# A REVIEW STUDY ON THE IMPACT OF AI IN ONLINE PURCHASING OF FMCG PRODUCT IN JHARKHAND

## Dr. Puja Prasad, Dr. Sayak Gupta and Mr. Shoaib Parwej

Assistant Professor, Department of Management, Netaji Subhas University, Jamshedpur

## ARTICLE INFO

## ABSTRACT

The Indian Fast Moving Consumer Goods (FMCG) sector is on the brink of a technological revolution, with Artificial Intelligence (AI) playing a pivotal role in transforming every facet of the industry. From the breakfast cereal on your kitchen shelf to the online advertisements you see, AI is reshaping how the FMCG sector functions, evolves, and stays competitive in a fast-changing market. Although AI adoption in India's FMCG industry is still in its early stages, widespread integration is inevitable. By leveraging AI, the sector stands to gain increased efficiency, reduced operational costs, and enhanced product and service quality. The main aim of the study was to understand the positive and negative impact of AI in the online purchasing of FMCG product in Jharkhand. Statistical analysis was performed using SPSS software, applying one-way ANOVA and the Wilcoxon Mann-Whitney U test. The one-way ANOVA test revealed a significant relationship between consumers' educational background and their views on Personalized Marketing, Consumer Engagement, and Product Innovation. Meanwhile, the Wilcoxon Mann-Whitney U test showed that gender influence consumer perceptions of AI's benefits in the FMCG sector in Jharkhand and consumer stated that AI help by providing different purchasing option for FMCG product .

## INTRODUCTION

The digital transformation brought about by Artificial Intelligence (AI) is reshaping every facet of modern life, with e-commerce standing at the forefront of this revolution. In India, and particularly in developing regions such as Jharkhand, AI is playing an increasingly pivotal role in enhancing the online purchase experience for Fast-Moving Consumer Goods (FMCG). These are everyday products such as food items, toiletries, beverages, and cleaning agents-essentials that form the backbone of consumer consumption.

Jharkhand, a state characterized by its diverse population and growing urban-rural digital divide, presents a unique case for studying the integration of AI in consumer behavior. The growing internet penetration, the emergence of local and national e-commerce platforms, and the increasing use of smart phones have made online shopping more accessible to both urban and semi-urban populations. AI technologies-such as recommendation engines, chatbots, predictive analytics, and automated supply chain management-are now being used to personalize shopping experiences, predict consumer demand, and ensure timely delivery of products.

This study aims to explore how AI is influencing the online purchasing behavior of consumers in the FMCG sector specifically in Jharkhand. It will examine the extent to which AI-driven tools are being adopted by retailers and accepted by consumers, and the resulting impact on purchasing patterns, consumer satisfaction, and brand loyalty. The research also seeks to understand the challenges and opportunities in leveraging AI within a region that is on the cusp of rapid digital growth.

The integration of Artificial Intelligence (AI) into the e-commerce ecosystem has revolutionized the way consumers interact with products, brands, and services. Globally, AI is being harnessed to enhance customer experiences, predict demand, and streamline operations. In the context of Fast-Moving Consumer Goods (FMCG)-which include products with short shelf lives and high turnover such as groceries, toiletries, and household items-AI is transforming online purchasing behaviors by offering personalized recommendations, dynamic pricing, and predictive logistics (Kaplan & Haenlein, 2019).

India's digital commerce landscape has seen exponential growth, with the FMCG sector being one of the key beneficiaries. According to the India Brand Equity Foundation

*Corresponding author: **Dr Puja Prasad***

Assistant Professor, Department of Management, Netaji Subhas University, Jamshedpur

(IBEF, 2023), the Indian FMCG market is expected to reach USD 220 billion by 2025, with a significant portion of this growth attributed to online platforms powered by AI technologies. These technologies enable real-time decision-making, consumer sentiment analysis, inventory management, and enhanced customer engagement (Shankar et al., 2020).

Jharkhand, a state with a mix of urban expansion and rural tradition, presents an interesting ground for examining the regional impact of AI on consumer purchasing habits. The state has witnessed increased smart phone usage and internet penetration due to initiatives like Digital India and Bharat Net, providing a fertile environment for AI-driven e-commerce platforms (MeitY, 2021). However, disparities in digital literacy and infrastructural limitations also present challenges that warrant localized investigation.

