

A STUDY ON NEUROMARKETING POTENTIAL, PROBLEMS AND APPLICATIONS IN THE INDIAN E-COMMERCE SECTOR

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ABSTRACT

The purpose of this research is to investigate the notion of neuromarketing and its related features. In today's unpredictable economy, advanced marketing research methodologies are required to determine client preferences or limits for meeting their needs. Neuromarketing research techniques can investigate consumers' brains and may provide answers to many outstanding issues about consumers. This study highlights the complementing function of neuromarketing strategies in comprehending many elements of customer behavior. It focuses on the potential application of Eye Tracking as a neuromarketing approach for market research. It also takes into account the scenario of consumer purchasing behavior before and after neuromarketing. It also refers to the use of tools created by cognitive neuroscience and psychology experts to evaluate and understand people's reactions to products and promotions, allowing marketing efforts to be refined and made more effective. Aside from that, it demonstrates the obstacles and limitations of the neuromarketing idea in the e-commerce industry. This article also provides a glimpse into the future of neuromarketing.

This study is descriptive and secondary in nature, and it is based on a survey of the literature. This study fills a vacuum in the marketing literature by introducing the notion of neuromarketing to the E-commerce business. Data for this study was gathered from a variety of secondary sources, including articles, blogs, and prior related research papers. The findings of this article offer a possible approach for Eye Tracking in influencing consumer purchase behavior on Ecommerce websites and scrollers' online purchasing perspectives. It is possible that in the current and future scenarios, neuromarketing techniques, particularly eye tracking, will be used in marketing research.

Keywords: Neuromarketing, E-Commerce, Consumer Engagement, Eye Tracking, Market Research

Introduction

People have tried to understand how they make decisions over the years. Contemporary neuroscientific research, however, has demonstrated that most mental processing—including decision-making—takes place subconsciously. People's inability to forecast their future decisions can be attributed to these unconscious processes. It is frequently seen that people say one thing and then do another; as a result, their thoughts do not influence their actual decisions. Consumer neuroscience is seen as the academic use of neuroscience to better understand how consumer behavior affects marketing. It may be a novel method within the field of consumer research that has emerged quickly. Cognitive neuroscience is the study of the nervous system to understand the biological underpinnings of human behavior. It is split into two categories: clinical and non-clinical research. They are frequently distinguished from one another as follows: Clinical study is referred to as "neurology," and it examines how brain abnormalities (such as tumors and system nervous problems) can affect a person's cognition, emotion, and behavior in comparison to healthy people. Nonclinical research is also investigating how healthy consumers react to stimuli. Consumer neuroscience, as previously indicated, relates to technologies used in neurophysiological market research.

Brain scans like MRIs, EEGs, PETs, and others have been used in-depth research on these phenomena to gauge how consumers respond to particular goods, commercials, and brands (Greefield, 2006). The idea behind this technology, which was developed at Harvard in 1990, is based on the idea that 90% of an individual's emotions are stored subconsciously and must be stimulated in order to elicit the desired response. This can be done by motivating an individual's cognitive and psychological functions, which help them to develop the behavior of choice, such as when purchasing specific products from a particular brand (Sreedevi et al, 2013). India is a fertile market for the neuromarketing philosophy since it has a rapidly expanding economy and a sizable

consumer base. (Solomon, 2018) estimates that India, with a population of 130 billion, will overtake the United States as the largest consumer market by 2025, with a CPI index of 137.60 Index Points by 2017. From 14 billion in 2015 to a projected 29 billion by 2020, the electronic market has grown significantly. Similarly, the 2018 market for advertisements was 693 billion. Since there are both potential and problems for neuro-marketing in the Indian market, this review will explore more into this idea.

