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NEUROMARKETING AND ARTIFICIAL INTELLIGENCE: A SYSTEMATIC REVIEW OF CONSUMER BUYING BEHAVIOUR AND SUPPLY CHAIN OPTIMISATION IN THE FMCG SECTOR

Pooja Ganesh Thakare[1], Dr. Dilip Rambhau Jagtap[2], Dr. Swapnil Vitthalprasad Mishra[3]
[1] *Research Scholar, G. T. Patil Arts, Commerce& Science College, Nandurbar.*
Email: ps983438@gmail.com
[2] *Principal and Research Guide, Late Annasaheb Pitambar Shankar Wadile Arts College, Thalner.*
[3] *Head and Research Guide, G. T. Patil Arts, Commerce& Science College, Nandurbar.*

Abstract
Neuroscience is used in various marketing strategies, known as neuromarketing. The goal of neuromarketing strategies is to gain a clear understanding of consumers in the field of marketing. This understanding of consumer preferences and expectations can be very helpful in organisation. According to Wikipedia, Artificial intelligence (AI) is the capability of computational systems to perform tasks typically related with human intelligence, such as learning, reasoning, problem-solving, perception, and decision-making. This study primarily focuses on how neuromarketing and AI is contributing to the marketing field and supply chain. This study is a systematic review based on sources collected from the Google Scholar, website and other peer-reviewed journals. The study reveals that neuromarketing tools are helpful in understanding consumers' emotional and cognitive responses to products or advertising to predict consumer preferences. The study concludes how the combination of AI &neuromarketing is helpful to FMCG organisations to get the competitive advantage and its impact on business performance.

Keywords: Neuromarketing, Consumer Buying Behaviour, Supply Chain Management, AI in Consumer Buying Behaviour, FMCG, EEG, Eye-tracking, Facial Coding.

► *Corresponding Author: Pooja Ganesh Thakare*

1. Introduction

We all are aware that companies analyse consumer buying behaviour before launching the products in the market. According to a webpage NIQ, recent understanding of consumer behaviour is crucial for companies across various sectors, as it directly impacts marketing strategies, sales, and customer retention. By comprehending how and why consumers make their purchasing decisions, businesses can tailor their products and services to better meet the needs and desires of their target audience [1]. Recent years have seen advances in neuroimaging to such an extent that neuroscientists are able to directly study the frequency, location, and timing of neuronal activity to an unprecedented degree. However, marketing science has remained largely unaware of such advances and their huge potential. In fact, the application of neuroimaging to market research – what has come to be called 'neuromarketing'[2]. According to Wikipedia, Artificial intelligence (AI) is the capability of computational systems to perform tasks typically associated with human intelligence, such as learning, reasoning, problem-solving, perception, and decision-making. It is

a field of research in computer science that develops and studies methods and software that enable machines to perceive their environment and use learning and intelligence to take actions that maximize their chances of achieving defined goals.[3]

A blog from Gutenberg presents their views on blending AI and neuromarketing , Neuromarketing blends neuroscience, psychology, and marketing to understand what truly grabs attention, triggers emotions, and drives decisions. Today, machine learning in marketing psychology makes it possible to uncover these insights faster—analyzing vast data from eye movements, facial reactions, and even brainwave responses [4].Supply chain management (SCM) is the coordination of a business' entire production flow, from sourcing materials to delivering an item.[5]

In today's era AI is contributing to every sector as Elma Kelly in her Journal says that AI contributed to greater sustainability in supply chains by reducing resource waste and supporting environmental goals, thus demonstrating its critical role in modernizing and optimizing supply chain practices [6].Before moving forward, let us understand the definition of FMCG. Fast-moving consumer goods (FMCGs) are products that are sold quickly, are affordable for consumers, and have high turnover for companies. FMCGs have a short shelf life because of high consumer demand (e.g., soft drinks and confections) or because they are perishable (e.g., meat, dairy products, and baked goods) [7].

This is important today because the integration of neuromarketing and artificial intelligence helps FMCG companies gain a deeper understanding of consumer purchasing behavior and create more personalized marketing strategies. This combination optimizes supply chains, reduces waste, improves inventory management, and increases efficiency in the competitive FMCG market.AI makes businesses' marketing more effective, personalized, and results-driven. It's time for companies to adopt AI to boost sales, customer engagement, and gain a competitive edge [8].

We will study how neuromarketing and artificial intelligence influence consumer buying behaviour in the FMCG sector and the role of AI-based insights in optimizing demand forecasting and supply chain efficiency in FMCG companies. We will also go through the fact that neuromarketing is different from traditional marketing.

2. Literature Review

2.1 Neuromarketing and Consumer Buying Behaviour

Chatterjee and Giri (2021) define that neuromarketing tools help companies to understand consumer choices, preferences in a very better way. All this encourages them to make innovative products and searches for those strategies which make them to analyse consumer needs which ultimately lead them to do improvements in the customer satisfaction and to get a competitive advantage in their field.[9]

Mada (2024) stated that neuromarketing could reveal subconscious emotional processes so that marketers could understand consumer buying behaviour and influence them which traditional marketers were unable to do. The article emphasises that techniques like fMRI, EEG and eye-tracking disclose deep insights like how marketing stimuli work for consumers and how the consumers make decisions. However, the study highlights that ethical consideration should be taken while taking benefit from these methods. The study put emphasis on the privacy of consumers. The article also points out that neuromarketing is helping companies in improving marketing strategies but it should be accepted in a very ethical way while being a responsible organisation.[10]