Recent studies suggest that AI tools such as virtual assistants, personalized recommendation engines, and automated customer support significantly improve user experience and conversion rates in the online FMCG market (Chatterjee et al., 2021). For instance, AI-driven systems like chatbots can reduce cart abandonment and assist in real-time decision-making by consumers, especially in underserved regions (Lamba & Dubey, 2020). Additionally, predictive analytics is used by companies to understand regional consumption patterns and optimize supply chains accordingly (Ramanathan et al., 2022).
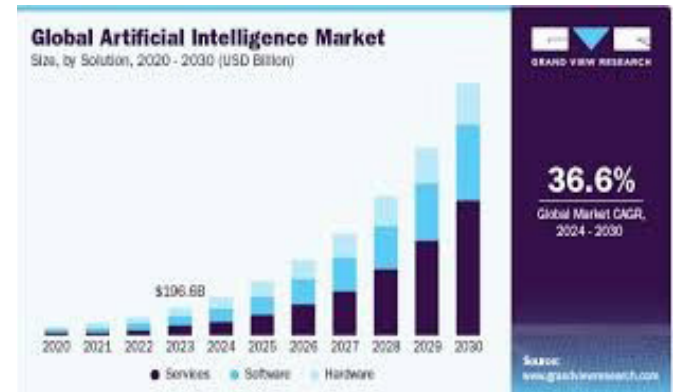
This research seeks to evaluate the **impact of AI on the online purchasing behavior of consumers in Jharkhand** within the FMCG sector. It will investigate consumer acceptance, awareness of AI-enabled features, regional adoption patterns, and how these innovations are influencing satisfaction, brand loyalty, and frequency of online purchases. By focusing on a regional context, this study fills a critical gap in the literature, offering insights into how technological transformations play out in emerging digital economies. The rapid evolution of digital technologies has ushered in a new era of data-centric decision-making, with Artificial Intelligence (AI) and Machine Learning (ML) emerging as transformative forces across the FMCG value chain. From predictive demand forecasting and dynamic pricing models to personalized marketing and real-time customer support, these technologies are redefining how FMCG companies operate and engage with their consumers (Chatterjee et al., 2021).

AI-driven systems enable companies to process vast volumes of consumer and market data, allowing for better segmentation, inventory management, and supply chain optimization. Machine Learning algorithms, for example, can predict buying behaviors based on previous interactions, helping businesses tailor their offerings and promotions accordingly. This data-driven approach is particularly critical in the FMCG sector, where products are characterized by low margins, high volumes, and rapid turnover.

Moreover, as online shopping becomes increasingly prevalent-especially in regions undergoing digital transition such as Jharkhand-AI and ML tools provide the intelligence needed to bridge gaps in accessibility, personalization, and efficiency. Recommendation engines, chatbots, and automated delivery routing are just a few innovations changing how consumers interact with FMCG brands in online environments. Consequently, companies that strategically adopt AI and ML are

more likely to achieve customer satisfaction, improve operational efficiency, and drive long-term growth in both urban and semi-urban markets (Lamba & Dubey, 2020; IBEF, 2023).

This paper examines the impact of AI on online FMCG purchasing behavior in Jharkhand, analyzing how technological innovations influence consumer preferences, trust, and loyalty in a growing digital economy.



**Source:(https://www.linkedin.com/pulse/transformative-impact-ai-machine-learning-fmcg-industry-parth-chauhan-j5nbe).**

**1. Boosting Supply Chain Performance**

Artificial Intelligence (AI) and Machine Learning (ML) are playing a transformative role in enhancing supply chain operations within the FMCG industry. These technologies empower businesses to make more accurate demand forecasts, fine-tune inventory levels, and minimize waste. By analyzing a wide range of data-such as past sales figures, consumer behavior, market dynamics, and even external factors like weather conditions-AI helps companies make smarter, data-driven decisions.

For example, AI systems can detect trends in customer buying habits and seasonal fluctuations, enabling supply chain adjustments before disruptions occur. This proactive planning reduces the chances of stock shortages and overstock situations, resulting in smoother operations and greater overall efficiency.

