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Applications, Challenges, Promises and Potential Role of Neuromarketing as an Emerging Tool of Market Research

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Abstract: India certainly is a fascinating economy and also as one of the fast growing BRIC nations, the country off late has seen unprecedented growth since mid-90's until around 2010 or so post which the economy slowed down a bit and now is showing signs of growth again. Neuromarketing is by far one of the emerging disciplines which are also an applied extension of both neuroscience and marketing. Purchase intention of consumers and understanding human mind is one of the important aspects of neuromarketing. It's also a branch of marketing study that looks at how customers react to various marketing stimuli on a sensorimotor, cognitive, and emotional level. The salesperson's behaviour, which is indicated by consultative selling and in-store marketing assets, manages the customer's shopping experience, and the consumer is gradually engaged. The area of neuromarketing provides a great route for reading consumers' minds, interests, and preferences, allowing marketers to conduct successful and efficient targeted marketing. Aside from that, technology provides a direct window into the brain's decision-making centres, positively affecting the crucial decision-making process toward purchasing specific goods. Neuromarketing uses a variety of methods and approaches to analyse the inside/outside reflexes of a customer's brain, as well as the most up-to-date cognitive scanning techniques. MEG, EEG, fMRI, PET, Galvanic skin reactions, electromyography, TMS, and cardiovascular parameters are some of the most often utilised technology-infused neuromarketing inner reflex methods. Body language, emphatic design, face coding, and eye tracking are some of the time-tested traditional outer reaction detection approaches used in neuromarketing. The notion of neuromarketing, on the other hand, is likely to have a greater influence in rising nations like India, given their fast growing customer population and purchasing power. Aside from being complicated, rural consumers have a variety of natural characteristics, and neuromarketing can give deeper insights into their total purchasing intentions.

Keywords: Consumer behaviour, ECG, fMRI, Neuromarketing, Neuroscience, PET, TMS.

I. Introduction

In academia, the idea that "the mind is what the brain does" is gaining traction, particularly in the hot field of neuroscience. Neuromarketing is a relatively new field of marketing that looks at a customer's purchasing habits. It's made up of the terms "neuromarketing" and "marketing." The area of science that examines the nerve system is known as neurology. Neuromarketing is an emerging topic of marketing that focuses on studying the human brain's responses to marketing and product stimuli. Ale Smidts (Erasmus University) created the term "neuromarketing" in 2002. It is one of the technologies that can help the marketing and sales professions get traction. A button in a critical system that is used to immediately initiate an extreme measure in the event of an emergency. When people's panic buttons are pressed, they become irritated. This might happen at home, in a hostel, at work, or anywhere else. The pusher understands how to activate the button in such a way that the target becomes irritated. By pressing the buy button, the same reasoning is applied to marketing. The only difference is that this time it should be for the general public. The marketers are on the lookout for a buy button. Let's take a look at what Neuromarketing is all about. Emotions, according to neuroscientists, have a significant impact on decision-making, which can lead to a preference for one brand over another.

The term "neuromarketing" was coined by market research firms in 2002. The application of information from cognition in market research was pioneered by 2 market research

organisations located in the United States, Bright House and Sales Brain. This introduced a new dimension to the field of market research. The core concept of neuromarketing is to examine a customer's behavior from a cognitive standpoint. Read Montague of Baylor College of Medicine utilised functional magnetic resonance imaging (fMRI) to examine the brains of people who had eaten Pepsi or Coca-Cola in 2004. According to the findings, when subjects were cognizant of the brand they were drinking, their brain activity increased. The frontal cortex of the brain revealed greater activity when the favored brand was consumed. The frontal cortex of the brain is engaged in functions such as attention to detail, short-term memory, and decision-making. This is the first experimental proof of neuromarketing's value as a legitimate marketing technique and the role of the brain's emotional relationship with brand popularity. Neuromarketing has risen in significance and appeal among companies, marketers, and advertisers since its debut in 2002 (Morin, 2011).

The brain is the major regulator of human behaviour, expressed emotions, and decision-making processes, according to previous study findings (Murphy, Illes & Reiner, 2008). Furthermore, research shows that people are unable to articulate their motives for behaviour or preferences for certain products in the great majority of instances, whether consciously or unconsciously (Vecchiato, Astolfi, De Vico Fallani, Toppi, Aloise, Bez & Babiloni, 2011). With this in mind, Camerer, Loewenstein and Prelec (2005), Kenning and Plassmann (2005), Riedl, Hubert and Kenning (2010) and Sanfey, Loewenstein, McClure and Cohen (2006) believe that neuroeconomics explains consumer behaviour through neurological and physiological processes. Although neuromarketing will not be able to entirely replace conventional marketing methods, there is evidence that new technologies such as fMRI (functional magnetic resonance imaging) can aid in the efficiency of marketing efforts (Keller, 2008; Venkatraman, Clithero, Fitzsimons & Huettel, 2012; Adolphs, Tranel, Koenigs & Damasio, 2005). Because product preferences are thought to be influenced by branding and advertising, neuromarketing is likely to contribute to and influence these preferences positively through the use of neuromarketing techniques (Bruce, Bruce, Black, Lepping, Henry, Cherry & Savage, 2014; Esch, Möll, Elger, Neuhaus & Weber, 2008).

A. Why is Neuromarketing Important?

Because it is considered to have the ability to disclose implicit and automatic decision-making processes, as well as hidden information about consumer behaviour not available through standard marketing approaches, neuromarketing has a tremendous influence on businesses and society (Hubert & Kenning, 2008; Tusche, Bode & Haynes, 2010; Ariely & Berns, 2010; Senior & Lee, 2008).

