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Neuromarketing: Integrated Marketing Communication Recent Tool

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ABSTRACT

An increasing amount of research is being done on how customers' brain responses impact their decision-making since it is crucial to understand why consumers choose one product over another in the current market. Customers' decisions are influenced by neuromarketing and its implicit and automatic processes, which also reveal any covert understanding of consumer behavior. While positioning itself as one of the primary areas of study aimed at achieving this goal, neuromarketing is still a relatively new and fast developing field. The purpose of the study was to investigate how advertising affects customers' online purchase decisions. Another objective is to investigate how consumers' gaze patterns, fixation rates, heat maps, and feelings are affected by stimuli or marketing initiatives. The stimulus is provided by the consumer, and the advertising campaign measures the response. The most recent studies' systematic literature review was employed by the authors. With the aid of PRISMA, the scanned literature was included and excluded. Authors used the Forest Plot based on partial correlation to examine the effect size of the literature they had used. SLR's publication bias was examined using a funnel plot. To bolster the strength of the evaluated literature, content analysis was done.

Keywords: Neuromarketing, Automatic Processes, PRISMA, Forest and Funnel Plot

1. INTRODUCTION

The human brain processes more than 50% of information unconsciously (Ala et al., 2022, Kant, 2020). Compared to traditional questionnaire and interview-based analysis techniques, neuromarketing and consumer neuroscience studies describe reality more accurately (Aldayel et al., 2020). Ali Gaafar and Al-Romeedy (2022) conducted research in a number of areas where neuroscience helps advance theory by providing opportunities and guidance. The work contributed to new empirical tests of common groundless claims. It also explained consumer group differences and the influence of physiological characteristics and biological factors such as hormones and DNA on consumer preferences and decisions. Since its inception in 2002, neuromarketing has become increasingly important (Gurgu et al., 2020). The same is very common among companies, marketers and advertisers (Alsharif et. al, 2021).

Neuromarketing, also known as brainwave activity, eye tracking, and skin response, is the scientific study of how people's brains react to advertising and other brand-related communications (Yadete et al., 2023). The study of neuroscience is challenging and time-consuming, despite the abundance of studies on consumer perception and attitude. The hidden elements of decision-making are now more known thanks to neuroscience (Pereira et al., 2022). The increased application of neuromarketing techniques to the examination of consumer preferences and decision-making processes is advantageous to both consumers and marketers (Oikonomou et al., 2023).

The role of emotions in online retail environments is examined in order to capitalize on the benefits and drawbacks of the modern consumer experience. Major brand executives conducted research on the most recent changes to the retail sector (Yadete and Kant, 2023). Kant and Wakjira (2022); the researcher examined issues with the human brain and ways to change the purchasing process. The traditional brick and mortar stores may be better equipped to meet customer needs given the evolving, complex e-commerce and traditional brick and mortar environments (Mansor & Isa, 2020). Online retailers change their prices in response to pricing changes made by rivals. The Consumer Neuroscience Model of Branding includes the following steps: representation, attention, predicted value, experienced value, remembered importance, and learning (Nilashi & Abumalloh, 2023).

Neuromarketing cannot replace conventional methods, but state-of-the-art tools like FMRI (functional magnetic resonance imaging) will boost the potency of marketing campaigns (Adula et al., 2023). Neuromarketing will have a major impact on businesses and society because it has the ability to recognize implicit and automatic processes that affect consumer decision-making and because it will reveal hidden information about consumer behavior. This could not have been accomplished using conventional methods (Bhardwaj et al., 2023). Since the retail industry has undergone significant change, there are many opportunities for all online sellers right now. Online retailers can better understand changing consumer behavior with the help of consumer neuroscience (Kant et al., 2022).

The importance of emotional investment and personal relevance cannot be overstated. Retailers consider the entire buying process and are knowledgeable about the best ways to influence customers while they shop (Dereso et al.). It is crucial to create a customer experience that elicits emotional responses and streamlines the rewards process in order to encourage consumer repurchase (Spence, 2020). The three important phases of the purchasing process have been identified by the researcher. Thanks to marketing communications and word-of-mouth experiences, retailers can interact with customers and elicit an emotional response from them that is then stored for use in the future.