Neuromarketing uses neuroimaging techniques in market research to better understand how people react to marketing stimuli (such as products, commercials, etc.). Thus, the concept of neuromarketing is solely associated with brain processes that comprehend the buyer's subconscious notion. According to the literature, Smidt was the first to use the word "neuromarketing," which he defined as the study of customer brain circuits to better understand consumer behavior. In 2002, the Bright House Company made the first declaration of NM field in the United States, coupled with the establishment of a subsidiary that would do market research using fMRI technology.

Although the term "neuromarketing" is a new concept, numerous firms (including PepsiCo.) have previously used alternative methodologies, such as EEG, to tackle marketing challenges. Without a doubt, NM has expanded the scope of study into how inputs influence behavior and perception in the brain. Neurobiology, psychology, and economics are three foundations that support NM. Thanks to NM, the unconscious was exposed to a broader range of hidden knowledge, allowing buyers to make more educated purchasing decisions. Sebastian claimed that because traditional research is embedded in consumers' daily lives, it can examine the emotional and cognitive experiences underlying their language utterances. This gets us to the key issue with traditional methods: they presuppose that consumers' impressions of goods, services, or advertisements are correct. However, they disregard customers' unconsciousness, which is critical to decision-making, leaving a large gap between what consumers truly think and what firms assume about the market. As a result, from a marketing standpoint, neuromarketing is an intriguing and ground-breaking area of marketing research. Neuromarketing has recently experienced an increase in attention from both the academic and business communities, resulting in an increase in the number of neuromarketing businesses. Along with the rise of neuromarketing firms, it is clear that publications in key marketing journals have increased dramatically in the last ten years.

The digital world is higher than ever, with more distractions as platforms and content proliferate. Each digital environment offers its challenges from page layout to product visualization to integrating recommendations and reviews — emotion matters in any situation. The study aims to explore the various Neuromarketing tools for online retailing.

In addition, in e-commerce neuromarketing, the implicit associations test and other biometric techniques, approaches, and procedures are applied. Eye tracking, analyzing electrodermal reactivity, monitoring psychophysiological reactivity, and measuring heart and breathing rates are among them. Researchers in e-commerce marketing can use the data from these sensors to examine the neurological activity of consumer behavior in real time. Furthermore, these technologies make it simpler to capture a customer's first impression and how easily they interact with the design of your website. Based on the research findings, major e-commerce companies are applying neuromarketing tactics when constructing their packaging, products, and advertising campaigns. For example, Frito-Lay discovered that glossy packets with images of potato chips elicited a negative reaction when compared to matte bags with potato-themed imagery. After that, they stopped using the gleaming ones.

Literature Review

The utilization of neuromarketing techniques traces its roots back to June 2002 when Brighthouse, an advertising company based in Atlanta, USA, announced the establishment of a specialized department focused on leveraging functional magnetic resonance imaging (fMRI) for marketing research (Fisher, Chin & Klitzman, 2010). Prior to the formalization of the term "neuromarketing," various companies were already employing neurophysiological methods such as electroencephalography (EEG) to tackle marketing challenges (Fugate, 2007). However, the advancement of technology paved the way for the wider adoption of neuromarketing techniques in the exploration of consumer preferences (Murphy, Illes & Reiner, 2008). This ability to analyze and understand consumer preferences garnered considerable interest from marketing research companies, while simultaneously intriguing academic researchers and eliciting mixed reactions from certain segments of society (Nenad, 2011). A relatively new field of research in marketing is neuromarketing. The study of consumers' sensory, cognitive, and emotional responses to marketing stimuli forms the basis of the field. There are 100 billion neurons in the network that makes up the human brain. Research by (Nemorin, 2017) indicates that consumers react to stimuli from advertising. It is currently unclear how the brain functions and how a brain's

