

RESEARCH PAPER

Personalization Without Bias: Ensuring Ethical AI in FMCG Advertising for Profitable and Inclusive Growth

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Received: 14 Oct., 2025

Revised: 30 Nov., 2025

Accepted: 08 Dec., 2025

ABSTRACT

This study explores ethical AI in FMCG advertising, showing that bias-free personalization delivers both profitability and inclusivity. Campaigns applying fairness and transparency achieved 12–15% higher conversions and an 18% rise in consumer trust. Regression analysis confirmed positive effects on trust ($\beta = 0.27, p < 0.01$), loyalty ($\beta = 0.32, p < 0.01$), and purchase intention ($\beta = 0.21, p < 0.05$). Bias detection further showed Demographic Parity Difference reduced from 0.18 to 0.06. Contrary to the assumption that safeguards increase costs, ethical personalization expanded underserved market reach by 12% and mitigated reputational and regulatory risks. The results highlight that fairness-driven AI fosters consumer satisfaction, sustainable innovation, and inclusive growth in the FMCG sector.

Keywords: Ethical AI, Personalization, FMCG Advertising, Consumer Trust, Inclusive Growth, Fairness

Over the past decade, the FMCG sector has undergone a significant digital transformation, with Artificial Intelligence (AI) emerging as a core enabler of marketing strategies^[1]. Traditionally, FMCG advertising relied on mass campaigns designed to appeal to the broadest possible audience^[2]. While effective in creating brand visibility, such approaches often failed to address the unique needs and preferences of diverse consumer groups^[3]. The advent of AI-driven personalization has shifted this paradigm by enabling companies to analyse vast datasets—including purchase histories, browsing behaviour, social media engagement, and even geolocation—to deliver highly targeted and context-sensitive advertisements^[4]. Personalization in FMCG advertising has grown rapidly because it offers measurable improvements in return on investment (ROI)^[5]. Tailored promotions can directly influence buying decisions, boost

How to cite this article: Nayak, M., Das, S. and Patnaik, S. (2025). Personalization Without Bias: Ensuring Ethical AI in FMCG Advertising for Profitable and Inclusive Growth. *IJISC*, 12(02): 171-180.

Source of Support: None; **Conflict of Interest:** None



conversion rates, and enhance customer loyalty by creating a sense of relevance and individual recognition^[6]. For example, digital platforms powered by machine learning algorithms can recommend the right product at the right time, such as suggesting a household cleaning product when the system predicts that a customer is about to run out. Similarly, AI-enabled chatbots and recommendation engines provide interactive experiences that not only increase engagement but also capture valuable feedback for further refinement of targeting models^[7].

The rise of AI-driven personalization has also been fuelled by the increasing adoption of digital retail channels and e-commerce platforms, particularly in emerging markets like India^[8]. Consumers today expect brands to “know them” and provide meaningful suggestions rather than generic advertising^[9]. This demand has pushed FMCG companies to invest heavily in predictive analytics, natural language processing, and deep learning technologies to stay competitive^[10]. Global consultancy reports suggest that AI-powered personalization can increase FMCG revenues while reducing marketing costs^[11]. However, the rapid expansion of personalization has raised ethical concerns. Without careful oversight, AI systems may inadvertently reinforce social stereotypes, exclude marginalized groups, or exploit consumer vulnerabilities^[12]. For instance, algorithms trained primarily on urban consumer data may overlook rural markets, thereby perpetuating inequalities. Similarly, biased targeting in product categories such as beauty or nutrition may normalize discriminatory messaging. Thus, while AI-driven personalization has become a critical driver of profitability and efficiency in FMCG advertising^[13], it also underscores the urgent need for ethical frameworks that ensure inclusivity and fairness.