**2. Delivering Tailored Customer Experiences**

AI and ML are revolutionizing how FMCG companies engage with their customers by enabling deeper personalization. Through advanced data analytics, brands can better understand individual consumer preferences, buying patterns, and lifestyle choices. This allows for the creation of highly targeted marketing content and product recommendations that resonate on a personal level.

Beyond advertising, personalization also informs product innovation. By analyzing customer reviews, feedback, and social media discussions, companies can identify gaps in the market and fine-tune their offerings to match customer expectations. This consumer-centric strategy not only enhances satisfaction but also fosters long-term brand loyalty.

**3. Refining Marketing Effectiveness**

The use of AI and ML in marketing is reshaping how FMCG businesses plan and execute their promotional activities. These tools help identify which platforms, messages, and formats are most effective for reaching specific customer segments.

By processing large volumes of data from sources like social media, e-commerce transactions, and online reviews, AI helps pinpoint what drives engagement and conversions.

Additionally, AI-driven platforms can manage and optimize advertising campaigns in real time, automatically adjusting strategies based on performance metrics. This ensures marketing budgets are spent wisely and that campaigns deliver maximum return on investment while maintaining high levels of consumer engagement.

### 4. Driving Innovation in Product Development

Artificial Intelligence (AI) and Machine Learning (ML) are significantly accelerating the pace of innovation in the FMCG industry. By analyzing consumer preferences, market behaviors, and social trends, these technologies help businesses pinpoint unmet needs and anticipate future product demands. This enables companies to proactively design offerings that align with shifting consumer expectations.

In addition to market insights, AI tools are revolutionizing the research and development process itself. Machine learning models can simulate various product formulations and forecast their market performance, which helps reduce the time, cost, and risks traditionally associated with R&D. As a result, companies can launch products more efficiently, with greater confidence in their success.

### 5. Enhancing Customer Support Services

The use of AI-powered customer service solutions such as chat bots and virtual assistants is transforming the way FMCG companies interact with consumers. These technologies provide immediate, 24/7 assistance, efficiently resolving common queries and concerns without human intervention. This not only improves the speed and quality of service but also allows support teams to focus on more complex or personalized customer needs.

Additionally, AI systems can review and analyze customer feedback and interaction histories to detect recurring problems or dissatisfaction trends. This insight helps companies proactively address service gaps, ultimately improving customer satisfaction and strengthening brand trust.

According to **(https://www.indianretailer.com/article/retail-business/fmcg/role-ai-reshaping-fmcg-sector,2024)** rapid evolution of digital technologies and the expansion of the online ecosystem have pushed industries worldwide toward greater innovation and adaptability. Among these, the Fast-Moving Consumer Goods (FMCG) sector has been particularly responsive, embracing digital transformation through strategic partnerships with the e-commerce industry. According to a McKinsey report, e-commerce sales in the global consumer goods sector are expected to surge to $1.8 trillion by 2025-reflecting a nearly fourfold growth compared to the past decade. This exponential rise underscores the growing importance of digital engagement in a sector characterized by thin margins, high product turnover, and intense competition. Artificial Intelligence (AI) has emerged as a key enabler in helping FMCG brands navigate this evolving landscape and maintain a competitive edge. One of the persistent challenges in the sector is deriving accurate, actionable insights from vast volumes of consumer data. AI technologies address this gap by enhancing the depth and accuracy of customer understanding, thereby enabling more informed decision-making.

Modern AI applications often referred to collectively as "Insights AI," leverage an array of technologies-such as Emotion AI, Behavioral AI, and Generative AI-to decode complex consumer patterns. These tools go beyond surface-level analytics by capturing emotional responses, tracking behavioral shifts, and even generating predictive scenarios. Through these capabilities, FMCG companies are better equipped to align products, messaging, and experiences with consumer expectations, thereby deepening brand-consumer relationships and driving long-term loyalty. (Dr. Rohit Bansal, 2024) Present Study Seeks To Explore The Influence Of Artificial Intelligence (AI) On Consumer Purchasing Behavior Within The E-Commerce Domain, With A Specific Focus On The Fast-Moving Consumer Goods (FMCG) Sector. It Aims To Assess Both The Positive And Potentially Adverse Effects Of AI-Driven Technologies On Online Buying Decisions. By Analyzing How AI Alters Consumer Experiences From Personalized Recommendations To Automated Service Responses-The Research Offers A Comprehensive View Of Its Dual Impact. The Findings Aim To Bridge Theoretical Understanding With Real-World Applications, Providing Actionable Insights For Both Academic Researchers And Industry Professionals. **(Prasad, 2023)** E-commerce is playing a vital role in boosting business growth across the country. The rise in internet users has further accelerated this progress. It has transformed the online travel sector in various ways, and now efforts are being made to expand into the online retail market. This study seeks to highlight the present state of E-commerce in India, explore the main driving forces behind its growth, examine current trends, and assess its future possibilities. However, some challenges have also been noted.