B. Background of Neuromarketing

The origins and background of neuromarketing will be examined first: It's striking how quickly interest in applying neuromarketing in consumer research grew and continues to rise (Kenning & Plassmann, 2008; Kenning & Linzmajer, 2011; Politser, 2008; Madan, 2010). This is demonstrated by the fact that a large number of neuromarketing companies have been created in recent years, while the number of articles in prominent marketing journals and Google searches for neuromarketing has expanded tremendously (Plassmann, Ramsey & Milosavljevic, 2012). When searching Google for the keyword "neuromarketing," for example, one can see that there were just a few hits in 2002, but hundreds in 2010 (Morin, 2011). The development of Information Technology (IT) and widespread usage of computers and the internet transformed and facilitated the way information is gathered, communication is done, and advertising is organised, as well as how all of this affected all other economic activities (Riedl, Mohr, Kenning, Davis & Heekeren, 2011). For example, the first 2 neuromarketing firms in the United States, Bright house and Sales Brain, were formed around the time of the formation of the so-called neuroculture (Fisher, Chin & Klitzman, 2010). They provided neuromarketing research and consulting services (Morin, 2011).

C. Description of Situation Related to Neuromarketing

With so many similar but slightly different products on the market today, it has become a crucial discipline to constantly develop and distinguish products that best meet the needs of clients (Leonard & Rayport, 1997; Dapkevicius & Melnikas, 2011). Given the rising significance of meeting consumer needs and the fact that it was previously difficult to assess the underlying brain processes that occurred when decisions were made, the objective perspective given by neuromarketing research and neuroscience looks especially promising (Kenning & Plassmann, 2008; Huettel *et al.*, 2009b). Furthermore, almost 80% of all new products fail within the first 3 years on the market, implying that greater alignments between freshly manufactured things and actual customer requirements are required (Calvert & Brammer, 2012).

D. Definition of Neuromarketing

The traditional definition of marketing is an activity aimed at bringing products and people together by analysing and assessing significant human behaviour in the trade market (Ariely & Berns, 2010; Lee *et al.*, 2007). We adopt Ariely and Berns (2010)'s underlying definition, which argues that marketing is concerned with the presentation of items based on consumer requirements on the one hand, and

influencing the customer's decision-making process on the other. The most important distinction between marketing and neuromarketing is how information about consumer needs and preferences is obtained (Ariely & Berns, 2010). Within the neuro-area, we may differentiate 3 terms: neuroscience, neuroeconomics, and neuromarketing. "The study of the neural system with the objective of understanding the biological substrate of behaviour," according to Plassmann *et al.* (2012) (p. 18). In other words, it is the application of neurological results to sciences that seek to understand human behaviour, emotions, and ideas (Esch, Moll, Elger, Neuhaus & Weber, 2008; Kumlehn, 2011; Camerer, Loewenstein & Prelec, 2004; Kumlehn, 2011; Camerer, Loewenstein & Prelec, 2004). Neuroeconomics may thus be considered a sub-discipline of neuroscience. Neuroeconomics, according to (Rustichini, 2005; Sanfey, Loewenstein, McClure & Cohen, 2006), employs neuroscience techniques to try to understand brain processes while focusing on decision-making and economic issues. Its goal is to understand all ongoing and financially significant brain processes (Braeutigam, 2005). We will focus on the most essential definitions here, despite the fact that there are numerous. Neuromarketing is a branch of neuroeconomics, and therefore of neurosciences, that deals with marketing challenges by bringing brain research methodologies to management practice (Hubert, 2010; Fugate, 2007; Lee, Broderick & Chamberlain, 2007; Gang, Lin, Qi & Yan, 2012; Hubert & Kenning, 2008; Ariely & Berns, 2010; Dapkeviius & Melnikas, 2011).

According to Lee *et al.* (2007), neuromarketing is the study and understanding of human behaviour in relation to markets and marketing exchanges using neuroscientific techniques (p. 200). Neuromarketing is defined by Calvert and Brammer (2012) as the assessment of non-conscious brain responses that can only be identified through neuromarketing techniques.

E. Concept of Neuromarketing

A group of well extinguished Harvard University psychologists presented this notion in 1990. Ale Smidts invented the term "neuromarketing" in 2002. It's a new field of neuroscience in which researchers utilise medical equipment to see how people react to certain brands, slogans, and ads. In 2004, Baylor College of Medicine in Houston hosted the inaugural neuromarketing conference. "Memes" are the cornerstone of neuromarketing. Memes are little chunks of data that are stored in the brain. These units are powerful influencers that make judgments in 2.6 seconds or less. We will remember nice things, jokes, or songs if a meme is picked well, and we will spread it. Marketers impact memes because they stick in our minds. As a result, neuromarketing is a promising new topic with a lot of promise for use in areas like marketing, brand management, and advertising. It came about as a result of combining principles from neuroscience, psychology, human neurophysiology, and even neurochemistry. The scope of neuromarketing has been greatly expanded as a result of this. In a crowded and chaotic market, the neuromarketing idea offers a significant competitive edge. The language of consumption differs from one country to the next, and culture differs from one civilization to the next, but the language of the human brain is universal. As a result, neuromarketing has had a significant impact on products, brands, packaging, and marketing.

II. Review of Literature

The value of a product or service, as well as its competitive advantages, has always been the emphasis of marketing. In today's marketing, a more holistic approach to marketing, which includes the emotional component of the decision-making process, is gaining traction (Suomala *et al.*, 2012, p. 12). This research aligns with Kotler's current marketing philosophy, Marketing 3.0, in which he believes that firms should approach consumers as whole human beings, comprising of 4 parts: physical body, brain, heart, and spirit (Kotler *et al*., 2010, p. 34). In other words, if firms want to thrive in today's marketing landscape, they must engage their consumers' emotions and try to comprehend their concerns and wants, according to Kotler. Neuromarketing first appeared in the early 2000s and swiftly gained traction in both academic and commercial circles (Fischer *et al.*, 2010, p. 231). Despite the fact that neuromarketing is still in its infancy, no single academic can be credited with creating the technique. The earliest research utilising neuroscientific methods to correlate mood and electrical patterns in the brain were published in 1979 (Morin, 2011, p. 133), and the use of neuroscience in branding and consumer psychology goes back even farther. The author of the 1957 book "The Hidden Persuaders" discusses the "potential of combining the insights of psychiatry and the social sciences to influence our choices and behaviour" (Packard, 1957, p. 1).

