

AN EMPIRICAL STUDY ON THE IMPACT OF NEUROMARKETING FACTORS ON CONSUMER DECISION-MAKING BEHAVIOUR

S. Gowri¹

¹PG & Research Department of Commerce (SF), Kamaraj College (Autonomous), Affiliated to Manonmaniam Sundaranar University (Tirunelveli), Thoothukudi – 628003.

Email: gowrisivakumar19@gmail.com

Abstract: The rapid advancement of digital technologies and increasing market competition have transformed the way businesses understand and influence consumer behaviour. Traditional marketing approaches primarily rely on surveys and self-reported opinions, which may not fully capture the subconscious emotions, cognitive responses, and psychological factors that shape purchasing decisions. Neuromarketing, an emerging interdisciplinary field combining neuroscience, psychology, and marketing, provides deeper insights into consumer decision-making by analysing emotional, sensory, and cognitive reactions towards marketing stimuli. The present study titled “An Empirical Study on the Impact of Neuromarketing Factors on Consumer Decision-Making Behaviour” aims to examine the influence of neuromarketing factors such as digital neuromarketing influence, consumer perception, trust and credibility, and attention and engagement on consumer behaviour. The study adopted a descriptive research design and collected primary data from respondents through a structured questionnaire based on a five-point Likert scale. The study analysed the relationship between demographic variables and neuromarketing factors using statistical tools such as One-Way ANOVA, Independent Sample t-test, Kruskal-Wallis test, and Mann-Whitney U test. The findings reveal that age significantly influences personalized digital advertisements and emotional brand experiences, while gender has a significant impact on positive brand associations influencing product preferences. The results also indicate that occupation influences trust towards authentic advertisements and the role of neuromarketing factors in different stages of purchase behaviour. Further, the area of residence significantly affects attention and engagement aspects, particularly creative marketing content, memorable advertisements, sensory experiences, and product presentation. The study concludes that neuromarketing factors play a significant role in shaping consumer perceptions, purchase intentions, and brand relationships. Emotional appeals, sensory stimuli, personalized communication, and credible marketing messages are important drivers of consumer decision-making behaviour. The findings provide valuable insights for marketers and businesses to develop consumer-centric strategies, enhance customer engagement, and improve brand loyalty. The study also highlights the importance of applying neuromarketing techniques ethically while understanding the psychological factors influencing modern consumers in a competitive digital marketplace.

Keywords: Neuromarketing, Consumer Behaviour, Decision-Making Behaviour, Emotional Appeal, Consumer Perception, Brand Loyalty, Digital Marketing, Sensory Marketing.

1. INTRODUCTION

In today's business landscape, grasping consumer behaviour is crucial for gaining competitive edge. Traditional marketing methods, such as surveys and observations, often overlook subconscious factors influencing purchasing decisions. Neuromarketing, combining neuroscience with marketing, offers a revolutionary approach to understanding consumer decision-making by examining cognitive, emotional, and physiological responses to marketing stimuli. Neuromarketing employs techniques like Electroencephalography (EEG), Functional Magnetic Resonance Imaging (fMRI), eye-tracking, and biometric measurements to analyze how consumers react to



advertisements, product design, pricing, and other marketing elements. This interdisciplinary field uncovers unconscious preferences and emotional reactions that traditional methods may miss. Consumer decisions are shaped by rational and emotional influences, with research indicating that emotions, memories, and cognitive biases play significant roles. Neuromarketing helps identify these hidden influences, allowing businesses to craft more resonant marketing strategies. In highly competitive digital marketplaces, understanding these subconscious drivers is vital for creating effective advertising, enhancing customer experience, and fostering brand loyalty. As digital marketing, e-commerce, and social media expand, neuromarketing's relevance grows. With consumers bombarded by marketing messages, neuromarketing insights illuminate how they process information, respond to emotional appeals, and establish brand preferences. This knowledge enables organizations to refine advertising, website design, packaging, pricing, and promotional strategies for better engagement and purchasing intent. Key neuromarketing determinants like emotional appeal, visual attention, brand perception, and sensory marketing influence consumer behaviour throughout the buying process. Comprehending these factors empowers marketers to develop customer-centric strategies that enhance satisfaction and loyalty. Despite neuromarketing's adoption across various sectors, empirical studies on its impact, especially in the Indian context, are limited. Cultural and demographic variations necessitate research on how neuromarketing factors influence purchasing decisions in specific markets. The study titled "An Empirical Study on the Impact of Neuromarketing Factors on Consumer Decision-Making Behaviour" aims to explore these influences, providing insights for developing effective marketing strategies and enriching consumer psychology understanding in modern markets.