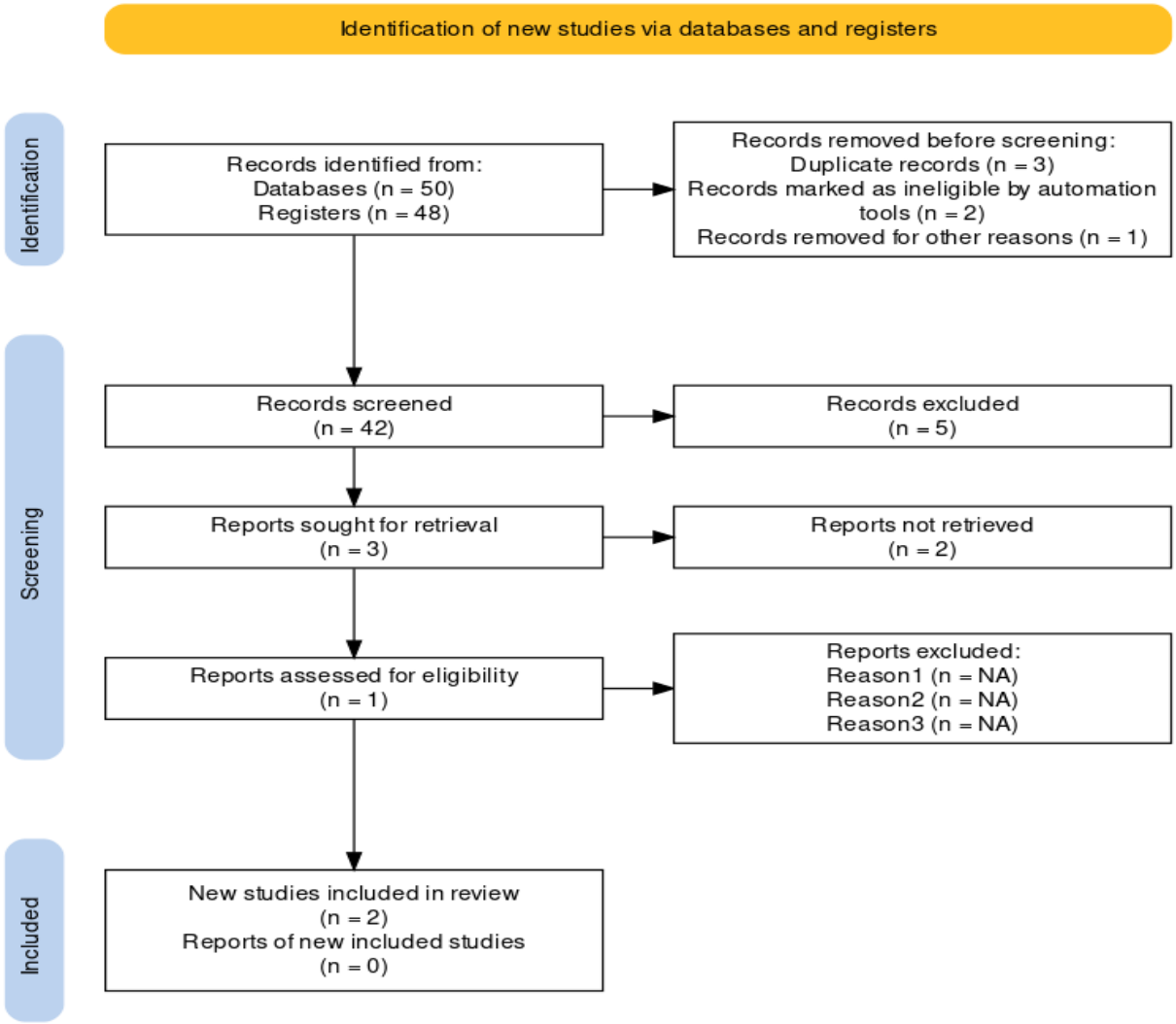
According to Paramashivaiah et al., (2021) a customer's purchase in a store leaves a lasting impression. In the post-tail phase, consumers begin to feel an emotional connection to the product. Buyers also play the role of brand ambassadors during the post-tail experience, positioning themse lves for subsequent purchases and fortifying their relationship with the business, products, or service Buyers also serve as advocates during the post-tail experience, positioning potential buyers and buyers (Dereso et al. 2023). With the expansion of platforms and information, the digital world has never been more distracting. Every digital environment has its own set of challenges, from website design to product display to adding recommendations and reviews. Emotion is a constant factor. Examining various neuromarketing tactics for online buying is the study's goal.