intricate structure gives rise to highly specialized human behavior (Donoghue, 2015). Broad authority in understanding mental conduct in humans is still being sought after. As a result, the fields of biology and social science have converged. Social, behavioral, physiological, and management sciences have significantly advanced as a result of the integrated study efforts of natural and social scientists. The study looked into how human decision-making influences individual decisions (Shiv & Yoon, 2012). To assess changes in activity in various brain regions, the researchers used functional magnetic resonance imaging. Specific regional brain spectra are measured using steady-state topography and electroencephalography. The measurement of alterations in the physiological state, commonly referred to as biometrics, uses the response and sensors. Additionally, they look into the heart and respiration rates, the galvanic skin reaction, the reasons why people make decisions, and the brain regions that are involved. The study of neuromarketing is becoming increasingly popular in both academic and professional settings. Businesses must predict consumer behavior if they have broad goals. They make investments in their research facilities, scientific personnel, and academic ties. It is clear that consumer researchers need more knowledge on how our senses influence the decisions we make when choosing products. For instance, what is the best perfume to spritz in a retail setting targeted towards elderly customers? How can food taste be perceived by the consumer's brain while an airliner is flying at 30,000 feet? Numerous businesses, like Google, CBS, Frito-Lay, and A&E Television, have used neuromarketing research services to find out how their target audiences respond to their advertisements or goods. Ale Smidts first used the phrase "neuromarketing" in 2002. (Nyoni and Bonga, 2017). Neuromarketing businesses were launched in the 1990s by Neurosense and Zaltman (Levallois et. al., 2019). White papers on potential uses of neuromarketing were also created by Unilever's Consumer Research Exploratory Fund (CREF) (Salati et al., 2018). The investigation of marketing stimuli through the observation and analysis of human emotions is known as neuromarketing. Since rational decision-making is not a conscious process and the majority of economic models are outdated, neuromarketing is justified. Instead, there is growing evidence that making decisions about what to buy and how to pay for it is an emotional process, and that the brain uses a number of short cuts to make decisions faster. Studies on neuromarketing examine how emotions affect people's decisions and how to use that knowledge to improve marketing. The theory is used to product design, marketing and advertising, pricing, store layout, and general improvements to the customer experience.

Purpose of the study

It might not be able to map the human brain, according to a marketer. There are numerous strategies to take advantage of customers' brain responses when they notice certain products. Because people react immediately, Google uses machine learning to understand more about how people behave. These predispositions are used by neuromarketing to pinpoint typical consumer behavioral tendencies. Additionally, it offers in ways that prepare your target market to convert through conversions. The primary goal of this study is to understand the neuromarketing theory and how it works in practice in the e-commerce sector. It also attempts to fill in any gaps in the literature and determine how eye tracking affects customer purchase behavior.

Objectives of the study

- To understand the concept underlying neuromarketing and its uses.
- To study the difficulties businesses experience and the issues that result from adopting this idea in the e-commerce sector.
- To comprehend consumer cognitive and emotional responses while taking into account e-commerce developments in order to comprehend consumer trends.

Research Methodology

This study employs the descriptive research approach since the purpose of the research is to evaluate the applications and challenges of the E-commerce industry while also studying the factors. The researcher gathered material from a number of renowned national and international research publications, blogs, websites, reports, and technology reviews. However, in this case, the researcher has no control over the variables and must instead analyze trends and traits. The goal is to explain the current situation. Because no quantitative parameters are considered, this study is qualitative in nature.

Data Analysis

The field of science known as neuromarketing investigates the causes of consumer behavior. We demonstrate how it can assist you in better comprehending their needs and meeting them with cutting-edge tools and services. An e-commerce website is much more than simply a technique to boost sales for your company; it's really the only way to ensure its future success. Although the statement may seem a little extreme, the data back it up. A solid online presence is more important than ever, especially for physical stores that didn't previously have this perspective, as the COVID pandemic unavoidably impacted commerce forever. The growth of e-commerce hit 17.1% in 2021 before slowing down to 9.7% in 2022. A 24% increase in e-commerce retail sales

is anticipated by 2026. (source: Oberlo). Companies are no longer content with just having an online presence because online sales are already standard. It is not surprising that those with the best-equipped online stores have fared the best when it comes to surviving the closure of physical stores. Because there are specialized solutions available to assist you manage your sales portal, which will, in turn, enable you to increase sales and establish a larger base of loyal clients. Technology is gradually but surely transforming the marketing environment. Everyday improvements and new developments are made to marketing technology. We have reached a point when technology significantly influences customer purchasing behavior and decision-making. Even more of an impact is being felt on online buying, and as an online retailer or other player in ecommerce, you need to be aware of this. What's more, the research has already been completed? Important eCommerce firms have already put the results into practice to enhance their client interactions online.

