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NEURO MARKETING – EXPLORING THE CONSUMER MIND

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ABSTRACT - Today marketers aiming at better understanding of their customers and consumer's preferences, motivations and expectations than ever before. Over the decade the traditional methodologies of understanding the customers have welcomed mixed reactions and some have not gained the success as they rely on the expressions and more often the customers have to articulate the situation before answering any questions. Under these prevailing conditions the present paper reviews and discusses the various tools that can be used in Neuromarketing with their application areas. Neuromarketing is branch of neuro science which tries to find the answers for hidden part of the consumer by analysing reactions of the brain and other physiological responses. It is evident from the literature that neuroimaging techniques can defiantly have vital inputs for the unseen and unheard part of the consumer.

Key words: Consumer, Marketing, Neuromarketing, Neuroscience, Research, Traditional techniques

I. INTRODUCTION

Neuro marketing is the most sought after word for the marketing companies in order to understand the consumer black box. Fortunato et al. (2014), defines Neuromarketing is a system of neuroscience that studies the cortical regions of the brain that is responsible for consumer behaviour, and also as a research instrument for observing the reactions of the brain when a consumer is exposed to marketing stimuli.

Over the centuries the efforts are being made to understand how and when the consumer buys the product and what really makes him to arrive at the decision? Given a different marketing stimuli how the consumer arrives at a decision to buy a product or a service? Numerous research theories and experiments were conducted to arrive at the definitive conclusion about the decision making process of a consumer, which is entirely a mental process rather than any other activities. At times a traditional approaches have failed to give a correlation between the variable that makes the consumer to tale the decisions.

Hence over a decade the companies are trying to find the answers through different creative techniques of data collection and analysis. But till today we are unable to arrive at the definitive conclusion about the situation and the variables which stimulates the buying decision of the consumer. Neuromarketing is trying to give the answers to the some of the questions. Neuromarketing is the study of consumer behaviour with application of neuroscience. Neuromarketing probes the consumer mind without the help of cognitive or conscious participation of the consumer. "Neuromarketing is a field of marketing research, oriented towards Branding, Product design, Advertising, Customer decision making".

II. BRIEF HISTORY OF NEUROMARKETING

Neuro marketing is combination of neuro and marketing, neuro science is traditionally associated with the human brain. Neuro science deals with how the nervous system in human body develops and what it does when it is subjected to different stimuli. Hence neuro scientists study the brain and its impact on the behaviour and cognitive functions of a humans. It is also known as neural science.

It is an interdisciplinary discipline which has a close association with medicine, mathematics, linguistics, engineering, computer science, chemistry, physics and psychology. The society of neuro science (SfN) says "neuroscience is the study of a nervous system which includes the brain, spinal cord and sensory nerve cells called neurons".

The term neuro marketing was started appearing in the field of marketing around 2002. During that period U S companies like Brighthouse and Sales Brian started neuro marketing research and consulting services recommending the use of the technology and the knowledge of neuro science to the marketing field in order to understand the consumer's brain. Neuro marketing orients the marketer to look at the consumer behaviour from the brain perspective.

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In 2003 professor of medicine Read Montegue, at Bayer college of medicine conducted an experiment to check how the human brain works in making the brand choices of Coke or Pepsi. He made two different group of individuals and asked them to drink a either Coke or Pepsi and their brains were scanned by fMRI scan. But the findings of the study failed to reveal how the consumer makes the brand choices but it revealed that how the different parts of the brain reacts if the consumer are aware or not aware of the brand. The findings of the study says that the frontal portion of the brain is crucial for executive function which manages our attention and controls the short term memory. Also it does the planning activity. When the consumer know that they are drinking Coke , then they prefer Coke but it is otherwise when they don't know the brand they preferred Pepsi instead of Coke. In this situation the older portion of the brain located in limbic system is active. This part of the brain is responsible for more instinctive and emotional behaviour. The findings of the study even though it welcomed a lot of criticisms in the field of research it paved a way to researcher to think away from the traditional way of analysing the consumer behaviour. After 2005 the Neuromarketing has grown rapidly. The neuro marketing techniques offered exiting techniques to probe in to the consumer mind to know how the information is processed and decision is made. It removes the barrier of conventional method of consumer research where the consumers are asked how they are affected by a particular marketing stimuli.