Objective of the Study

One of the study's goals is to inform the audience about the topic of neuromarketing. However, the main goal is to evaluate how neuromarketing influences different marketing inputs, such as advertising and consumer purchasing behavior. By conducting objective research on the brain, this novel technique is expected to produce more practical customer enticement strategies.

2. LITERATURE REVIEW

Figure 1: PRISMA



Source: PRISMA (2023)

Meta Analysis of Concept of Neuromarketing

Several publications have provided definitions of neuromarketing some of which are included here;

Table 1: Meta Analysis of Concept of Neuromarketing

	Study	Concept of Neuromarketing

1	Smidts, 2002	In order to develop new advertising campaigns and branding strategies, neuromarketing studies consumer brain patterns to determine how they respond to various advertisements and goods.
2	Collins Dictionary	Neuromarketing is the study of the neural processes in the brain to better understand consumer behavior and improve marketing strategies.
3	Lee et al, 2002	Neuromarketing aims to comprehend how and why consumers make their purchasing decisions by utilizing "neuroscientific tools to evaluate and comprehend human behavior in connection to markets and marketing exchanges."
4	Kenning & Hubert, 2006	The use of research from neuroscientific consumer studies in the context of managerial practice is known as neuromarketing
5	Zurawicki, 2010; Dooley, 2010	Most commonly, neuromarketing is described as a recent area of marketing research that examines customers' cognitive and affective reactions to various marketing stimuli
6	Georges &Badoc, 2010	The method of neuromarketing enables knowledge and comprehension of the information-processing mechanisms used by the human brain

Source: Authors own Meta analysis (2023)

Systematic Literature Review

342 documents were released overall between 2008 and 2023. There were a total of 26 options. Figure 1 shows the PRISMA framework, which has four stages. These include (I) identification as records located through database searching, (ii) screening the record publications, (iii) eligibility as determining the publications that qualify for this review, and (iv) selecting and including studies.

Neuromarketing is a recent field of marketing study. The study of consumers' sensory, cognitive, and emotional responses to marketing stimuli forms the foundation of the field. The human brain's neural network is made up of 100 billion neurons (Tufa and Kant, 2023). Both in academia and business, interest in neuromarketing research is growing. Forecasting consumer behavior is necessary for businesses with international ambitions. They invest in their research infrastructure, scientific talent, and interdisciplinary academic partnerships.

Table 2: Systematic Literature Review

Nemorin's (2012)	Advertising stimuli cause consumers to respond. Currently, it is unclear how the brain works and how its complex operation contributes to the highly specific human behavior that we see in the world.
Donoghue, 2015	People are still looking for a comprehensive authority who can explain human mental behavior. This leads to the convergence of the social and biological sciences. The collaboration of the natural and social sciences has yielded significant advances in the social, behavioral, physiological, and other fields.
Shiv & Yoon, 2012)	Electroencephalography and steady-state topography are used to measure specific regional spectra of the brain. The monitoring of a person's biometric or physiological status changes involves responses and sensors. They also look into