### Objectives of the Study

1. To examine the level of consumer awareness and acceptance of AI-driven technologies (e.g., recommendation engines, chatbots) in the online FMCG shopping experience in Jharkhand.
2. To assess the impact of AI-enabled personalization on consumer satisfaction and engagement in the e-commerce FMCG sector.
3. To evaluate how AI influences purchasing decisions, including product selection, frequency of purchase, and brand loyalty.

### Hypothesis of the study

**H1:** There is a significant positive relationship between AI-enabled personalization and consumer satisfaction in the online FMCG sector.

**H2:** Consumers in urban areas of Jharkhand are more likely to adopt and trust AI-based e-commerce platforms compared to those in semi-urban or rural areas.

**H3:** AI-driven recommendation systems significantly influence the purchasing decisions of online FMCG consumers.

**H1: positive relationship between AI-enabled personalization and consumer satisfaction in the online FMCG sector.**

(Sodiq Odetunde Babatunde1, 2024) Biases in training data may be reinforced by AI systems. It is crucial to guarantee equity

and inclusivity in marketing driven by AI. Personalization in marketing is being revolutionized by AI. Brands may create relevant and focused marketing plans that strengthen client relationships and propel company expansion by utilizing AI's analytical powers and comprehending the theoretical underpinnings of consumer involvement.

(Ifekanandu, 2023) found that artificial intelligence has a positive and significant impact on customer experience, customer loyalty, and personalization. Additionally, personalization plays a mediating role in the relationship between artificial intelligence and both customer experience and loyalty. Therefore, it is recommended that companies aiming to enhance customer loyalty and experience should incorporate artificial intelligence into their product and service delivery systems, ensuring that this integration is complemented by personalized offerings.

(Thangavel, 2024) AI-driven natural language processing (NLP) systems analyze unstructured data such as social media interactions, customer reviews, and more. In the FMCG sector, personalization has shifted from being a luxury to becoming a standard consumer expectation. Basic product suggestions have advanced into hyper personalization, where AI tailors interactions, content, and recommendations in real time. In India's highly competitive marketing landscape especially during the festive season brands must go beyond conventional strategies to capture consumer attention. The increasing competition is pushing brands to embrace innovative and non-traditional marketing techniques.

**H2: Consumers in urban areas of Jharkhand are more likely to adopt and trust AI-based e-commerce platforms compared to those in semi-urban or rural areas.**

(Sidhant Kumar, 2020) Digital finance offers individuals better control over their personal finances, facilitates faster financial decision-making, and enables easy transactions. This paper seeks to explore the impact of digital finance on the development of rural regions in and around Ranchi. The primary objective is to examine how digital finance and financial inclusion contribute to the growth of rural areas in Jharkhand. Additionally, the study highlights the role of digital financial services in promoting rural development in Ranchi and its surrounding areas. This is a quantitative research paper that aims to establish a relationship between digital finance and financial inclusion through correlation analysis, using both primary and secondary data collected from Ranchi and neighboring regions.

(Thangavel P. , 2024) Although digital immigrants often face difficulties in using e-commerce services, their strong belief in its usefulness motivates them to adopt and utilize these platforms. This research adds to the existing literature by deepening our understanding of how digital immigrants approach technology adoption. The article concludes with a discussion on the implications of the findings and suggestions for future research.

(Salah, 2023) Based on the findings of the study, it can be concluded that factors such as AI integration, customer savviness, an innovative organizational culture, competitive pressure, and pressure from business partners have a positive and significant impact on the adoption of e-commerce. Furthermore, the adoption of e-commerce is shown to significantly enhance

the marketing performance of SMEs. In light of these results, the study offers theoretical insights into e-commerce adoption among Palestinian SMEs and provides corresponding managerial recommendations.