Packard suggests motivational research and the depth approach (the whys of human behaviour) as techniques for investigating and engaging customers' unconscious minds, recognizing that customers' actual buying behaviour frequently differs from what they say about their buying patterns and reasons (Op.cit., pp. 4-13). The most well-known neuromarketing method was created by Harvard professor Jerry Zaltman (Gerald Zaltman) in the late 1990s and patented as the Zaltman Metaphor Elicitation Technique (ZMET). ZMET is based on probing the human unconscious with carefully selected sets of images that create a positive emotional response and awaken buried images, metaphors, and purchase impulses. Detected images are utilised to build graphical collages that serve as advertising foundations. Hundreds of large companies-customers, including Coca-Cola, General Motors, Nestle, and Procter & Gamble, swiftly adopted Marketing Technology ZMET. Neurology's methodologies and concepts have inspired a lot of interest and attention in the disciplines of marketing and consumer research during the last decade, culminating in a hybrid termed neuromarketing. Martinez claims that neuromarketing will allow marketers to get more objective data from and about customers than traditional marketing methods like surveys and interviews. Martinez believes that combining qualitative, quantitative, and

neuroscience research to apply neuroscience in marketing is the most successful strategy since they will complement and support each other, resulting in the most comprehensive data possible (Op.cit., p. 6). It's an attempt to figure out how and where our brain reacts to marketing and advertising stimuli, as well as how much of an impact they have.

Neuroscientific approaches are used to investigate consumer behaviour, decision-making processes, emotions in purchasing decisions, and marketing phenomena by examining the underlying neurobiology (Javor *et al.*, 2013, p. 2). Systems neuroscience, or the study of how various brain regions or complex brain systems interact, is the major emphasis of neuromarketing (Braeutigam, 2005, p. 350). Consumer neuroscience is distinct from neuromarketing, which relates to commercial interest in neuro-physiological tools and is an academic research at the intersection of neuroscience and consumer psychology (Javor *et al.*, 2013, p. 3). Advertising's physiological effects may be measured in a variety of ways. The emerging field of neuromarketing is described by Michael J. R. Butler (2008) as changeable knowledge. The development and use of neuromarketing skills are seen differently by various marketing researchers. Different perspectives of information are nothing new, but discovering new links between them is useful to knowledge generation and dissemination.

The research–practice gap in neuromarketing was briefly discussed before the contribution of that article, which included the development of a unique Neuromarketing Research Model, addressed it. The Model connects basic research reporting, applied research reporting, media reporting, and power dynamics. The term "neuromarketing" (NM) is a recent addition to the marketing vocabulary. "Applying the methodologies of the neurology lab to the issues of the advertising world" is how neuromarketing is defined (Thompson, 2003, 53). Marketers have chosen an integrated discipline known as neuromarketing in order to better understand and characterize the neurological correlations that underpin consumer behaviour and the processes that underpin decision-making. In order to distinguish between the neurological and physiological underpinnings, as well as the somatic aspects that impact consumer behaviour, these human behavioural theories have begun to integrate results from neuroscience. Neuromarketing originated as an interdisciplinary technique for researching the neurological aspects of consumer decision-making as a result of the combining of marketing and neuroscience (Sanfey, Lowenstein, McClure & Cohen, 2006).

Neuromarketing examines consumer behaviour by progressively applying brain processes and neuroscientific tools to develop a complete understanding of the neurological foundation of brand connections and purchasing power. This new field aims to scientifically explain customer psychological positions that influence purchasing decisions, as well as provide a broad estimate of the effectiveness and influence of a variety of marketing tactics, such as advertising and product placement, by focusing on how marketing tactics, such as advertising and product placement, affect an individual's neurobiology. Using neuroimaging and event-related potentials, neuromarketing provides a framework for investigating the brain pathways and processes that impact consumer purchasing habits (ERP) **(**Javorm Koller, Lee, Chamberlain & Ransmayr, 2009)**.** According to Morin (2011), neuromarketing has the potential to investigate the 4P's of marketing—product, price, promotion, and place—and may substantially aid marketers' knowledge of how to sell their products or services successfully.

Neuroscientific data is increasingly being used in marketing research papers, journals, schools, organisations, and conferences to gain a better understanding of the factors that influence customer purchasing decisions and how that information can be applied to build new marketing techniques. Although neuromarketing has provided several chances for businesses to continuously assess implicit reactions to marketing stimuli, the field is still in its infancy (Morin, 2011). Sales Brain and Bright house were among the first firms to commercialize neuromarketing as a marketing discipline in 2002. These businesses began to provide neuroscience-based marketing and consulting services (Morin, 2013). McClure utilised fMRI data to discover the brain correlates of participants' preferences between Coke and Pepsi in the first neuromarketing study (Morin, 2013).

III. Research Objectives of the Proposed Study

- To study the significant stance of Neuromarketing in present situation.
- To identify different neuromarketing strategies currently in use.
- To study the significance of Neuromarketing on influence on respective marketing inputs.
- To study the ethical issues involved in Neuromarketing.
- To understand the major advantages and limitations of Neuromarketing.

IV. Research Methodology Adopted for the Purpose of Study

The goal and significance of this research is to assess the necessity for exploratory research in order to better understand how consumers and marketers think about Neuromarketing. An exploratory study can also be used to establish the basis for future investigations, such as determining if what is being seen can be explained by current literature and examining it in light of it. Thus, secondary data, already published literature reviews, fact sheets, journals, and magazines are used to perform qualitative research.

V. Neuromarketing as an Emerging Significant Stance in Current Scenario

Neuromarketing's development has been mirrored in nearly every sector of business, including automobiles, information technology, fast-moving consumer goods, and, finally, the

entertainment industry. The following are some of the most important aspects of its existence:

Hyundai Motors use EEG testing in the design of its vehicles to gauge consumer reactions to certain aspects of the external appearance. "We want to know what people think about a car before we start manufacturing thousands of them," says Macko, manager of brand strategy at Hyundai Motors (Burkitt, 2009). Frito Lay, the American snack manufacturer, has employed neuromarketing on many times, according to Cheetos the Orange Underground (Brat, 2010). Frito Lay discovered that the glittering, bright-colored packaging they were employing for potato chips in 2008 activated the anterior cingulated cortex of the brain, which is linked to emotions of guilt, using neuroimaging. The anterior cingulate cortex showed no activation when another style of package with dull beige hues and pictures of potatoes and other healthful components was tested. As a result, Frito Lay ditched the gleaming packaging in favour of a matte design featuring healthful components (Burkitt, 2009).