	the rate of breathing and heartbeat, the galvanic skin response, the factors that influence consumer choices, and the brain areas involved.
Nyoni and Bonga, 2012	The paper looked at how people perceive a human choice that leads to a personal choice. Tracking changes in activity in various brain regions required the use of functional magnetic resonance imaging.
Salatiet al., 2016	Undoubtedly, more data on how our senses affect the decisions we make when choosing products is needed by consumer researchers. How can the flavor of food served in an aircraft that is flying at a height of 20,000 feet be processed by the consumer's brain, or what is the best perfume to be sprayed in a retail setting that caters to elderly customers?
Donoghue, 2015	Consumer responses to marketing stimuli are studied in the emerging field of neuromarketing. Despite the fact that the human brain is a well-developed network of 100 billion neurons, there is little research on the in-depth understanding of how the brain functions and how a brain's complex operation results in the highly specific human behavior.
Shiv & Yoon, 2012	Social and biological sciences came together as a result of the information. The collaborative research efforts of natural and social scientists have significantly aided advances in the social, behavioral, physiological, and managerial sciences. Theoretical advancements in neuro-economics and decision neurosciences about human decision making now take into account both individual choices and the neurological mechanisms behind such choices.

Source: Authors own SLR (2023)

In order to comprehend marketing stimuli, neuromarketing observes and examines human emotions. According to neuromarketing theory, rational decision-making is not primarily a conscious process and that the majority of economic theories are outdated. Contrarily, there is growing evidence that emotional factors play a role in purchasing decisions and that the brain uses a number of short cuts to speed up the decision-making process. The purpose of neuromarketing research is to better understand how emotions influence human decision-making and to improve marketing. When creating products, improving promotions and advertising, setting prices, creating store designs, and generally improving the customer experience, the principle is put into practice.

To solve the problem, it is possible to combine newly discovered information from earlier studies with the experiences and discoveries of other researchers. Due to the sizeable time and financial commitment, neuromarketing does not have a study cap.

Thematic and Content Analysis

Table 3: Thematic and Content Analysis

Study	Method	Viewpoint	Theme
Adeola et. al, (2022)	Quantitative	Cognitive Neuo-imaging	Neuro-imaging methods to item for consumption
Ala et. *al.(2023)*	Qualitative	Cognitive Neuo-coding	Behavioral-organizational dynamics universal view on neuro-marketing
Alsharif et. al. (2023)	Qualitative	Cognitive Neuo-imaging	Brain images and customer behavior

Alsharif *et al.* (2023)	Quantitative	Cognitive Neuo-mapping	Advertising non-invasive techniques
Bhardwaj *et al.* (2023)	Qualitative	Cognitive Neuo-sensing	Physiological dimension in psychological processes
Halkiopoulos et. al., (2022)	Qualitative	Cognitive Neuo-imaging	Neuro-imaging of consumer neuroscience
Nilashi & Abumalloh (2023)	Qualitative	Cognitive Neuo-mapping	Primary dialogue in the native's text implanted in neuro-marketing

Source: Researchers Own TCA (2023)