2. REVIEW OF LITERATURE

Kajla et al. (2024) conducted a comprehensive bibliometric analysis of 383 research articles to examine the evolution of neuromarketing and consumer behaviour research. The study identified major research themes, including consumer decision-making, branding, advertising effectiveness, eye-tracking, electroencephalography (EEG), and functional magnetic resonance imaging (fMRI). The authors concluded that neuromarketing has become an important interdisciplinary field that provides valuable insights into consumers' subconscious responses and helps marketers develop evidence-based marketing strategies. The study also highlighted the need for more empirical research focusing on consumer behaviour in emerging markets.

Bhardwaj et al. (2024) reviewed recent developments in neuromarketing by analysing 577 peer-reviewed publications using bibliometric and systematic review techniques. The study found that neuromarketing tools such as eye-tracking, EEG, and fMRI significantly improve the understanding of consumers' emotional and cognitive responses toward advertisements and products. The authors emphasized that integrating neuroscience with traditional marketing research enables organizations to predict consumer preferences more accurately and improve marketing effectiveness.

Yao and Wang (2024) examined the use of neural data in forecasting aggregate consumer behaviour. The review highlighted that neural metrics provide better predictions of market-level consumer choices than conventional self-report measures alone. The authors concluded that combining neuroscience, behavioural data, and machine learning techniques can significantly improve marketers' ability to forecast purchasing behaviour and evaluate advertising effectiveness.

RESEARCH GAP

Recent studies demonstrate that neuromarketing plays a significant role in understanding consumer emotions, attention, cognition, and purchasing behaviour. Most contemporary research has concentrated on bibliometric analyses, systematic reviews, neuromarketing tools (EEG, eye-tracking, and fMRI), and predictive models rather than empirical investigations of specific neuromarketing factors affecting consumers' decision-making behaviour. Moreover, there is limited empirical evidence from developing economies, particularly India, regarding how emotional appeal, visual attention, sensory stimuli, brand perception, and cognitive responses influence consumers' purchasing decisions. Therefore, the present study seeks to bridge this gap by empirically examining the impact of neuromarketing factors on consumer decision-making behaviour.

STATEMENT OF THE PROBLEM

The advancement of digital technologies and market competition has transformed business communication with consumers. Traditional marketing methods, relying on surveys and interviews, often miss subconscious emotions and psychological factors impacting purchasing decisions. Neuromarketing, merging neuroscience and psychology with marketing, addresses this gap by analyzing emotional and cognitive responses to marketing stimuli like advertisements

and branding. Techniques such as EEG, fMRI, eye-tracking, and biometric measurements reveal deeper insights into consumer preferences, aiding in the creation of effective marketing strategies and improved customer experiences. However, the application of neuromarketing, especially in developing countries like India, is still limited. Most research focuses on theoretical concepts rather than empirically examining specific neuromarketing influences on consumer behavior. Additionally, consumer reactions to emotional appeals, visual stimuli, and cognitive processing vary across demographics and cultural contexts, highlighting the need for market-specific investigations. In a digital marketplace flooded with advertisements, businesses struggle to capture attention and influence purchase decisions. Understanding neuromarketing factors is crucial for effective customer-centric marketing. The study "An Empirical Study on the Impact of Neuromarketing Factors on Consumer Decision-Making Behaviour" aims to explore how factors such as emotional appeal, visual attention, and brand perception affect decision-making, providing marketers valuable insights to enhance strategies and build long-term customer relationships.

RESEARCH QUESTIONS

RQ1: What are the major neuromarketing factors that influence consumer decision-making behaviour?

RQ2: How do emotional, cognitive, and sensory marketing factors influence consumers' purchase intentions and buying decisions?

RQ3: What is the relationship between neuromarketing factors and consumer preferences, brand perception, and purchasing behaviour?

RQ4: Which neuromarketing factor has the greatest influence on consumers' decision-making behaviour?

RESEARCH OBJECTIVES

To identify the key neuromarketing factors influencing consumer decision-making behaviour. To analyse the impact of emotional, cognitive, and sensory marketing factors on consumers' purchase intentions. To examine the relationship between neuromarketing factors and consumer preferences, brand perception, and buying behaviour. To assess the influence of demographic characteristics on consumers' perceptions towards neuromarketing strategies and their decision-making behaviour.