III. WHY NEURO MARKETING?

Companies invest huge amount of money in developing the product and convincing the customers to buy the same through various promotional tools that will not give the intended result as they fail in developing the desired engagement among the customers. This makes the consumer to not buy the products. Morin (2011).According to Fortunato et al. (2014), Neuromarketing can be defined as a technique of neuroscience that recognises the cortical regions which is responsible for consumer behaviour, also a and also as a research instrument for detecting the reactions of the brain when consumer is subjected to marketing stimuli. The consumer will pick a product from the selves of the store largely based on emotions and thoughts which he is unaware. Martin Lind storm's in his book "Buy ology - Truth and Lies about Why We Buy" (2010) says that subconscious mind plays a significant part in buying decisions. The brain is responsible for making the decisions. Hence many of the traditional research findings fail because those studies are based on the self-report of the consumers where they do not express the truth and true views about their buying motivations. Since the brain prefers mental shortcuts rather than a long deliberations. The strongest part of the human brain is that it process the visual stimuli without the use of visual vortex. Hence human being prefers images to the words and experiences over the explanations, hence it is very much appropriate to say that human beings are not thinking machines that feels but they are feeling machines that thinks. Hence the brain depends on the instinctual responses rather than another. The voluminous data we receive everyday will become useless unless the brain gives attention to it. Plassmann et.al (2015) explained how neuro marketing can make the difference to marketing field and the researcher in identifying the consumer behaviour mechanism which help to validate, refine the existing marketing theories or to extend them, to find out the implicit process of consumer decision making. Traditional marketing research relies on more subjective, indecisive and may be at times untruthful reporting which is the reflection of the conscious mind. Whereas the neuro marketing helps in understanding what consumer like and don't like, need fear, are bored or exited at the subconscious level. Hence it tries to remove the subjectivity. It tries to measure the attention level, emotional engagement and memory storage instead of measuring the opinion. Many of the traditional research methods measures the explicit conscious expressions but Neuromarketing research aims at gathering implicit that is the inner feelings. A notable point in Neuromarketing techniques is its ability to identify and record the consumer response to marketing stimuli in real time, under truthful environments of exposure.

IV. TECHNIQUES OR TOOLS USED IN NEUROMARKETING

(Suomala et al. 2012, p. 12) opines that better approach to marketing, including the emotional component of the buying decision process is gaining more importance today. From the last decade many marketers have started applying a neuroscience to marketing which has resulted in the growth of the Neuromarketing industry and the academic research. The latest development is applying modern neuro imaging technology to explore the consumer perceptions and buying decisions based on the human brain. Thus, consumer neuroscience can be defined as "the study of the neural conditions and processes that underlie consumption, their psychological meaning, and their behavioural consequences" (Reimann et al. 2011, p. 610). Galvanic skin response and eye tracking studies are the oldest techniques which measures skin arousal and eye movements during the exposure to the marketing stimuli are also comes under the umbrella of Neuromarketing.

There are number of tools and techniques like fMRI, EEG, eye tracking, Conductance, HRV, EMG, MEG etc that Neuromarketing uses for finding the hidden information in the minds of the consumer. Zurawicki (2010), Kenning et al. (2005) and Calvert et al. (2004have classified majority of the tools used in Neuromarketing into the techniques which record metabolically changes of the brain and the tools which record electric activity in the brain. Majority of

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these devices are used primarily as medical diagnostic instruments. These equipment's provide a colourful images of a real time based on the changes in the ion polarity, temperature and electronic impulses. This data can be used for analysing the precise behaviour of the consumers. Lewis (2004) opines that fMRI and EEG are the two most important techniques of analysing human brain.

(Functional) Magnetic Resonance Imaging (fMRI): It is one of the most prominent method of understanding the human brain. It is the combination of radio waves and the magnetic field which produces the signal. In this techniques Zurawiki (2010) says that the consumer lies on the bed and his is surrounded by the large magnet which makes the protons inside the brain align with the magnetic field. When certain proton of the brain is active the respective blood vessels reacts to it and produces the change in the magnetic field. This is displayed in coloured images of the brain. This is called as BOLD signal - Blood Oxygen Level Dependent signal (Williams, 2010).