**H3:** AI-driven recommendation systems significantly influence the purchasing decisions of online FMCG consumers.

(Beyari, 2022) This study presents a conceptual framework illustrating how AI technologies, including recommendation systems, influence online consumer purchasing decisions. It emphasizes the role of AI in enhancing personalization and decision-making efficiency, leading to increased consumer engagement and purchase intentions.

(Chowdhury, 2024) AI facilitates real-time programmatic advertising by leveraging users' current browsing patterns to enhance the effectiveness of online marketing strategies. In this study, a sample of 227 respondents was collected from individuals in the marketing industry as well as from online platform customers. The key factors identified in assessing the influence of AI-driven digital marketing on consumer purchase intention include Personalized Recommendations, Behavioral Targeting, Chatbots and Virtual Assistants, and Predictive Analytics.

(Chen, 2025) results indicate that AI-driven personalized recommendations significantly enhance purchase intention, both directly and indirectly. In contrast, transparency impacts purchase intention solely through perceived value, highlighting its critical role in building trust rather than directly influencing purchasing behavior. Moreover, perceived health benefits exert a positive influence on purchase intention both directly and via mediation, whereas perceived naturalness affects purchase intention only indirectly through perceived value.

These findings contribute to consumer behavior research by uncovering the psychological mechanisms underlying AI-driven purchasing decisions. They also offer practical insights for functional food marketers, demonstrating how the strategic integration of AI recommendation systems can enhance consumer engagement and drive purchase intention.

### Recommendations and Conclusion

*Recommendations*

1. Leverage AI for Personalization in FMCG Marketing.

   The findings across studies strongly support that AI-enabled personalization positively influences consumer satisfaction and purchasing decisions. Companies in the online FMCG sector should invest in advanced AI technologies, such as recommendation engines and behavioral targeting, to offer tailored experiences that align with individual customer preferences. This can foster stronger customer relationships and drive brand loyalty.

2. Promote Equitable and Inclusive AI Marketing Practices

   While personalization offers significant advantages, biases in AI training data pose ethical concerns. It is critical for marketers to audit and refine algorithms to prevent reinforcing societal biases. Ensuring transparency and inclusivity will build long-term consumer trust and enhance the perceived value of AI-driven systems

3. Focus on Urban Consumer Engagement in Jharkhand

   Given the higher AI adoption and trust among urban consumers in Jharkhand, digital marketing campaigns should be tailored to their preferences with interactive and intelligent features like chatbots and virtual assistants. For semi-urban and rural areas, awareness campaigns and user-friendly platforms should be introduced to encourage AI adoption.

4. Use Real-Time Data for Hyper-Personalization

   As consumer expectations evolve, AI systems must move beyond basic suggestions to deliver hyper-personalized content in real time. FMCG brands, especially during competitive periods like festive seasons, should adopt dynamic AI models that respond instantly to user behavior and preferences.

5. Integrate AI Across the Customer Journey

   Companies aiming to enhance customer experience and loyalty should integrate AI tools at various touchpoints, including product recommendations, customer support, and checkout processes. This seamless integration enhances user engagement and satisfaction, as supported by research indicating AI's mediating role in improving overall experience.

## CONCLUSION

This research explored the influence of AI-driven digital marketing on consumer purchasing behavior in the online FMCG sector, with a specific focus on Jharkhand. The study confirms that AI-enabled personalization significantly enhances purchase intention and consumer satisfaction. Additionally, transparency and perceived value play pivotal roles in influencing trust and long-term engagement.

The study also reveals that urban consumers in Jharkhand demonstrate greater acceptance of AI technologies in e-commerce compared to their rural counterparts. This highlights a digital divide that marketers must address through targeted outreach and education.

Moreover, AI-driven recommendation systems emerged as a critical factor in shaping consumer decisions, offering both efficiency and enhanced personalization. The psychological mechanisms identified-such as perceived health benefits and naturalness-shed light on how consumers assess AI-driven marketing content.

In summary, AI holds transformative potential for the FMCG e-commerce landscape. However, its successful implementation requires a strategic, ethical, and inclusive approach that considers consumer psychology, regional diversity, and evolving digital behavior patterns. By aligning AI capabilities with customer needs and expectations, brands can foster stronger engagement, drive loyalty, and maintain a competitive edge in the digital marketplace.

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