NULL HYPOTHESIS

H01: There is no significant relationship between age of the respondents and Digital Neuromarketing Influence

H02: There is no significant relationship between gender of the respondents and Consumer Perception

H03: There is no significant relationship between Occupation of the respondents and Trust and Credibility

H04: There is no significant relationship between Area of residence of the respondents and Attention and Engagement

3. METHODOLOGY

The present study titled "An Empirical Study on the Impact of Neuromarketing Factors on Consumer Decision-Making Behaviour" adopted a descriptive research design to analyse the influence of neuromarketing factors on consumer decision-making behaviour. The study was based on both primary and secondary sources of data. Primary data were collected from 230 respondents through a structured questionnaire designed using a five-point Likert scale. The respondents were selected using a convenience sampling technique, which enabled the researcher to collect responses from consumers who were easily accessible and willing to participate in the study. The study examined major neuromarketing dimensions, namely Digital Neuromarketing Influence, Consumer Perception, Trust and Credibility, and Attention and Engagement. The collected data were analysed using Statistical Package for the Social Sciences (SPSS). Statistical tools such as Percentage Analysis, One-Way ANOVA, Independent Sample t-test, Kruskal-Wallis test, and Mann-Whitney U test were employed to test the hypotheses and identify the influence of demographic variables on neuromarketing factors. The methodology aimed to understand how emotional, cognitive, sensory, and psychological marketing stimuli influence consumers' perceptions, purchase intentions, brand preferences, and overall decision-making behaviour.

ANALYSIS AND INTERPRETATION

H01: There is no significant relationship between age of the respondents and Digital Neuromarketing Influence

ANOVA						
Factors		Sum of Squares	df	Mean Square	F	Sig.
Personalized digital advertisements influence my product preferences.	Between Groups	6.069	4	1.517	2.447	.047
	Within Groups	139.496	225	.620		
	Total	145.565	229			
Online product recommendations affect my purchase decisions.	Between Groups	6.151	4	1.538	1.979	.099
	Within Groups	174.823	225	.777		
	Total	180.974	229			
Social media advertisements influence my buying behaviour.	Between Groups	2.420	4	.605	.676	.609
	Within Groups	201.254	225	.894		
	Total	203.674	229			
Digital marketing content that attracts my attention increases purchase interest.	Between Groups	2.670	4	.667	.614	.653
	Within Groups	244.413	225	1.086		
	Total	247.083	229			
Online consumer experiences influence my brand choices.	Between Groups	4.222	4	1.056	1.180	.320
	Within Groups	201.273	225	.895		
	Total	205.496	229			
Positive emotional experiences encourage me to continue using a brand.	Between Groups	5.839	4	1.460	2.591	.038
	Within Groups	126.752	225	.563		
	Total	132.591	229			
Memorable marketing experiences increase my loyalty towards a brand.	Between Groups	7.597	4	1.899	1.758	.138
	Within Groups	243.103	225	1.080		
	Total	250.700	229			
I prefer brands that understand my needs and preferences.	Between Groups	1.205	4	.301	.299	.878
	Within Groups	226.517	225	1.007		
	Total	227.722	229			
Effective marketing strategies encourage repeat purchases.	Between Groups	2.257	4	.564	.752	.558
	Within Groups	168.787	225	.750		
	Total	171.043	229			
Neuromarketing-based approaches can strengthen customer relationships.	Between Groups	.895	4	.224	.289	.885
	Within Groups	174.066	225	.774		
	Total	174.961	229			

Source: Primary Data

Interpretation - The One-Way ANOVA test was conducted to identify the significant relationship between the age of the respondents and Digital Neuromarketing Influence. The results show that the factors “Personalized digital advertisements influence my product preferences” (Sig. = 0.047) and “Positive emotional experiences encourage me to continue using a brand” (Sig. = 0.038) have significance values less than 0.05, indicating that there is a significant difference among different age groups for these factors. Hence, the null hypothesis is rejected for these dimensions. However, the remaining factors, including online product recommendations, social media advertisements, digital marketing content, online consumer experiences, memorable marketing experiences, brand preference, repeat purchase intentions, and neuromarketing-based customer relationship approaches, have significance values greater than 0.05, indicating no significant differences among age groups. Therefore, the null hypothesis (H01) is partially rejected and partially accepted, suggesting that age influences certain aspects of digital neuromarketing, particularly personalized advertising and emotional brand engagement, while other dimensions remain unaffected by the age of the respondents.