Traditional metrics (such clicks, shares, and scroll times) can provide you with a wealth of information about the effectiveness of a campaign, but they are unable to capture consumer sentiment. Neuromarketing can help with that. Neuromarketing can assist you in analyzing the emotional response to your efforts as an addition to more conventional marketing effectiveness indicators. In order to determine consumers' subconscious preferences, neuromarketing research frequently use either brain-scanning technologies or physiological data. This could be used to help with marketing, product development, or advertising. Neuromarketing often involves either brain scanning using fMRI or EEG technologies or physiological tracking, such as eye movement monitoring, facial recognition, body temperature monitoring, and heart rate monitoring.

The strengths of fMRI and EEG technology differ.

EEG is typically used to measure the effects of dynamic stimuli such as video, TV shows, commercials, and internet user experience. Functional magnetic resonance imaging (fMRI) is used mostly for static stimuli such as logos, payoffs, and outdoor advertising. Typically, measuring physiological tracking is easier. There are numerous tools on the market, such as the eye-tracking application mentioned above or Noldus' FaceReader, which measures facial expressions. While employing neuroscience to drive your marketing strategy is an intriguing possibility, it seems more fitting for an era in which Black Mirror sci-fi novels are truly a reality.

The following are the most common neuromarketing approaches for business entities:

1. **Eye Tracking:** Eye gaze or eye tracking is a technology that is actively employed in neuromarketing. Eye tracking measures either the audience's point of sight or the movements of an eye relative to a person's head. It basically measures how long a person spends gazing at a given region or the direction a person looks over an item. This can be accomplished by using wearable eye trackers, which automatically collect and store pertinent data. There are numerous applications for eye tracking. For example, to study how users interact with your products or services. This allows you to detect possible UX issues and address them, leading in increased engagement and client happiness.

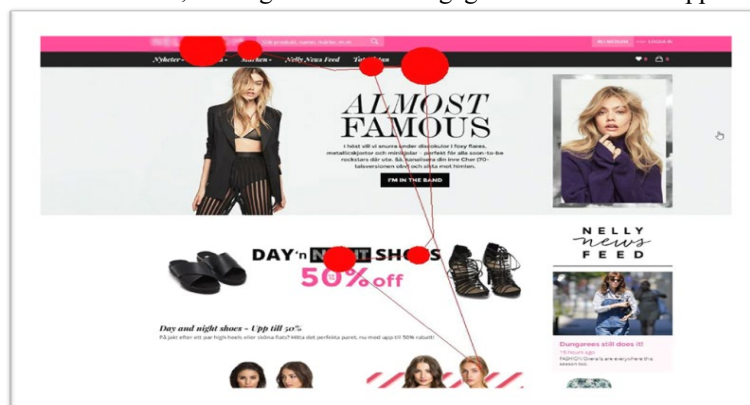


Fig.1 Eye Tracking

(Source: <https://www.neurosciencemarketing.com/blog/articles/what-is-neuromarketing.htm>)

2. **Color Psychology**

The study of how colors influence and predict human behavior is known as color psychology. Color has a tremendous influence on purchasing decisions because it is the most used sense in humans. Companies, for example, go to considerable lengths to test how colors effect adverts and call-to-action buttons. According to one study, a red call-to-action button is more likely to result in customer interaction than a green call-to-action button. Color has benefits that go beyond simply promoting engagement. It can also have an effect on perceptions, such as how food tastes or how effective a

placebo pill is. Colors can also transmit emotions or sensations, such as how yellow or orange are perceived as vibrant, whereas blue is perceived as tranquil and relaxing.