Reviewed Literature Contribution

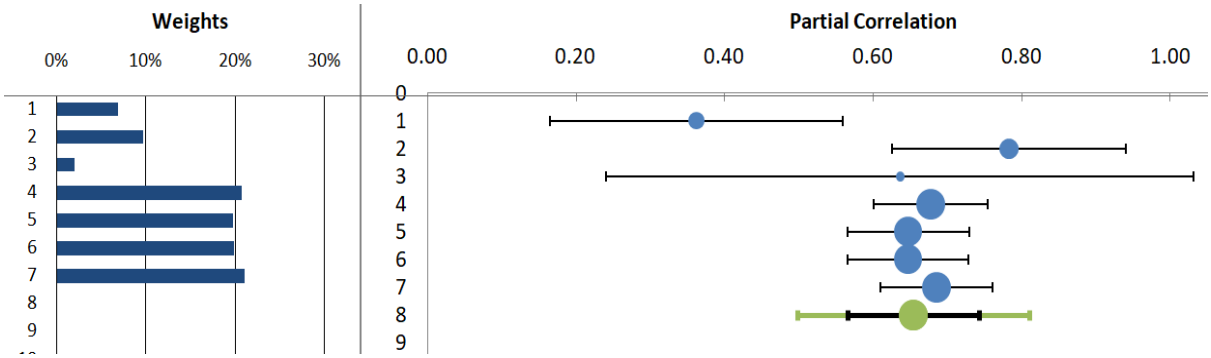
Table 4: Effect Size

#	Study name	Weight	Partial Correlation	CI Lower limit	CI Upper limit
1	Adeola et. al, (2022)	6.93%	0.36	0.16	0.56
2	Ala et. al. (2023)	9.66%	0.78	0.63	0.94
3	Alsharif et. al. (2023)	2.07%	0.64	0.24	1.03
4	Bhardwaj et al. (2023)	20.71%	0.68	0.60	0.75
5	Halkiopoulos et. al., (2022)	19.77%	0.65	0.57	0.73
6	Alsharif et al. (2023)	19.81%	0.65	0.57	0.73
7	Nilashi & Abumalloh (2023)	21.05%	0.69	0.61	0.76

Source: Meta Essentials (2023)

An updated effect size from a multiple regression model serves as a representation of a neuromarketing strategy's predictive power. The index, denoted by the abbreviation rsp, is the semi-partial correlation between the predictor and the desired outcome. Numerous predictor variables were taken into account in the regression model when calculating this partial effect size, which belongs to the correlation family of effect sizes. The derivations used in neuromarketing studies gave the effect size and its variance. Confidence intervals and standard errors can be calculated for specific numbers. Weighted analyses of neuromarketing studies can also be used to examine heterogeneity and pinpoint the central tendency and variance of the outcomes. This method was used to carry out the meta-analysis of the semi-partial correlations.

Figure 2: Forest Plot



Source: Meta Essentials (2023)

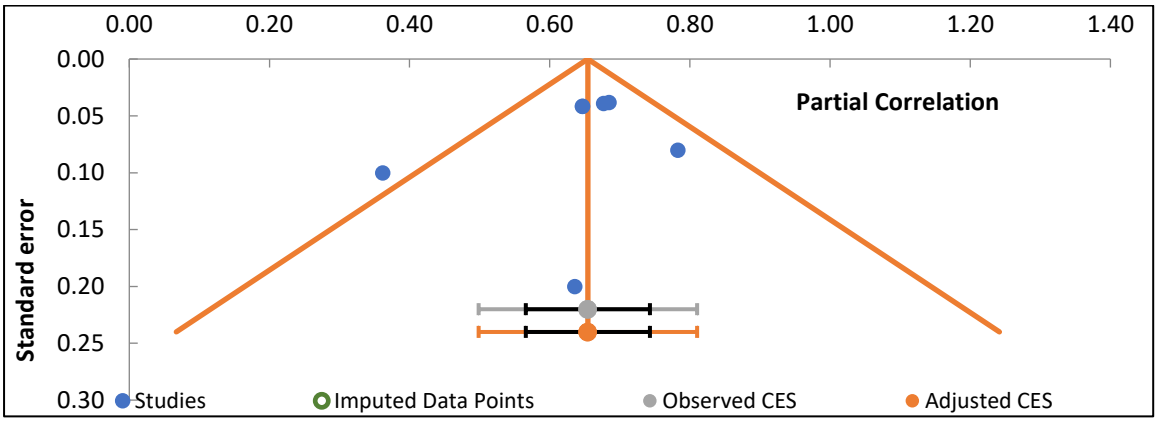
The green circle in the centre of each horizontal line (confidence interval, CI) reflects the point estimate of the effect for a particular study in a forest plot that shows the effect size of neuromarketing research. The size of the box reflects the study's weight in terms of the combined estimate of all neuromarketing studies.