Tools used in neuromarketing (EEG, eye tracking, facial recognition)

- **EEG (Electroencephalography)** –EEG involves placing electrodes on the scalp to measure patterns of brain activity in response to stimuli. This can measure the mental effort required to process an advertisement and the emotional response it elicits, for example, whether an advertisement is confusing or emotionally appealing.
- **Eye Tracking** – Eye tracking is used to measure the eye movement a person focuses on a specific stimulus and for how long. It measures metrics in the form of fixation duration, area of interest, and visual heat maps. It also reveals the areas of advertising and product packaging that attract the most attention and helps marketers understand general visual attention and engagement.
- **Facial Recognition (Facial Coding)** – Analyzes facial expressions to observe micro emotions such as happiness, surprise, anger, or confusion in response to marketing stimuli.

These tools help companies understand consumers' subconscious reactions beyond traditional surveys.[11]

2.2 Neuromarketing differs from traditional marketing

Both neuromarketing and traditional marketing is helping in understanding consumers' choice and demand pattern. If we talk about the difference, neuromarketing uses neuroscientific tools to understand stimuli while traditional work on surveys and focus groups to collect the data from the consumers to study their buying pattern and their preference. The neuromarketing measures the subconscious reactions to stimuli to disclose their emotional and cognitive responses. [11]

2.3 Artificial Intelligence in Consumer Behaviour

Davtyan (2025) explains how AI models, such as predictive analysis, sentiment analysis, and machine learning, analyze vast amounts of consumer data in real time. AI helps companies perform consumer segmentation and personalized targeting, leading to better engagement, marketing efficiency, and informed decision-making compared to traditional marketing. It helps companies understand consumer behaviour and develop more effective marketing strategies.[12]

2.4 AI in Supply Chain Optimisation in FMCG

The study by Kelly, A. (2024) concludes that AI is helping to improve various areas of supply chain management. AI is assisting with demand forecasting, logistics planning, risk management, and inventory control. This research also suggests that AI is helping to detect bottlenecks and create a smoother flow of the supply chain with lower costs and improved efficiency. AI is also helping reduce waste by utilizing the right resources. This paper also confirms that AI is a transformative tool for supply chain optimization.[13]

2.5 Integration of Neuromarketing and AI

Neuromarketing is a combination of neuroscience, psychology, and marketing that helps capture attention, evoke emotions, and influence decisions. In today's world, machine learning in marketing psychology makes it easier to make in-depth inferences quickly. It helps analyze vast amounts of data in real time. Neuromarketing studies the brain and how it responds to different stimuli. AI helps analyze data collected through neuromarketing methods like facial coding and eye-tracking EEG. This data serves as an actionable insights tool to help design campaigns that connect emotionally and increase recall.[14]

3. Research Methodology

3.1 Research Design

This study includes a systematic literature review from the already existing research on the areas like neuromarketing, AI, combination of AI with neuromarketing, consumer buying behaviour and supply chain management in the area of FMCG sector.

3.2 Data Sources

The data were collected from Wikipedia, the Gutenberg, IBM, Research Gate, the brief AI investopedia and other peer reviewed journals for this paper.

3.3 Search Strategy

The keywords were search our hair as fellows follows

"Neuromarketing","Consumer buying Behaviour", "Supply chain management", "AI in consumer buying behaviour", "FMCG", "EEG", "Eye-tracking" and "facial coding"

Search operators like OR, AND were also used to improve the search.

4. Analysis and Discussion

4.1 Interrelation of Neuromarketing and consumer Buying Behaviour

The companies use neuromarketing techniques to get deep insight in the form of consumer choices, preferences which help them to do work on marketing strategies. The research concludes that the neuromarketing technique is contributing to analyse consumer buying behaviour.

4.2 How Neuromarketing differs from traditional marketing?

Neuromarketing uses scientific tools to understand buying patterns and consumer choice whereas traditional marketing collects data from surveys and Focus Groups to study buying patterns but neuromarketing reveals about the emotional and cognitive response.

4.3 Impact of AI on consumer buying behaviour

AI models are helping in analysing vast consumer data in real time. These help companies to do consumer segmentation personalized targets in all the leads to increase marketing efficiency and better marketing strategies.

4.4 Impact of AI on business performance

Neuromarketing is allowing companies to get Deep Insight from consumer behaviour in the form of consumer choices and preferences. All this makes them work on marketing strategies whereas AI helps in analyzing vast data in real time which reduces effort and time. Combination of both AI & neuromarketing contributing to make marketing strategies more effective and precise. It is also contributing to make the supply chain more effective.

5. Conclusion & Recommendations

The study provides a comprehensive understanding of how neuromarketing and AI are helpful in getting deeper insight into consumer behaviour by measuring subconscious reactions. This study also reveals that through AI models like predictive analysis sentiment and analysis analyse vast amounts of data in real time. AI help companies to do personalized targeting which leads to a better marking efficiency the data collected through neuromarketing methods (EEG, facial coding and eye-tracking) serves as actionable insight tool to design campaign Strengthen Brand recall .Under this study it is also acknowledged that AI is also strengthening the SCM by assisting in demand forecasting, risk management etc. Overall the researcher could conclude that AI andneuromarketing enable companies to improve marketing ability with the help of data driven insight in consumer behaviour.

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