Yahoo, a 60-second television commercial for Yahoo features cheerful, dancing individuals from all around the world. Yahoo tested the ad on individuals who wore EEG hats before spending money on prime-time and cable TV, as well as online.

PayPal, which is owned by eBay, is attempting to encourage more e-shoppers to use its online payment service by portraying it as quick. PayPal was persuaded by brain-wave studies that speed excites consumers more than safety and security, which had previously been the focus of its advertising efforts.

EEG Data is being used by *Microsoft* to show how engaged players are when they use an *Xbox.* Microsoft teamed up with EmSense to place EEG caps on players and display them advertising on their gaming system. It was able to determine which regions of the brain were activated by the advertisements.

Ford Motor Company is a car manufacturer. Automobile companies like DaimlerChrysler, Ford of Europe, and others are employing medical studies to better understand how people think in order to develop more effective sales presentations. Images of sports cars activate the pleasure region of the male brain in the same way as sex, cocaine, and chocolate do, according to early findings from an electrodes-on-the-scalp and Magnetic Resonance Imaging scanning study. In a research published in 2004 in Neuron by Read Montague's group, 67 people had their brains scanned while taking the "Pepsi Challenge," a blind taste test of Coca-Cola and Pepsi.

Media: Neuromarketing is frequently used in the media industry. For instance, to observe how people react to movie screenplays or trailers, to see which areas of a website draw users' attention, or to watch how people react to specific music. However, it is uncommon for movie studios, filmmakers, or anyone in the industry to openly acknowledge to using the method (Randall, 2011).

VI. Rising Usage in Neuromarketing in Current Context

Neuromarketing has grown by leaps and bounds, and several businesses have emerged with it as their main line of business. Some instances of neuromarketing businesses that are framing famous marketer's marketing mix are:

Brighthouse: Brighthouse, an American advertising agency, was the first to use the term neuromarketing in a news release in 2002. Focus on the Brain (NeuroFocus) (Now Nielsen Consumer Neuroscience) NeuroFocus was an American neuromarketing firm that was bought by The Nielsen Company, a global market research firm, in 2008 and renamed Nielsen Consumer Neuroscience. Millward Brown is a public relations firm that specializes in Millward Brown began in the United Kingdom and today has offices in Europe, America, Asia, the Middle East, and Africa (Millward Brown, 2014c; Millward Brown, 2014a; Millward Brown, 2014b; Millward Brown, 2014a).

Neurosense: Neurosense is a London-based company. Gemma Calvert established Neurosense, which claims to be the first company to provide commercial fMRI scans (Neurosense, 2013a). BBC, Coca-Cola, Ford, Heinz, Intel, and L'Oreal are just a few of Neurosense's well-known clientele (Neurosense, 2013b).

Neuro Insight: Professor Richard Silberstein created Neuro-Insight in 2005, and it now has offices in the United States, the United Kingdom, Germany, and Australia, where it provides neuromarketing services focusing in marketing communications (NMSBA, 2013).