Table 5: Meta-Analysis Model	
Model	Random effects model
Combined Effect Size	
Partial Correlation	0.65
Z-value	18.08
Heterogeneity	
Q	12.07
p_Q	0.060
I^2	50.31%

Source: Meta Essentials (2023)

Publication Bias:

Figure 3: Funnel Plot



Source: Meta Essentials (2023)

Neuromarketing research may be built as a funnel plot in order to assess the presence of publication bias. If there is publication bias among neuromarketing studies, smaller (less accurate) studies that failed to show statistical significance will be less likely to be published. This is illustrated by the asymmetry of the funnel plot. The funnel plot is a visual tool for assessing publication and other bias in meta-analysis. Simple scatterplots of estimated treatment effects from individual studies are displayed against a measure of study size (vertical axis).

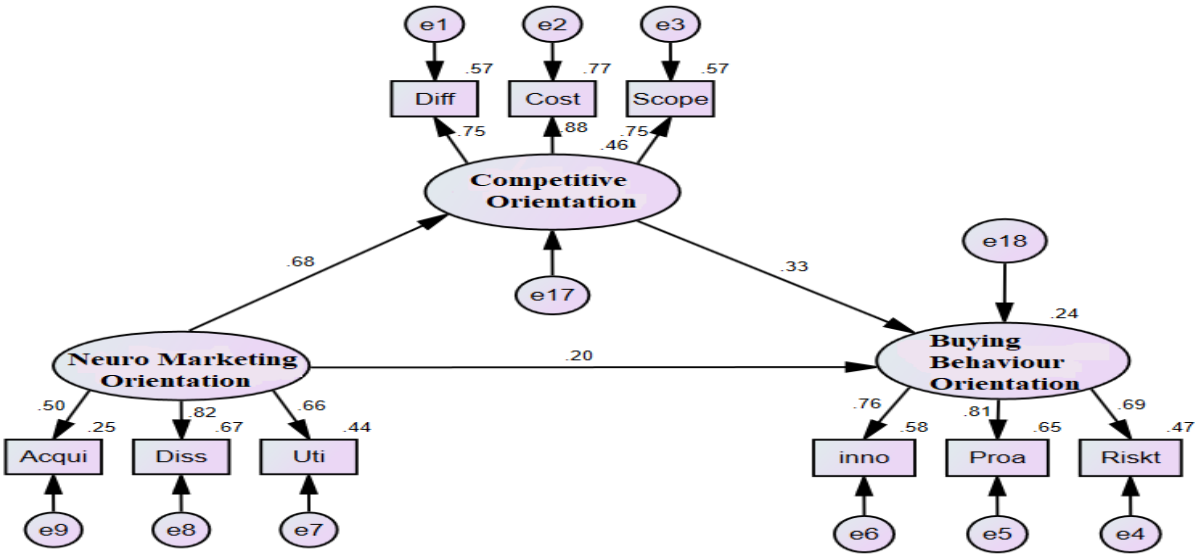
Table 6: Heterogeneity	
Q	12.07
p_Q	0.060
I^2	50.31%
T^2	0.00
Trim and Fill	On
Estimator for missing studies	Linear
Search from mean	Left

Number of imputed studies	0

Source: Meta Essentials (2023)

Neuromarketing as an Integrated Marketing Communication tool

Figure 4: SEM



Source: AMOS 2023

Table 7: Regression Weights

			Estimate	S.E.	C.R.	P
Competitive Orientation	<---	Neuro Marketing Orientation	.849	.095	8.917	***
Buying Behaviour Orientation	<---	Competitive Orientation	.316	.091	3.482	***
Buying Behaviour Orientation	<---	Neuro Marketing Orientation	.231	.115	2.005	.045

Source: AMOS 2023

Neuromarketing as an Integrated Marketing Communication tool because p-value founded less than 0.05 for all relations. Neuro Marketing Orientation have significant relation with Competitive Orientation with p-value of 0.000, critical ration of 8.197 and standard estimate of 0.095. Neuro Marketing Orientation have significant relation with Buying Behaviour Orientation with p-value of 0.045, critical ration of 2.005 and standard estimate of 0.115.