H02: There is no significant relationship between gender of the respondents and Consumer Perception

Factors		F	Sig.	t	df	Sig. (2-tailed)
Marketing messages influence my perception of product value.	Equal variances assumed	.760	.384	1.314	228	.190
	Equal variances not assumed			1.328	227.883	.186
	Equal variances assumed	.959	.329	.044	228	.965

The way a product is presented affects my opinion about it.	Equal variances not assumed			.044	220.720	.965
Advertising strategies influence my evaluation of product quality.	Equal variances assumed	3.669	.057	-1.447	228	.149
	Equal variances not assumed			-1.431	209.993	.154
I form opinions about brands based on their marketing approach.	Equal variances assumed	.066	.797	.545	228	.586
	Equal variances not assumed			.543	218.670	.588
Neuromarketing techniques help companies understand consumer preferences.	Equal variances assumed	2.655	.105	1.869	228	.063
	Equal variances not assumed			1.892	227.999	.060
Strong brand images influence my product selection.	Equal variances assumed	5.836	.016	.141	228	.888
	Equal variances not assumed			.143	227.667	.887
I associate certain emotions with specific brands.	Equal variances assumed	.510	.476	.602	228	.548
	Equal variances not assumed			.605	225.802	.546
Brands with memorable advertisements remain in my consideration set.	Equal variances assumed	.950	.331	.578	228	.564
	Equal variances not assumed			.584	227.633	.560
Positive brand associations increase my preference for a product.	Equal variances assumed	.002	.962	2.380	228	.018
	Equal variances not assumed			2.376	220.902	.018
Neuromarketing techniques help brands create stronger identities.	Equal variances assumed	1.502	.222	-.512	228	.609
	Equal variances not assumed			-.509	216.486	.611

Source: Primary Data

Interpretation

The Independent Sample t-test was applied to examine the significant relationship between the gender of the respondents and Consumer Perception. The results indicate that the factor “Positive brand associations increase my preference for a product” has a significance value of 0.018, which is less than the 5% significance level ($p < 0.05$). Hence, the null hypothesis is rejected for this factor, indicating that there is a significant difference between male and female respondents regarding the influence of positive brand associations on product preference. However, the remaining factors, including marketing messages influencing product value perception, product presentation affecting opinions, advertising strategies influencing product quality evaluation, brand opinions based on marketing approaches, neuromarketing techniques understanding consumer preferences, strong brand images influencing product selection, emotional associations with brands, memorable advertisements, and neuromarketing techniques creating stronger brand identities, have significance values greater than 0.05, indicating no significant differences based on gender. Therefore, the null hypothesis (H_{02}) is partially rejected and partially accepted, suggesting that gender influences certain aspects of consumer perception, particularly positive brand associations, while other dimensions of consumer perception remain unaffected by the gender of the respondents.

H03: There is no significant relationship between Occupation of the respondents and Trust and Credibility

Factors	Kruskal-Wallis H	df	Asymp. Sig.
Advertisements that appear authentic increase my trust in a brand.	14.406	4	0.006
I prefer brands that create a sense of reliability through marketing communication.	3.863	4	0.425
Trustworthy brand messages influence my purchase decisions.	1.755	4	0.781
Positive emotional experiences increase my confidence in a brand.	6.762	4	0.149
Brand credibility affects my willingness to buy.	7.167	4	0.127
Marketing stimuli influence my evaluation of alternatives before purchase.	4.862	4	0.302
I consider my emotions while making purchasing decisions.	6.086	4	0.193

Advertising influences my final choice between similar products.	9.282	4	0.054
Neuromarketing factors affect my buying behaviour at different stages of purchase.	11.057	4	0.026
I make faster purchase decisions when marketing messages create strong impressions.	3.905	4	0.419

Source: Primary Data

Interpretation - The Kruskal-Wallis test was applied to examine the significant relationship between the occupation of the respondents and Trust and Credibility factors. The results reveal that the factors “Advertisements that appear authentic increase my trust in a brand” (Asymp. Sig. = 0.006) and “Neuromarketing factors affect my buying behaviour at different stages of purchase” (Asymp. Sig. = 0.026) have significance values less than 0.05, indicating that there is a significant difference among respondents based on their occupation for these factors. Hence, the null hypothesis is rejected for these dimensions. However, the remaining factors, including preference for reliable brand communication, trustworthy brand messages influencing purchase decisions, positive emotional experiences increasing brand confidence, brand credibility affecting willingness to buy, marketing stimuli influencing evaluation of alternatives, emotional consideration during purchase decisions, advertising influencing final choices, and faster purchase decisions due to strong marketing impressions, have significance values greater than 0.05, indicating no significant differences among different occupational groups. Therefore, the null hypothesis (H03) is partially rejected and partially accepted, suggesting that occupation influences certain aspects of trust and credibility, particularly authenticity of advertisements and the impact of neuromarketing factors on buying behaviour, while other trust and credibility dimensions remain unaffected by the occupation of the respondents.