Fig. 1: Showing Neuromarketing - You are being Controlled while Buying

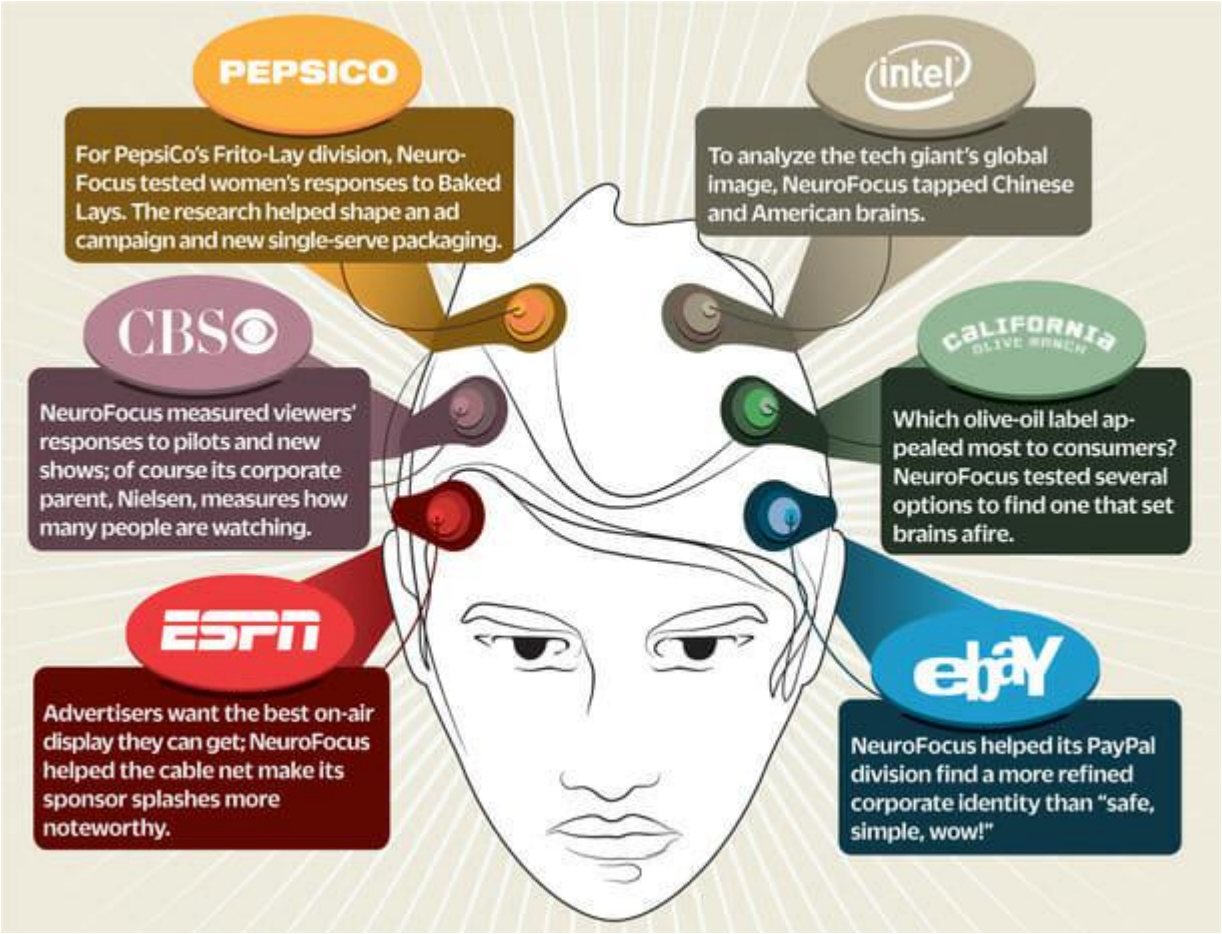

Fig. 2: Showing How Neuroscience Affects Customer's Buying Behaviors

VII. Major Tools and Techniques of Neuromarketing

The term Electroencephalography (EEG) refers to an electrical depiction of brain activity (Postma, 2012). Despite the fact that EEG is an old technology, it is still considered a useful tool for monitoring changes in the electrical field in specific brain regions (Ariely & Berns, 2010; Morin, 2011; Camerer, Loewenstein & Prelec, 2004; Madan, 2010). Electroencephalography (EEG) is a type of brain scanning that records the electrical activity of the brain on the scalp. Electrodes inserted into the scalp detect even the smallest changes in electrical activity. 16 and 32 channel EEG devices are utilised. On the screen or on paper, the computer depicts the electrical activity of the brain as waves. The collected EEG data is analysed with software created in-house.

When a client is exposed to a certain stimulus, *HD EEG* is an improved version of EEG that can capture very precise brain activity data. This 256-channel EEG gadget does a detailed source localization analysis of brain signals. Furthermore, the data collected will allow us to construct very accurate heat maps of brain activity, which will be included in the final report.

Galvanic Skin Response, often known as skin conductance, is a method of measuring the temperature and electrical conductivity of the skin, which changes based on the skin's moisture content. Skin conductance is a technique for detecting and quantifying psychological and physiological arousal. Its most prevalent application is in lie detection software. Galvanic skin response is also used to determine pulse rate. The degree of excitement or tension that the person feels in reaction to specific triggers is shown by the variations in the pulse.

Tracking the Movements of the Eyes: Eye tracking technology is used to track the location of the eye as it moves its focus across the surface of a visual stimulus. In the realm of neuromarketing, eye trackers are utilised in product design and software design studies. The most common approach for monitoring eye movement is to employ a camera that records the pupil's motions. Our technical team created custom-made eye tracking devices and software.

VIII. Neuromarketing Instruments

Positron Emission Tomography (PET) is a technique for recording metabolic activities in the brain (PET). The term "functional magnetic resonance imaging" (fMRI) refers to a form of magnetic resonance imaging that focuses on the brain (fMRI). The method of electroencephalography (EEG) is used to capture electrical activity in the brain (EEG).

Transcranial magnetic stimulation (TMS) is utilised in magneto encephalography (MEG), which is a kind of brain imaging that employs (MEG) State Topography that is Consistent (SST) without monitoring brain activity. The conductivity of the skin coding of the Face Electromyography of the face is used to track the movements of the eyes.

Analytical Thinking: Cognitive Analysis is a digital analytic model that integrates EEG, galvanic skin response, and eye tracking data to provide a detailed assessment of a person's reaction to a given trigger. This guarantees that none of the biometric information gathered is incorrect. The term "functional magnetic resonance imaging" (fMRI) refers to a type of MRI scan. The word "MRI" stands for "magnetic resonance imaging and it refers to a technology that uses magnets to create a picture of the architecture of the brain (Postma, 2012). An MRI scanner is used to assess blood oxygen levels, which might suggest increased brain activity in particular locations (Ariely & Berns, 2010).

Following is how the measurement works: The magnetic field can detect the amount of oxygen in the blood in the brain. As a result, if neuronal activity in a particular brain area increases, so does oxygen-rich blood, because the brain requires oxygen to function. fMRI is a type of non-invasive neuroimaging technique that is mostly utilised in marketing. It has sparked a lot of attention in recent years since it allows scientists to separate certain neuronal systems that are linked to specific brain processes (Postma, 2012; Wilson, Gaines & Hill, 2008). Isolating the brain system is a difficult process that is only made easier by today's modern technologies (Kumlehn, 2011).

Empathic design is another technique for analysing human beings without the use of any technology. The term 'empathic' can also be used to describe someone who is sensitive. This approach involves observing the customer in his or her own surroundings, thus it may happen in the usual course of business (Postma, 2012; Leonard & Rayport, 1997).

IX. Significance of Neuromarketing Influence on Respective Marketing Inputs

When compared to traditional marketing methods, the qualitative research technique neuromarketing - the application of neuroscience principles to marketing – offers significant advantages (Kosslyn, 1999; Taher, 2006). As a consequence, the efficacy of neuromarketing techniques in terms of consumer behaviour will be analysed, and the following significant marketing tools will be explored in greater depth. Finally, a well-organized overview of which marketing strategies are effectively influenced by neuromarketing is generated.

A. Neuromarketing on Consumer Buying Behavior

The following assertions may be made about the impact of neuromarketing on the marketing tool Consumer Buying Behavior. Because the number of dazzling product representations is continuously increasing, an in-depth examination of consumer-buying behaviour, especially using neuromarketing approaches, might be beneficial (Gang, Lin, Qi & Yan, 2012; Butler, 2008). However, there are a few factors to take into account. To begin with, it's important to note that most consumers are unable to express their wishes and requirements when questioned directly, which is why it's thought that the brain has internal information that might reveal genuine desires and needs. People's buying behaviour might most certainly be impacted if this knowledge was available, and the disadvantage of the cost of neuromarketing components would be balanced by the benefit of the internal information given (Ariely & Berns, 2010). As a result, neuromarketing approaches provide an excellent chance (Kenning *et al.*, 2007).