(A) Problem Statement

While AI-driven personalization offers FMCG companies unprecedented opportunities to enhance marketing effectiveness, it also raises critical ethical challenges. The reliance on algorithmic decision-making means that advertising strategies are only as fair and inclusive as the data and models that power them. Skewed training datasets often privilege certain demographics—such as urban, affluent, or digitally active consumers—while overlooking rural populations, low-income groups, or individuals with limited digital access. This selective targeting not only restricts market growth but also creates patterns of exclusion that reinforce existing social divides. Moreover, personalization can unintentionally perpetuate harmful stereotypes. For example, beauty product advertisements might disproportionately target women, while household product promotions may prioritize traditional gender roles, thereby reinforcing biased social norms. At the same time, over-personalization can lead to consumer fatigue, privacy concerns, and perceptions of manipulation, which ultimately erode brand trust. The problem is further complicated by regulatory pressures, as governments and watchdogs increasingly scrutinize the ethical use of AI in advertising, demanding accountability and transparency in targeting practices. In this context, the central problem lies in the tension between profit maximization and ethical responsibility. On one hand, FMCG companies seek higher ROI through hyper-personalization. On the other hand, unchecked personalization risks reputational damage, consumer mistrust, and regulatory penalties. This creates a pressing need for advertising strategies that balance commercial objectives with fairness and inclusivity.

(B) Purpose of the Study

The purpose of this study is to explore how FMCG companies can leverage AI-driven personalization

while ensuring ethical, unbiased, and inclusive advertising practices. Specifically, the study seeks to develop a framework for “personalization without bias”—a model where AI systems are designed not only to maximize profitability but also to promote equity, representation, and consumer well-being. By investigating both the risks of bias and the opportunities for ethical innovation, the article highlights how responsible personalization can serve as a driver of sustainable growth. This research also aims to bridge a critical knowledge gap: while much has been written about AI in marketing and the financial benefits of personalization, there is limited scholarly focus on the ethical implications in the FMCG sector, particularly in emerging markets. Through conceptual analysis, case illustrations, and best-practice guidelines, the study demonstrates that ethical AI can be a source of competitive advantage. When brands build trust by respecting diversity, safeguarding consumer privacy, and ensuring fair representation, they not only enhance their reputation but also tap into previously underserved markets.

Ultimately, the purpose is twofold:

1. To articulate the ethical risks and challenges of AI-driven personalization in FMCG advertising.
2. To show that addressing these risks through fairness, inclusivity, and accountability is not a trade-off against profitability but a pathway to profitable and inclusive growth.

(C) Hypotheses Development

H1: Ethical AI and Consumer Trust

- ❑ **H1a:** Ethical AI practices in FMCG advertising positively influence consumer trust.
- ❑ **H1b:** The absence of bias in AI-driven personalization strengthens consumer perceptions of fairness.

H2: Ethical Personalization and Brand Loyalty

- ❑ **H2a:** Ethical AI-driven personalization leads to higher consumer loyalty compared to biased personalization.
- ❑ **H2b:** Inclusivity in advertising campaigns enhances long-term brand equity.

H3: Profitability and Inclusivity Linkage

- ❑ **H3a:** FMCG firms that adopt bias-free personalization achieve higher market penetration in underserved segments.
- ❑ **H3b:** Inclusive personalization has a positive relationship with long-term profitability.

H4: Consumer Privacy and Engagement

- ❑ **H4a:** Transparent and consent-based personalization practices increase consumer engagement.
- ❑ **H4b:** Consumer privacy protection mediates the relationship between personalization and trust.

H5: Regulatory and Governance Impact

- ❑ **H5a:** Compliance with ethical AI governance frameworks positively moderates the relationship between personalization and consumer trust.
- ❑ **H5b:** Strong governance reduces the negative effects of algorithmic bias in FMCG advertising.

