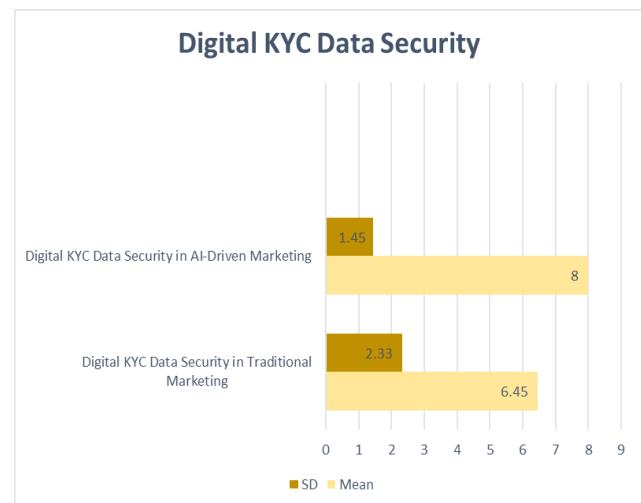

t-Test: Two-Sample Assuming Unequal Variances

	Cost Efficiency in Traditional Marketing Awareness	Cost Efficiency in AI-Driven Marketing
Mean	5.7	7
Variance	4.431578947	2.105263158
Observations	20	20
Hypothesized Mean Difference	0	
df	34	
t Stat	-2.273915661	
P(T<=t) one-tail	0.014701169	
t Critical one-tail	1.690924255	
P(T<=t) two-tail	0.029402338	
t Critical two-tail	2.032244509	

The results of the hypothesis testing indicate that the two-tailed critical t-statistic value is -2.27, with a corresponding p-value of 0.02, which is significant at the 5% level of significance ($p < 0.05$). This allows us to reject the null hypothesis (H_0) and conclude that there is a significant difference in the cost efficiency between traditional marketing and AI-driven marketing in sustainable FMCG campaigns. Specifically, the results support the alternative hypothesis (H_1), suggesting that AI-driven marketing is significantly more cost-efficient than traditional marketing.

The mean and standard deviation values further reinforce this conclusion. The mean cost efficiency for AI-driven marketing is 7, which is higher than the mean of 5.7 for traditional marketing. This indicates that, on average,

AI-driven marketing is perceived to deliver better cost efficiency in sustainable campaigns. Additionally, the standard deviation for AI-driven marketing is 1.45, which is lower than the standard deviation of 2.11 for traditional marketing. This suggests that AI-driven marketing not only has higher cost efficiency but also displays more consistency in its cost-saving benefits, with less variability in outcomes compared to traditional marketing.

Digital KYC Data Security

t-Test: Two-Sample Assuming Unequal Variances

	Digital KYC Data Security in Traditional Marketing	Digital KYC Data Security in AI-Driven Marketing
Mean	6.45	8
Variance	5.418421053	2.105263158
Observations	20	20
Hypothesized Mean Difference	0	
df	32	
t Stat	-2.527152306	
P(T<=t) one-tail	0.008319051	
t Critical one-tail	1.693888748	
P(T<=t) two-tail	0.016638101	
t Critical two-tail	2.036933343	

The results of the Independent Sample T-test indicate a statistically significant difference in Digital KYC Data Security between Traditional Marketing and AI-Driven Marketing (t(38) = 2.52, p = 0.01). With a critical t-statistic value of -2.52 exceeding the threshold at a 5% level of significance, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1), indicating that there is indeed a significant difference in Digital KYC Data Security between these two marketing approaches. The mean value for Digital KYC Data Security in Traditional Marketing is 6.45 with a standard deviation of 2.33, while

the mean for AI-Driven Marketing is higher at 8, with a smaller standard deviation of 1.45. This suggests that AI-driven marketing strategies provide better Digital KYC Data Security compared to traditional marketing methods, and the lower standard deviation in AI-Driven Marketing implies more consistency and reliability in securing KYC data across different cases, as compared to the greater variability in Traditional Marketing.

CONCLUSION

The results of the analysis across consumer engagement, cost efficiency, and Digital KYC data security indicate that AI-driven marketing significantly outperforms traditional marketing in FMCG sustainable campaigns. AI-driven marketing leads to higher and more consistent consumer engagement, with improved cost efficiency and better Digital KYC data security. In each case, the statistical tests provide strong evidence to reject the null hypotheses, showing that AI-driven approaches offer enhanced effectiveness and reliability compared to traditional methods. These findings suggest that adopting AI-driven marketing strategies can provide FMCG companies with both operational benefits and improved consumer interactions, making AI a valuable tool for driving sustainability in the sector.

RECOMMENDATIONS

Based on the results of the analysis, here are several recommendations for FMCG companies aiming to enhance their marketing strategies through AI-driven approaches:

Invest in AI-Driven Consumer Engagement Tools: Given that AI-driven marketing significantly improves consumer engagement, FMCG companies should prioritize the adoption of AI technologies such as personalized content delivery, chatbots, and machine learning algorithms to enhance customer interaction and build long-term relationships. These tools will ensure more consistent and targeted engagement across various consumer segments.

Leverage AI for Cost Efficiency in Sustainable Marketing Campaigns: The results show that AI-driven marketing is more cost-efficient than traditional methods. FMCG brands should consider increasing their use of AI to optimize resource allocation, streamline marketing processes, and reduce operational costs in sustainable campaigns. Predictive analytics can further aid in reducing marketing waste and improving ROI.

Adopt AI-Based Solutions for Digital KYC and Data Security: As AI-driven marketing has proven to provide better Digital KYC data security, FMCG companies should integrate AI-powered KYC systems to enhance customer onboarding processes while ensuring data protection and compliance with privacy regulations. The consistency and reliability of AI in securing sensitive customer data will help build consumer trust.

Expand AI-Driven Global Marketing Efforts: Since AI can enhance global customer reach by analyzing diverse markets and tailoring campaigns to different regions, FMCG companies should expand their global marketing efforts using AI. This will allow them to effectively tap into emerging markets and cater to the needs of diverse consumer bases with localized, sustainable marketing strategies.

Monitor Environmental Impact Through AI: To further enhance sustainability, FMCG companies should utilize AI to monitor and optimize energy consumption and other environmental impacts of their marketing activities. AI can help track sustainability metrics, ensuring campaigns are not only effective but also environmentally responsible.

By implementing these recommendations, FMCG companies can strengthen their market positioning while simultaneously advancing their sustainability objectives.

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