According to Eser, Isin, and Tolon (2011), neuromarketing "makes use of the most recent discoveries in brain scanning to learn more about the mental processes behind client purchase decisions" (p. 854). Because all neural and cognitive processes associated with purchasing decisions are influenced by multiple factors, or "multi factors," and thus cannot be reduced to one solitary factor, the critical statement about a "buy button" in the brain, which would theoretically be able to predict consumer buying behaviour by activating the brain area responsible for making the final decision, can be refuted here (Ariely & Berns, 2010). Finally, neuromarketing techniques may be used to analyse key impacts in general, and especially in connection to consumer purchasing behaviour, with the results serving as a template for future research or product development (Wilson, Gaines & Hill, 2008).

B. Neuromarketing on Advertising

The following issues should be considered when considering the impact of neuromarketing on marketing tool advertising. According to Ariely and Berns (2010), the way particular decisions are presented in advertisements, such as by role models, may have a huge impact on the actual decision made by a consumer. As a result, the topic of product presentation to market consumers and advertising is becoming increasingly essential. Because the effects of advertising are still unknown, neuromarketing and, specifically, neuroimaging techniques, are viewed as an interesting and valuable tool for marketers (Ariely & Berns, 2010). Advertising's attractiveness and the activity of brain areas linked with it were examined by Kenning and Linzmajer (2011).

Using neuromarketing methods, they revealed that more appealing advertising stimulates the ventromedial prefrontal cortex and the ventral striatum, which are essential for emotions in decision-making and reward processing. When a less appealing commercial was shown, these brain areas were not engaged. This means that using neuromarketing approaches, it is feasible to determine if advertising is considered appealing or not and hence determine its efficacy. Furthermore, it was discovered in their research that advertising were recalled better when they were either highly appealing or very ugly.

Additionally, in order to create advertising that is appealing to customers, pleasant face expressions are essential (Kenning & Linzmajer, 2011). The findings of reasonably mature research by Ambler and Burne (1999) and Ambler *et al*. (2000) indicated that emotional pictures in advertising are also indications that help the remembering process of advertisements. Taking all of the facts into consideration, we believe that, when used correctly, neuromarketing may have a good and beneficial impact on advertising.

Because of the underlying knowledge of which brain regions are responsible for certain ideas and actions in the brain, as well as the technical examination of which brain areas are engaged, extremely useful information may be acquired. Thus, when advertising is presented to a test subject and neuromarketing techniques such as fMRI or EEG are used, it is quite likely that information indicating whether or not an advertisement is attractive will be obtained. Although using this strategy does not guarantee that a buyer will make a purchasing choice, it may be used to make advertising as appealing as possible by employing neuromarketing tactics, therefore increasing the purchase decision in a favourable way. To summarise, if advertisers can figure out which pictures elicit particular responses in the medial prefrontal cortex, they should be able to use this information to boost sales (Cranston, 2004).

C. Neuromarketing on Pricing

When it comes to the impact of neuromarketing on price, there are numerous distinct scientific literatures to consider. Because pricing is such an important factor in a product's presentation and image to customers, there are a number of marketing studies that have looked at its impact (Bijmolt *et al.*, 2005). Price is an essential indication in the decision-making process since, in most cases; expenses are weighed against benefits when making a decision (Lee, Broderick & Chamberlain, 2007). As a result, it's possible that consumers are being deceived by greater costs because they anticipate higher quality, albeit this isn't always the case (Kenning & Linzmajer, 2011). It's important to understand a customer's willingness to pay in order to properly price a product. This is the highest price that a customer is willing to pay for a particular product or service (Simon & Dolan, 1998). However, there is a problem with the manner in which this willingness to pay is conveyed. Customers have been shown to have difficulty retrieving price for individual things and, perhaps more significantly, determining how much they are willing to spend for certain products (Vanhuele & Drèze, 2002; Evanschitzky, Kenning & Vogel, 2004). On this premise, one may claim that the use of neuromarketing techniques can be extremely useful in determining customers' willingness to pay, and that marketer's can then alter pricing appropriately. This may be accomplished by presenting test subjects with items and a range of pricing. Then, in addition to analysing the brain activity, one may question which of the given prices represents the greatest willingness to pay. When looking at brain activity, one can observe if there are areas of the brain that are engaged more for pain or happiness.

D. Neuromarketing on New Product Development

In terms of Neuromarketing's impact on new product creation as a marketing technique, one may argue that its efficacy is limited. According to Ariely and Berns (2010), neuromarketing approaches are more suitable when evaluating the product experience itself, rather than judgments made before the product is designed. In other words, prior to product development, it is believed that no meaningful findings can be derived. As a result, it is recommended that when creating new goods, other approaches be used (Ariely & Berns, 2010). However, the rationale appears to be substantially different in Calvert and Brammer's (2012) analysis. In particular, it is mentioned in their study that because fMRI can efficiently filter information, it may be used in the process of pretesting and developing new goods, as it would provide internal information.

E. Neuromarketing on Communication

Following that, the influence of neuromarketing on communication will be evaluated. Due to a dearth of particular literature on the issue, some reasoning is relied on logic. Since nonverbal communication includes body language and facial expressions, it's fair to assume that neuromarketing approaches may be used to assess these nonverbal manifestations of individuals, particularly the exterior responses body language (Postma, 2012). These data, however, are not as exact as fMRI or EEG measurements, as previously stated. As a result, it's fair to assume that neuromarketing measurements won't have much of an influence on verbal communication, because remarks made verbally don't require neuromarketing analysis and may be reviewed in the usual way.

F. Neuromarketing on Distribution of Products

When it comes to neuromarketing's influence on product distribution, it might be claimed that neuromarketing techniques like eye tracking, body language, EEG, or fMRI can be used to acquire vital internal data (Ailawadi & Keller, 2004; Kotler & Keller, 2006). The top-shelf example is a specific example of decision-making and product distribution, as well as its examination using neuromarketing approaches. The only items that are truly examined by consumers are those on the top shelves in stores, according to this example (Chandon, Hutchinson, Bradlow & Young, 2009). This is because excellent locations are thought to attract greater attention and, as a consequence, are more likely to be chosen by buyers (Pieters & Warlop, 1999). Customers may wear an EEG cap on their heads while supermarket shopping, for example, to monitor their motions and do eye tracking. All of this may be reviewed in the end, and will almost certainly reveal a lot about people's decision-making processes (Plassmann, Ramsy & Milosavljevic, 2012). This experiment may be conducted not just in physical stores, but also on the internet (Dreze & Hussherr, 2003).