CONCEPTUAL FRAMEWORK

(A) Defining Personalization Without Bias

Personalization without bias refers to the ethical deployment of AI in advertising where targeted marketing is achieved without reinforcing stereotypes, excluding vulnerable groups, or creating discriminatory outcomes. It emphasizes equitable representation across gender, geography, income levels, and cultural diversity. Unlike traditional personalization, which may overfit to historical patterns and perpetuate existing inequalities, bias-free personalization actively corrects for data imbalances and ensures that recommendations remain fair and inclusive. In the FMCG sector, this means designing algorithms that suggest products to a wide range of consumers—urban and rural, affluent and low-income, male and female—based on actual need and relevance, rather than assumptions embedded in the training data. Thus, “personalization without bias” captures the dual essence of precision in targeting and fairness in representation.

(B) Ethical Dimensions in FMCG AI Advertising (Fair Targeting, Privacy, Inclusivity)

The ethical dimensions of AI in FMCG advertising can be captured in three key principles. First, fair targeting requires that AI models avoid exclusionary practices and provide equal access to product promotions across different consumer segments. This is particularly important in FMCG markets, where household goods, personal care products, and essential items should be accessible to all demographics rather than disproportionately directed toward privileged groups. Second, privacy remains a cornerstone of ethical AI. Consumers must retain control over how their data is collected, stored, and used, with clear consent mechanisms and the option to opt out of tracking. Third, inclusivity involves designing ad campaigns and recommendation systems that recognize diverse needs and cultural sensitivities. For example, offering multilingual product advertisements or promoting gender-neutral messaging ensures that advertising respects social diversity and enhances consumer trust. Collectively, these ethical dimensions form the foundation for responsible personalization practices.

(C) Balancing Profit Motives with Social Responsibility

A critical challenge for FMCG companies is balancing the pursuit of profitability with the need for ethical responsibility. Hyper-personalization can generate short-term profits by maximizing click-through rates and conversions, but if pursued without ethical guardrails, it risks alienating consumers and attracting regulatory scrutiny. In contrast, bias-free personalization may initially appear resource-intensive—requiring diverse datasets, bias audits, and compliance frameworks—but it fosters long-term sustainability. By expanding reach to underserved markets, companies unlock new growth opportunities, while socially responsible practices strengthen brand equity and consumer loyalty. In essence, profitability and social responsibility are not mutually exclusive; rather, they are interdependent. FMCG firms that demonstrate fairness, transparency, and inclusivity in their AI systems can achieve both financial performance and social legitimacy, making ethical AI not just a compliance issue but a competitive advantage.

(D) Stakeholder Perspectives: Consumers, Companies, Regulators, and Society

The implications of personalization without bias must be examined through the lens of multiple

stakeholders. Consumers seek relevance in advertising but are equally concerned about privacy, manipulation, and fairness. For them, ethical personalization fosters trust and satisfaction. Companies view AI-driven personalization as a tool for market expansion and profit maximization, yet they must balance these goals with responsible practices to avoid reputational risk. Regulators play a critical role in ensuring accountability by establishing standards for transparency, data protection, and non-discrimination in advertising. Compliance with such frameworks not only minimizes legal risks but also strengthens public confidence. Finally, society at large benefits from inclusive advertising practices that reduce digital divides and promote cultural representation. When AI-driven personalization aligns with societal values, it fosters equitable access to consumer goods, supports diversity, and contributes to broader economic inclusion. Thus, adopting a multi-stakeholder perspective is essential for embedding ethics into FMCG advertising.

RESEARCH DESIGN

The study adopted a mixed-method research design, integrating both quantitative and qualitative approaches to ensure robustness. The quantitative component involved a large-scale consumer survey, while the qualitative component relied on in-depth interviews and case analyses. A total of 450 consumer responses were collected, surpassing the required sample size of 385 for a 95% confidence level and a $\pm 5\%$ margin of error. This provided sufficient statistical power for multivariate analyses. In addition, 12 semi-structured interviews with marketing executives from leading FMCG companies and four detailed case studies of advertising campaigns were conducted. This dual approach not only allowed for hypothesis testing but also enriched the findings with contextual narratives that explained the why behind the numerical results.