3. **Typography**

Font weight and typeface all have an impact on a website's reading and comprehension. Type had an effect in one study, where the font used on menus altered consumer judgment of how tasty a soup was. Menus were presented to two groups, one using the finely styled Lucida Calligraphy typeface and the other using the plain Courier font. A soup was described as "rich and creamy" on both menus. While both groups were served the same soup, the Lucida Calligraphy menu group found the soup to be better, fresher, and more pleasurable than the Courier group. Furthermore, familiar posts have been observed to improve client trust. According to one study conducted by Yale professor Nathan Novemsky, two pamphlets with the identical information but differing typeface (one familiar, one not so familiar) produced radically different results. Four out of ten participants who saw the leaflet with foreign font told Novemsky that they'd think about it longer before purchasing the featured phone, but just 83% of those who saw the leaflet with familiar typography indicated they'd buy the phone right away.

4. **Trust Seal**

To persuade buyers to conduct business with you in the context of web design, you must show yourself as trustworthy and professional. Social media shares are one way to accomplish this. Social sharing counters demonstrate that other people are connecting with your brand and, as a result, trust you as a company. You can also employ trust seals such as certificates, memberships, and prizes. These credentials increase consumer trust and reputation, increasing the likelihood that they will do business with you.

Companies Using Neuromarketing

Some well-known brands experimented with neuromarketing as far back as 2009. However, we've gathered a selection of new neuromarketing case studies for you to acquire insights and learn from.

1. **Frito- Lay's**

Frito-Lay collaborated with Neurensics, a neuro market research firm, to assess the impact of a 0.25 Turkish Lira price increase on Lays chips in Turkey. The main concern is whether a pricing change would result in a drop in revenue. Neurensics employed an EEG to analyze brain responses to the revised price as well as a regular questionnaire to find out. The findings demonstrated that what people say might be significantly different from what they actually think, demonstrating that purchasing decisions are frequently made unconsciously. First, participants were asked if they were likely to buy a bag of chips after the price increase. Second, while an EEG device assessed brain activity, the same group responded "expensive" or "cheap" questions about the same Lays goods. The contrast in outcomes between the two strategies was startling. Lays should have lost 33% of its sales, according to the standard questionnaire. The EEG data revealed a 9% reduction in sales. When the pricing change was implemented, parent firm PepsiCo experienced only a 7% sales loss. Asking individuals for their thoughts on prices, packaging, or advertisements can lead to inaccurate predictions. Changes can instead be measured using neuroscience and unconscious behavior.

2. **Philips**

Philips wanted to choose packaging for an ultra-light iron that would appeal to purchasers and enhance sales. They created two images of left and right hands grasping the iron. Philips employed Neurensics to examine both pictures to see whether one elicited a good emotional response.



New left (Philips variant)

New right (Neurensics variant)

Fig 2: Philips employed Neurensics (Source: <https://www.neurensics.com/en/fmri-in-neuromarketing>)

According to the fMRI study, individuals deemed left-handed packaging repulsive and unsafe. The same amount of attention, trust, and expectancies were aroused by the familiar, right-handed image. But why is that? This effect is described by the Neurensics team as a mental simulation: "an unconscious process in which the brain simulates utilizing the product or experiencing a circumstance." When 90% of the population is right-handed, imagining an iron handled in the left hand is more challenging. This creates feelings of repulsion. With this new information, Philips shifted to the packaging, holding the iron in his right hand.

3. Spotify and Steereo

Can you predict the next chart-topping song using neuroscience? Immersion was asked this question by Steereo, a platform that plays new music exclusively for rideshare drivers. To evaluate emotional responses to music, Immersion observed small variations in listeners' heart beats. The analysis correctly predicted hot songs 92% of the time. They also had 67% accuracy in estimating the number of super fans and followers for such songs on Spotify. In comparison, standard survey studies of song likeability revealed little association to actual hits.