G. Neuromarketing on Branding

We'll get into the influence of neuromarketing on branding a little later. To begin, it's important to remember that, when compared to other brands, consumer branding and loyalty to their preferred brands are associated with powerful emotions during the decision-making process.

Customers are more likely to stick with the brands they like. Only the most popular brand, according to Bechara and Damasio (2005), could generate emotions that affected decision-making, a phenomenon known as the winner-take-all effect (Bechara & Damasio, 2005). As a result, the branding process, as well as a brand in general, is an important component of a marketing strategy that should be approached with caution. According to fMRI brand study, there is a substantial difference in brain activity between popular and preferred brands (Kenning & Linzmajer, 2011; Hubert & Kenning, 2008; Deppe, Schwindt, Kugel, Plassmann & Kenning, 2005). As a result, using fMRI, EEG, or MEG methods, marketers should be able to determine which brain regions are engaged when items from certain brands are displayed, as well as how much these brands impact the decision-making process in general. Because branding has such a strong influence on a consumer's final decision, even if quality or price concerns are more severe than with neutral brands, it may be advisable to expand the use of neuromarketing approaches in branding to better and perfect the representation of a certain brand. Overall, brain activity can be utilised to predict product choice and brand awareness (McClure *et al*., 2004; Schaefer, Berens, Heinze & Rotte, 2006; Walter, Abler, Ciaramidaro & Erk, 2005).

To put it another way, Hubert and Kenning (2008) think that brands might operate as subconscious and hidden apprehensions that affect decision-making before the test subjects had even considered the product's advantages and flaws.

H. Neuromarketing on Decision-Making

The decision-making process is a marketing strategy that may be studied with the use of fMRI, a neuromarketing technology (Gang, Lin, Qi & Yan, 2012). Emotional integration, which can frequently give new information, is considered to have a significant impact on decision-making. (Plassmann *et al*., 2012). Numerous research, however, demonstrate that neuromarketing techniques may be utilised to assess decision-making processes. The striatum and the ventromedial prefrontal cortex are claimed brain regions that can be analysed using neuromarketing techniques like fMRI or EEG to determine whether a decision is positive or negative (O'Doherty, Dayan, Schultz, Deichmann, Friston & Dolan, 2004; Peelen, Li & Kastner, 2009; Zurawicki, 2011; Grosenick, Greer & Knutson, 2008). According to Knutson *et al.* (2007), the true final decision is based on a comprehensive evaluation of value gain and loss both before and after the decision is taken. A typical source of worry is that there are some claims that this assessment and free decision-making can be affected (Vohs & Schooler, 2008; Montague, 2008).

I. Neuromarketing on Product Design

Because neuromarketing technologies like fMRI and EEG can precisely determine which brain areas are engaged at certain times, they are considered as quite valuable when considering product design. A customer can be given with several various product designs, and the brain can assess which of these items has the most beneficial impact on the brain. Because this process occurs subconsciously in the brain, it has a greater level of dependability than when respondents merely give verbal descriptions of their preferences. Customers' outward expressions may or may not represent their real desires and preferences. The nucleus accumbens and the ventromedial prefrontal cortex, which are responsible for emotions in the decision-making process and reward cognition, are activated more when a product's design or packaging is attractive and beautiful, according to Reimann, Zaichkowsky, Neuhaus, Bender and Weber (2010). The only techniques that can detect these activations are fMRI and EEG. As a result, we may infer that using neuromarketing approaches to affect the efficacy of current marketing tool prices can be quite successful when done correctly (Gang, Lin, Qi & Yan, 2012).

X. Ethical Issues Involved in Neuromarketing

When discussing the neuromarketing research technique, there are numerous ethical considerations that must be considered. On the one hand, there is a scientific viewpoint that claims there is no such thing as a marketing plan that can improve the removal of an individual's free will (Madan, 2010). However, as stated in the following, several different perspectives on neuromarketing perceive possible dangers. First and foremost, numerous groups are afraid that the adoption of neuromarketing tactics, such as the so-called "purchase button," would entirely remove consumers' free will and convert them into "purchasing robots" unable to reject appealing offers (Commercial Alert, 2003; Kenning & Linzmajer, 2011; Wilson, Gaines & Hill, 2008; Lee, Broderick & Chamberlain, 2007). In today's environment of different but similar products and an affluent society, customers' free will and ability to make individual judgments is one of their most significant advantages. The notion of a free market will be lost if this is taken away or distorted (Wilson *et al.*, 2008). If this were to happen, the whole focus of trade would be economic gain, rather than the genuine wishes of consumers, and a major problem with free will would arise as a result (Madan, 2010). Furthermore, the element of trust, which is now required in order to build a positive customer-company connection, necessitates the implementation of specific privacy regulations (Iles & Racine, 2005). To put it another way, withholding information or intentionally manipulating customer behaviour through the use of technology that examines internal brain activity is plainly unethical, which is why safeguards should be put in place (Senior & Lee, 2008; Eser, Isin & Tolon, 2011). Muphy, Illes, and Reiner's perspectives must be considered when evaluating the ethical issues of neuromarketing (2008). According to them, neuromarketing research raises 2 major ethical concerns: On

the one hand, the protection of those who may be damaged or harmed as a result of neuromarketing study or implementation, and on the other, the consumer's independence and autonomy in decision-making, especially when neuromarketing's efficiency eliminates the need for fudging. The fast rise of companies that provide neuromarketing services provides evidence for this ethical problem (Reid, 2006; Kenning & Linzmajer, 2011). Lancet (2004) has already addressed the critical need for and suggestions for preventing excessive intrusion into personal privacy. A code of ethics, as recommended by Murphy *et al.* (2008), might be implemented. Another potential would be the development of new and improved techniques, as well as their more responsible application, while also addressing the absence of regulation by creating industry-intern norms, for example (Airely & Berns, 2010; Hubert & Kenning, 2008; Kumlehn, 2011; Hubert & Kenning, 2008).