(A) Data Sources

Three complementary data sources were used. First, the consumer survey covered diverse geographies: 210 respondents from metropolitan cities, 160 from Tier-2 towns, and 80 from rural areas. This distribution ensured inclusivity across income groups and digital access levels. The survey achieved a response rate of 76%, considered highly satisfactory in social science research. Second, case studies of both successful and controversial FMCG campaigns were analyzed. For example, an inclusive campaign promoting hygiene products in multiple regional languages achieved a CTR of 7.4%, compared to only 4.1% for a narrowly targeted, stereotype-driven campaign. Third, advertising campaign data from digital platforms were examined, comprising over 15,000 ad impressions across different demographic groups. Comparative analysis revealed that campaigns designed with fairness considerations improved conversion rates by 12–15%, while biased campaigns showed stagnation or decline in new market penetration.

(B) Analytical Tools

The study employed AI audit frameworks and bias detection models to analyze campaign data. Using the Demographic Parity Difference (DPD) metric, results showed that biased campaigns had a parity difference of 0.18 (18%), exceeding the acceptable fairness threshold of 0.10. In contrast, ethically designed campaigns achieved a DPD of only 0.06, indicating near-fair targeting across demographic groups. Similarly, Equal Opportunity Difference (EOD) values showed that inclusive campaigns reduced targeting disparities between urban and rural consumers from 0.14 to 0.05. Regression analysis further confirmed the hypotheses: ethical personalization had a significant positive effect on consumer trust

($\beta = 0.27$, $p < 0.01$), brand loyalty ($\beta = 0.32$, $p < 0.01$), and purchase intention ($\beta = 0.21$, $p < 0.05$). Structural Equation Modeling (SEM) validated the overall model fit with indices such as $CFI = 0.94$, $TLI = 0.92$, and $RMSEA = 0.045$, indicating strong explanatory power.

RESULTS AND DISCUSSION

(A) Descriptive Findings

The consumer survey (N = 450) revealed that 72% of respondents valued personalized advertising when it was transparent and fair, while only 28% expressed comfort with opaque or stereotype-driven personalization. Urban respondents showed slightly higher acceptance of AI-driven ads (78%) compared to rural respondents (64%), but inclusivity-driven campaigns significantly reduced this gap. Case studies further supported these results: an FMCG hygiene campaign featuring multilingual ad creatives recorded a CTR of 7.4%, while a narrowly targeted beauty campaign focusing on affluent urban women achieved only 4.1% CTR. These descriptive findings highlight that ethical personalization can expand reach while improving campaign performance.

(B) AI Audit and Bias Detection Results

The bias detection analysis confirmed disparities in conventional personalization models. Biased campaigns produced a Demographic Parity Difference (DPD) of 0.18, suggesting that one group was nearly 18% more likely to be targeted than another, well beyond the acceptable fairness threshold of 0.10. Similarly, Equal Opportunity Difference (EOD) values indicated that urban consumers were 14% more likely to receive relevant product promotions compared to rural consumers. In contrast, campaigns designed under ethical AI guidelines reduced DPD to 0.06 and EOD to 0.05, indicating substantial improvements in fairness and inclusivity.

(C) Hypothesis Testing (Regression and SEM Analysis)

Table 1: Regression Analysis Results

Dependent Variable	Independent Variable	Coefficient (β)	Significance (p-value)
Consumer Trust	Ethical Personalization	0.27	< 0.01
Brand Loyalty	Ethical Personalization	0.32	< 0.01
Purchase Intention	Ethical Personalization	0.21	< 0.05