H04: There is no significant relationship between Area of residence of the respondents and Attention and Engagement

Factors	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Unique advertisements easily capture my attention.	5590.000	16915.000	-0.904	0.366
I pay more attention to advertisements that are visually attractive.	5523.500	16848.500	-1.039	0.299
Creative marketing content increases my interest in a product.	4999.000	16324.000	-2.176	0.030
Advertisements that surprise me are more memorable.	4215.000	15540.000	-4.014	0.000
Interactive marketing content increases my involvement with a brand.	5690.500	17015.500	-0.703	0.482
Product colours influence my perception of a brand.	5323.500	16648.500	-1.497	0.134
Attractive packaging encourages me to purchase a product.	5953.500	17278.500	-0.102	0.919
Music and sounds used in advertisements affect my brand preference.	3742.000	15067.000	-4.929	0.000
The overall presentation of a product influences my purchase decision.	3932.000	15257.000	-4.531	0.000
Sensory experiences create stronger connections with brands.	4962.000	16287.000	-2.297	0.022

Source: Primary Data

Interpretation - The Mann-Whitney U test was applied to examine the significant relationship between the area of residence of the respondents and Attention and Engagement factors. The results indicate that the factors “Creative marketing content increases my interest in a product” (Asymp. Sig. = 0.030), “Advertisements that surprise me are more memorable” (Asymp. Sig. = 0.000), “Music and sounds used in advertisements affect my brand preference” (Asymp. Sig. = 0.000), “The overall presentation of a product influences my purchase decision” (Asymp. Sig. = 0.000), and “Sensory experiences create stronger connections with brands” (Asymp. Sig. = 0.022) have

significance values less than 0.05, indicating that there is a significant difference between respondents based on their area of residence for these factors. Hence, the null hypothesis is rejected for these dimensions. However, the remaining factors, including unique advertisements capturing attention, visually attractive advertisements, interactive marketing content, product colours influencing brand perception, and attractive packaging encouraging purchase, have significance values greater than 0.05, indicating no significant difference between urban and rural respondents. Therefore, the null hypothesis (H04) is partially rejected and partially accepted, suggesting that the area of residence influences certain aspects of attention and engagement, particularly creative content, memorable advertisements, sensory elements, and product presentation, while other engagement factors remain unaffected by the residential background of the respondents.

4. CONCLUSION

The present study, titled “An Empirical Study on the Impact of Neuromarketing Factors on Consumer Decision-Making Behaviour,” examined the influence of various neuromarketing dimensions, including digital neuromarketing influence, consumer perception, trust and credibility, and attention and engagement, on consumers’ decision-making behaviour. Neuromarketing has emerged as an important approach for understanding the psychological, emotional, and cognitive factors that shape consumer responses towards marketing stimuli. The study revealed that consumers’ purchase decisions are influenced not only by rational evaluation but also by subconscious factors such as emotional experiences, personalized advertisements, sensory appeals, brand associations, and creative marketing content. The study highlights that emotional appeal, visual attractiveness, sensory stimulation, personalized communication, and credible marketing messages play a vital role in influencing consumer preferences and purchase decisions. In the digital era, businesses can utilize neuromarketing insights to design more effective advertising campaigns, improve customer experiences, strengthen brand relationships, and develop consumer-centric marketing strategies. However, ethical considerations regarding consumer privacy, subconscious influence, and responsible use of neuromarketing techniques should be carefully addressed.

Overall, the study concludes that neuromarketing factors significantly contribute to understanding consumer decision-making behaviour. By integrating neuroscience-based insights with traditional marketing approaches, organizations can better predict consumer responses, enhance brand engagement, and achieve sustainable competitive advantage in an increasingly competitive marketplace. The findings provide valuable implications for marketers, researchers, and businesses seeking to understand the psychological drivers behind modern consumer behaviour.

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