XI. Major Advantages and Limitations of Neuromarketing

A. Advantages of Neuromarketing

The term "neuromarketing" refers to the use of behavioural neuroscience in marketing. Neuromarketing technologies discover stimuli and indications that indicate client behaviour that aren't visible to the naked eye. Product design, brand creation, and successful advertising may all benefit from neuromarketing approaches. Apart from the brain reaction at the time of purchase, they aid in understanding a customer's whole shopping experience from the moment they enter a store until they depart. A fascinating application is a virtual store with 2D and 3D retail items that simulates shopping in a physical store. Test clients are exposed to genuine marketing scenarios, and their purchasing decisions are properly analysed.

B. Limitations of Neuromarketing

Neuromarketing has its own set of disadvantages and limitations. A key drawback of neuromarketing is the information's lack of dependability and trustworthiness. The term "neuroscience" has lately acquired popularity in a wide range of fields of research. Only a few articles from neuromarketing businesses and academics are presently available. Furthermore, corporate or marketing expert results may be biased or falsified. The timing and situation in which marketing stimuli are received might also impact differential processing. Emotions and their connections to specific brain areas is a controversial subject. The difficulty of setting up fresh trials, as well as the considerable cost and time involved, are all significant drawbacks of neuromarketing.

XII. Critical Evaluation of Neuromarketing

When considering the subject of neuromarketing, there are a number of important factors to consider. According to Gary Ruskin, executive director of Commercial Alert, Obesity, diabetes, alcoholism, gambling, and smoking are all diseases that may be traced back to the negative repercussions of targeted marketing. (Wahlberg, 2004). Overconsumption and product addiction are 2 more unfavorable outcomes that are considered dangerous (Lee, Broderick & Chamberlain, 2007). As a result, he believes that any rise in marketing methods' productivity will be detrimental to society as a whole (Wahlberg, 2004). Other opponents believe that, while neuromarketing activities ultimately encroach on society's privacy, the trend is unlikely to be reversed in the near future since many firms still prioritize profits over privacy and freedom of choice (Dapkeviius & Melnikas, 2011; Kumlehn, 2011). Another point of view says that when neuromarketing techniques are employed, only the physiological evidence of a person's behaviour can be measured, indicating that finding a "purchase button" is impossible because only sections of the brain can be seen rather than affected (Kenning & Linzmajer, 2011). However, the greatest threat to neuromarketing, and therefore the largest critic, is that the results have the ability to severely interfere with the consumer's free choice and thus their privacy (Wilson *et al.*, 2008).

XIII. Managerial Implications on Neuromarketing

The position and development of neuromarketing as a new instrument in market research is reelecting and proving as the tapping of the consumer's brain sensation is used in advertising and luring them to further buying. Neuromarketing has already been embraced as a market research technique by companies such as the BBC, Coca-Cola, Ford, Heinz, Intel, and L'Oreal, P&G, Hyundai, Microsoft, Yahoo, and Ebay. Firms such as NeuroFocus, NeuroInsight, Neurosense, and Brighthouse are using the outsourcing services of companies like NeuroFocus, NeuroInsight, Neurosense, and Brighthouse to improve the outcomes of marketing research. Managers must also take advantage of this new marketing trend in order to place their brands in the subconscious minds of their customers. All of these neuromarketing firms have been developing different Neuromarketing approaches based on neuroscience, such as fMRI, EEG, Eye Tracking, GSR, Emapthy Design, and Cognitive Analysis. As a result, marketers will see a lot of promise in Neuromarketing in the future years.

XIV. Conclusion

It is widely believed that in the field of marketing, neuromarketing presents fascinating possibilities and new avenues for research. Neuromarketing is still in its infancy, but it has a lot of potential for the future. Researchers believe that neuromarketing has a long way to go and must overcome a number of obstacles before becoming a commonly utilised market research approach. Neuromarketing, on the other hand, is gaining popularity and is expected to play a significant role in the highly competitive sector of global marketing. As high-end technology and gadgets become more generally available,

neuromarketing is anticipated to expand in the future. One of the newest disciplines of marketing is neuromarketing. It can give useful information on consumer behaviour, which can then be used to build goods and services that please customers. We may expect further revelations of subtleties involved in determining the consumer and purchase behaviour of rural and urban customers for any product or brand as neuromarketing advances. The use of neuromarketing and neuroscientific approaches yielded more objective findings than when these techniques were not used, and these techniques are likely to disclose previously discovered internal information about human behaviour in general (Hubert & Kenning, 2008; Kenning & Linzmajer, 2011; Ariely & Berns, 2010). Marketers may utilise neuromarketing approaches to study the impact of customer buying behaviour, advertising, price, product distribution, and decision making on a much more scientific level by analysing both the test person and the marketing input (Fugate, 2007). Neuromarketing is typically characterized as a strategy for using imaging technology to find the human brains own undiscovered "secrets" (Kampakoglou, 2012). Researchers are increasingly concentrating on emotions and unconscious processes that impact human behaviour, as well as the fact that arguments and reasoning methods are no longer regarded reasonable (Bechara & Damasio, 2005; Camerer, Loewenstein & Prelec, 2005; Oehler & Reisch, 2008). Furthermore, because it is where conscious processes and emotions occur, the prefrontal cortex has been proven to be the most important region in the brain for neuromarketing studies (Vecchiato *et al.*, 2011).

Overall, it can be said that the growth of neuromarketing presents a win-win situation for both marketers and consumers if the ethical aspect is handled by performing neuromarketing operations responsibly. Marketers may obtain internal information, leading in improved product marketing and more customized goods for clients (Kenning & Linzmajer, 2011; Ariely & Berns, 2010; Lee, Broderick & Chamberlain, 2007; Madan, 2010). The method combines business and psychological components of economics, as well as neuroscience (Madan, 2010).

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