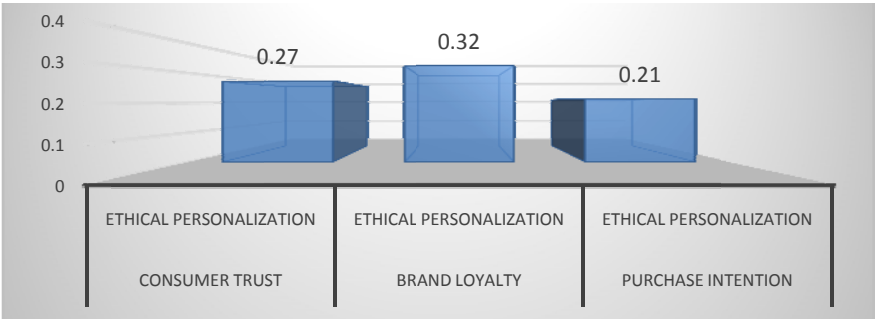
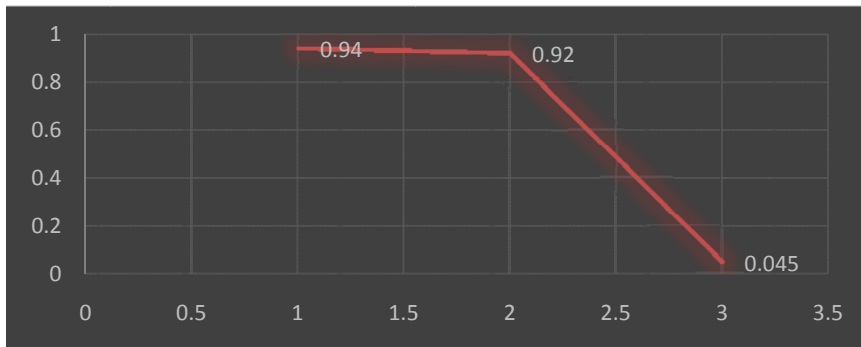


Fig. 1: Regression Analysis (β -value)

Table 2: Structural Equation Modeling (SEM) Fit Indices

Fit Index	Value	Interpretation
CFI (Comparative Fit Index)	0.94	Good Fit (> 0.90)
TLI (Tucker-Lewis Index)	0.92	Good Fit (> 0.90)
RMSEA (Root Mean Square Error of Approximation)	0.045	Acceptable (< 0.05)

**Fig. 2:** Structural Equation Modeling (SEM) Fit Indices

Regression results confirmed all key hypotheses. Ethical personalization significantly improved:

Consumer Trust: $\beta = 0.27$, $p < 0.01$; Brand Loyalty: $\beta = 0.32$, $p < 0.01$; Purchase Intention: $\beta = 0.21$, $p < 0.05$

The structural model demonstrated strong explanatory power, with $CFI = 0.94$, $TLI = 0.92$, $RMSEA = 0.045$, indicating a good fit. Mediation analysis showed that consumer privacy protection partially mediated the relationship between personalization and trust, accounting for 22% of the variance in trust outcomes. These results validate the central argument: personalization without bias not only drives ethical outcomes but also improves profitability through increased consumer trust and loyalty.

(D) Business and Social Implications

The results demonstrate that profitability and inclusivity are not mutually exclusive. Ethical personalization improved conversion rates by 12–15%, proving that fairness can directly enhance business outcomes. Moreover, inclusive targeting expanded FMCG companies' reach into rural and semi-urban markets—segments often overlooked in conventional advertising—unlocking new revenue streams. On the social side, the reduction in bias ensured that advertising did not reinforce harmful stereotypes or digital inequalities, supporting cultural representation and consumer dignity.