We live in a data-driven society where practically anything can be measured. However, Google Analytics will never be able to fully assess the most crucial aspect of your marketing campaign - its ability to elicit an emotional response from your target audience. Fortunately, the neuromarketing area is fast evolving, and this technology is becoming more accessible and practical for marketers today, paving the way for its widespread adoption in the future.

Applications of neuro-marketing

Neuromarketing is frequently used to ascertain consumer preferences. One of the main areas of concentration in marketing is the dissemination of information about a product and how it applies to the customer. A well-established psychological reality in marketing is that physical and emotional appeal in advertisements encourages the growth of recognition and trust. This will have an effect on the tastes and product preferences of the consumer. The calming and pleasant emotions evoked by advertising lead to the creation of a sense of identity and the activation of reward areas in the viewer's brain. Advertising agencies can utilize neuromarketing to target certain parts of advertisements, such as sound effects, imagery, and slogans, in order to produce effective commercials. It is feasible to more effectively assess customer preferences and choices before to crafting an advertisement.

Societal repercussions

Analyzing consumer behavior is crucial. It is the process by which consumers decide what to buy. This covers their opinions of other people, businesses, and brands, the relationship between price and quality, whether they are loyal to marketing or consumerism, and a more in-depth examination of the consumer mentality, which is psychological in nature. The relationship between customer value and readiness to buy is thought to be strongly influenced by both customer value and customer satisfaction.

Analysis of customer buying behavior and cognitive responses and stimuli has been aided by neuromarketing. The importance of consumer purchasing behavior can be observed in the potential for sales growth revealed by customer research. We can alter how we provide our products based on how customers choose to buy them.

Continuous consumer observation can help you detect product portfolio gaps, allowing you to introduce new products that will ultimately please your customers. You may get a good indication of who your future clients will be by looking at your current customers. If 50% of my current clients are impulsive, then future customers will be as well. Targeting and segmentation are made easier when you are tracking customer activity. Both sales and demand forecasting are possible, and this is where a grasp of consumer buying habits is essential. As a result, the business has reduced costs associated with manufacturing, marketing, and storage by researching consumer buying trends. Forecasting and effective resource use are essentially realized. These are just a few of the reasons why it is critical for every company to look at customer purchase trends. We can be sure that, in addition to how much it contributes to profits, a company that is in touch with its customers has a long-lasting advantage. It's critical to promote a customer-focused mindset in businesses, even those that are just getting off the ground.

Product Development and Innovation: Utilize neuro-marketing to understand consumer preferences and emotions, helping in the development of products that align with Indian consumers' desires.
Advertising and Branding: Gain insights into how Indian consumers respond to advertisements and branding strategies, optimizing campaigns to capture attention and create strong brand connections.
User Experience Optimization: Improve the user experience on e-commerce platforms by analyzing cognitive and emotional responses, enhancing navigation, product display, and personalization.
Pricing and Promotions: Understand how Indian consumers perceive pricing and promotions, enabling data-driven pricing decisions and effective promotional campaigns.
Customer Engagement and Loyalty: Utilize neuro-marketing to enhance customer engagement, loyalty programs, personalized communication, and customer service experiences.
Ethical Considerations: Ensure privacy and consent of consumers are respected when implementing neuro-marketing techniques.

Table 1: Applications of neuro-marketing

Findings

Neuromarketing, an interdisciplinary field that combines neuroscience and marketing, has emerged as a powerful tool to gain deeper insights into consumer behavior. By utilizing techniques such as brain imaging, eye-tracking, and biometric measurements, neuromarketers can understand and analyze consumer responses on a cognitive and emotional level. In the context of the Indian e-commerce sector, neuromarketing holds immense potential for optimizing marketing strategies, enhancing user experience, and improving overall customer satisfaction. It allows businesses to better understand consumer attention, emotional engagement, and decision-making processes, leading to more effective marketing campaigns and tailored e-commerce platforms. However, the adoption of neuromarketing techniques in the e-commerce sector comes with its own set of challenges. Businesses face obstacles such as the high costs associated with acquiring and maintaining the necessary equipment and expertise. Additionally, there is a scarcity of skilled professionals who can interpret and analyze the data obtained through neuromarketing, posing limitations in fully harnessing its potential. Ethical considerations also come into play, as capturing and analyzing consumers' neurological and physiological data raise privacy concerns, necessitating compliance with regulations and obtaining informed consent.