Table 8: Model Fitness

Model	RMSEA	CMIN	DF	P	CMIN/DF
Default model	0.006	110.099	37	.078	2.9729

Source: AMOS 2023

Neuromarketing as an Integrated Marketing Communication tool because p-value founded more than 0.05 for all relations with RMSEA 0.006, CMIN 110.099, degree of freedom 37 and CMIN/DF

2.9729; which is under acceptable threshold level. Neuromarketing as an Integrated Marketing Communication tool because p-value founded more than 0.05 as 0.078; it means promosed model is insignificant and not similar with the existing models.

Table 9: Total Effects

	Neuro Marketing Orientation	Competitive Orientation	Buying Behaviour Orientation
Competitive Orientation	.849	.000	.000
Buying Behaviour Orientation	.499	.316	.000

Source: AMOS 2023

Neuromarketing as an Integrated Marketing Communication tool because it have direct effect of 0.499 with Buying Behaviour Orientation. That intensified to 0.849 with the mediation of Competitive Orientation. Therefore, Competitive Orientation played a mediation role in between Neuromarketing and Buying Behaviour Orientation.

3. OVERVIEW OF DISCUSSION AND RESULTS

Because it directly affects 0.499 with Buying Behaviour Orientation, neuromarketing is a tool for integrated marketing communication. With Competitive Orientation's assistance, it became more intense to 0.849 level. Therefore, between Neuromarketing and Buying Behaviour Orientation, Competitive Orientation served as a mediator. Neuromarketing is the study of consumers' emotional and cognitive responses to media or marketing stimuli. Researchers use biometrics (such as heart rate, eye movement, galvanic skin response, facial coding, etc.) and technologies that detect brain activity to study how people physically respond to marketing messages.). It's no secret that neuromarketing has gained a lot of popularity. Many people, businesses, educational institutions, and governmental bodies use it in a variety of ways. The phrase is frequently used in the marketing sector, but it is not always clear what is meant. The term essentially describes the application of modern brain science to determine how customers are impacted by marketing and advertising. This study is essential for comprehending how neuromarketing affects consumer purchase decisions and the various factors that influence those decisions.

Cognitive psychology, consumer neuroscience, neuroeconomics, and neuroscience all intersect in this area. Neuromarketing is a branch of behavioral neurosciences that applies to marketing. The tools of neuromarketing recognize stimuli and cues that reveal consumer behavior that is not seen by careful visual observation. Effective product design, brand development, and advertising are aided by neuromarketing techniques. Aside from the neural response at the time of purchase, they aid in understanding the customer's entire shopping experience from the moment they enter a market until they depart. A fascinating application is a virtual store with 3D and 4D retail products that simulates shopping in a physical store. Test customers are exposed to real marketing situations, and their effective purchase decisions are analyzed.

Neuromarketing also faces significant challenges and limitations. The timing and environment of a person's exposure to marketing stimuli can also result in different processing of those stimuli. It is debatable whether or not emotions have a direct link to particular parts of the brain. One of the

main drawbacks of neuromarketing is the difficulty in developing new tests, the high cost, and the time factor.

4. CONCLUSION

The qualitative research approach Prior research has shown that neuromarketing has a number of advantages over traditional marketing tactics. Businesses are encouraged to use marketing inputs that are concentrated on achieving particular business goals by the discipline of neuromarketing, which suggests a value addition to marketing research. The development of neuromarketing as a science has advantages in terms of better quality and a deeper understanding of consumers. The study clarifies how neuromarketing is used to target customers in online retail advertising. The study may enable the researchers to carry out more research into how neuromarketing influences consumer attitudes. According to the report, a successful marketer must have improved consumer perception and a developing brand image. Neuromarketing in the field of marketing presents intriguing opportunities and novel research areas. Although they are still in their infancy, neuromarketing strategies have a bright future. Before neuromarketing can become a well-known tool in the field of market research, researchers in the field generally agree that it must develop and overcome a number of obstacles. However, neuromarketing is attracting more attention and is anticipated to be important in the fiercely competitive field of international marketing. In the long run, as cutting-edge technology and gadgets become more accessible, neuromarketing will undoubtedly reap greater benefits.

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