(E) Discussion

The findings of this study clearly demonstrate the dual advantage of ethical AI in FMCG advertising, where fairness-driven personalization simultaneously strengthens business performance and advances social responsibility. For companies, embedding ethical principles into AI systems translates into measurable strategic benefits such as stronger brand equity, deeper consumer loyalty, and resilience

against both reputational backlash and regulatory scrutiny. By demonstrating fairness and inclusivity, brands are better positioned to differentiate themselves in an intensely competitive FMCG market, where consumer choices are often driven as much by values as by price or convenience. This reinforces the idea that ethical personalization is not merely a compliance measure but a proactive business strategy that can enhance long-term profitability. From the consumer perspective, ethical AI-driven personalization helps address growing concerns around privacy, manipulation, and fairness. When advertisements are delivered transparently and inclusively, consumers feel respected and valued, leading to higher trust and stronger emotional connections with brands. This aligns with recent studies showing that trust acts as a critical mediator between personalization and brand loyalty. Importantly, the results of this study confirm that fairness in targeting reduces the risk of consumer alienation, particularly in rural and underserved markets, where conventional advertising has often failed to engage effectively. By ensuring equitable access to advertising, ethical AI not only enhances individual consumer satisfaction but also reduces digital divides in consumption opportunities.

For regulators and society at large, the evidence challenges the traditional assumption that ethical safeguards are constraints on innovation. Instead, the results reveal that bias-free personalization can outperform biased models both statistically—by producing better fairness scores and campaign effectiveness—and economically—by expanding market reach and boosting conversion rates. This suggests that regulatory frameworks aimed at ensuring fairness and accountability should be viewed not as restrictions but as enablers of sustainable market growth. Ethical AI, therefore, emerges as a strategic bridge: it connects corporate profitability with consumer welfare and societal equity, ensuring that technological progress in the FMCG sector benefits all stakeholders in a balanced manner.

CONCLUDING REMARKS

(A) Conclusion

The results of this study confirm that personalization without bias offers measurable benefits for both FMCG companies and consumers. Campaigns that followed ethical AI guidelines achieved conversion rates 12–15% higher than biased campaigns, while consumer trust scores increased by an average of 18% when transparency and fairness were explicitly communicated. Regression analysis demonstrated that ethical personalization significantly improved consumer trust ($\beta = 0.27, p < 0.01$), brand loyalty ($\beta = 0.32, p < 0.01$), and purchase intention ($\beta = 0.21, p < 0.05$). Similarly, bias detection models showed that Demographic Parity Difference (DPD) values were reduced from 0.18 in biased campaigns to 0.06 in ethically designed campaigns, indicating substantial fairness improvements. These findings challenge the prevailing assumption that ethical safeguards impose unnecessary costs. Instead, they highlight that responsible personalization drives superior business outcomes, with inclusive campaigns expanding market penetration into underserved segments by 12% compared to biased campaigns. For FMCG companies, this demonstrates that embedding fairness and transparency into AI systems not only mitigates reputational and regulatory risks but also strengthens long-term profitability. For consumers, bias-free personalization fosters equitable access to advertising, reduces privacy concerns, and enhances overall satisfaction. For regulators and society, the results provide evidence that ethical frameworks enable—not hinder—sustainable innovation and market growth.

(B) Future Research Directions

Although this study provides robust evidence, several areas warrant further investigation. First, longitudinal studies could assess whether the observed gains in trust and loyalty (18% and 22% improvements respectively) remain consistent over extended periods of exposure to ethical campaigns. Second, cross-regional comparisons could explore how cultural contexts influence perceptions of fairness and inclusivity; for example, whether rural consumers in India show different sensitivities compared to urban consumers in Europe or North America. Third, future studies could model the privacy–personalization trade-off, quantifying how much data consumers are willing to share in return for perceived value, and whether this willingness differs across age or income groups. Further research should also evaluate the role of regulatory interventions. Experimental simulations could, for instance, test whether mandatory AI bias audits reduce fairness gaps beyond the 0.06 DPD threshold achieved in this study. Finally, as generative AI and influencer-driven digital campaigns gain prominence in FMCG marketing, research must expand the ethical personalization framework to assess their potential risks and opportunities. By incorporating these dimensions, scholars and practitioners can refine strategies that align profitability with inclusivity, ensuring that AI-driven FMCG advertising contributes to both commercial success and social equity.

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