In studying consumer trends, neuromarketing research has highlighted the significant influence of visual cues on cognitive and emotional responses in the e-commerce environment. Factors like colors, shapes, and imagery play a pivotal role in shaping consumer preferences. Personalization, social proof, and ease of use have emerged as important elements for businesses to consider when designing their e-commerce platforms in the Indian market. Moreover, emotions have been found to be crucial in consumer decision-making, underscoring the importance of understanding and leveraging emotions to create impactful marketing campaigns and tailored e-commerce experiences. By gaining insights into consumer cognitive and emotional responses, businesses can better adapt to evolving consumer trends, meet customer expectations, and drive success in the dynamic landscape of the Indian e-commerce sector.

Limitations of Neuro-Marketing

Neuromarketing faces numerous hurdles and constraints. Neuromarketing has several serious problems, including a lack of reliability and untrustworthy information. The term "neuroscience" has recently gained prominence in a number of academic fields. There are very few academic and industry publications on neuromarketing at the moment. The conclusions offered by firms or marketing researchers are also susceptible to bias or influence. When and where marketing stimuli are received by a specific person may also result in different processing of the stimuli. Understanding emotions and how they relate to one another. It's debatable which areas of the brain are involved. One key disadvantage is the time and large expense component involved in generating new neuromarketing trials.

Conclusion

A customer's power to make decisions is not something that can be completely erased or hindered by a marketing strategy. There are also several concerns about neuromarketing. While using technology in market research is not harmful, some feel that by activating a purchase button, it may have the effect of erasing all of the customers' free choice. Customers' rational brain processes will be completely eliminated, and human robots engineered to respond to marketing stimuli will be constructed in their place. In other cases, people can be turned into pre-programmed purchasing machines geared to consume specific things. Companies are becoming increasingly interested in neuromarketing, and more are utilizing its services.

Future Scope for the Study

The future scope for the study of neuromarketing in the Indian e-commerce sector lies in exploring advanced techniques and technologies. As advancements in neuroimaging, biometrics, and artificial intelligence continue to progress, researchers can delve deeper into understanding consumer behavior and tailor marketing strategies accordingly. Integration of virtual reality (VR) and augmented reality (AR) into neuromarketing studies can provide immersive experiences and further enhance consumer insights.

There is a need for longitudinal studies to assess the long-term impact of neuromarketing interventions in the Indian e-commerce sector. Tracking consumer behavior over an extended period can shed light on the effectiveness and sustainability of neuromarketing techniques, helping businesses make informed decisions and adapt their strategies accordingly.

The future scope also encompasses the application of neuromarketing beyond the e-commerce sector. Exploring the potential of neuromarketing in other domains such as retail, advertising, and consumer research can broaden our understanding of consumer behavior and provide insights applicable to various industries.

With the rapid growth of mobile commerce and the increasing use of smartphones in India, there is a need to investigate the unique challenges and opportunities for implementing neuromarketing techniques in the mobile e-commerce space. Understanding how consumers engage with mobile platforms and how their cognitive and emotional responses differ from traditional e-commerce can guide the development of mobile-specific neuromarketing strategies.

Further research can focus on the ethical implications of neuromarketing in the Indian e-commerce sector. Studying consumer perceptions, attitudes, and concerns regarding the collection and usage of neurological and physiological data can help shape ethical guidelines and ensure responsible and transparent practices in the field.

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