Where it is used? : fMRI is used in testing new products, testing new advertising campaigns, developing advertisements, identifying the components of an advertisement, testing packaging design, price determination, positioning and repositioning campaigns, forecasting the consumer preferences and sensory testing

Limitations: (O'Connell et al. 2011) opines that the fMRI test are very expensive, hence the researcher has to pick a small sample which makes it non-scalable

Positron emission tomography (PET): It is also a very expensive experiment used for sensory perception and valence of emotions.

Where is it used: PET is used for testing of new products, testing advertisements and testing packaging design.

Limitations: The PET images are of short life (Zurawicki 2010), are also very poor in temporal resolution. The privacy of the respondents is at stake.

Techniques which measures the electric activity in the brain:

Electroencephalography (EEG): EEG is used to analyse brain waves for positive or negative emotions of the consumer. It chronicles brainwaves through imaging mental states, such as relaxation (alpha waves), sleep (delta waves), wakefulness (beta waves), calmness (theta waves).

Where it is used? : It measures emotional valence, cognition, memory encoding, recognition, attention, engagement / boredom, excitement also to record surface activity of brain wave, decision making.

Where it is used? : Analysing cognitive information processing (attention) and analysing differences in responses between left and right brain hemispheres

EEG usually used for analysing the advertisements, developing and testing of campaigns, to find the in-store experience, analysis and testing of websites and its usability.

Limitations: EEG is low in spatial resolution (Zurawicki 2010) apart from its low spatial resolution, as electric conductivity differs from consumer to consumer, because of which its difficult locate the exact position. (Zurawicki 2010; Kenning et al. 2007).

Magnetoencephalography (MEG): uses sensitive detectors placed in the helmet of the consumer head. Here the magnetic potentials records the brain activity at the scalp level. In Meg the magnetic field is not influenced by the type of tissue (blood, brain matter, bones), unlike electrical field used in EEG, and can indicate the depth of the location in the brain with high spatial and temporal resolution (Perrachione et al. 2008) .

What it measures? : The MEG measures the perception, attention and the memory of the consumers.

Where is it used? : MEG used for testing new products, testing advertisements, testing packaging design, identifying needs of the consumer and sensory testing

Limitations: The MEG experiments require a room free of earth's magnetic field (Zurawicki 2010) but (Ariely et al. 2010; Kenning et al. 2007) writes in their article that even though MEG has a limited spatial resolution, but better than EEG and is non-scalable (O'Connell et al. 2011).

Transcranial Magnetic Stimulation (TMS): TMS is less expensive compared to fMRI and EEG. (Perrachione et al. 2008), says that TMS uses the neural activity of the brain and uses the magnetic induction to stimulate the certain locations near to neocortex but without reaching the neocortex. It permits us to access the lower areas of the brain. Zurawicki (2010) compares TMS to fMRI and found that TMS will highlight the causal inferences by analysing the subject stimuli when other areas of the brain areas are disabled, stimulated, or normal. TMS uses a plastic case containing an electric coil which is placed near the consumer head. TMS discharges a magnetic field that passes through the brain and affects the changes in the brain and temporarily activates and deactivates the neurons by using high frequency and low frequency.

What it measures? : TMS measures the attention, cognition and changes in the consumer behaviour.

Where is it used? : TMS is used to testing new products, testing advertisements, testing packaging design and testing other marketing stimuli.

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Limitations: TMS cannot stimulate deep brain structures directly and as with all the tools TMS also raises the ethical barriers for consumers.

Steady State Topography (SST): SST provides a new understandings based on neural processing speed as compared with the EEG. Another significant feature of SST is that its ability to measure the variations in the delay (latency) between the stimulus and the Steady State Visually Evoked Potential (SSVEP) (Vialatte et al. 2010) response over extended periods of time. (Silberstein et al. 1990).

What it measures? : SST measures consumer behaviour, effectiveness of video, long term memory encoding, engagement, emotional intensity.

Where it is used? : SST is used for testing advertisements, testing movie trailers, testing prints and images, testing brand communication and many other similar applications.

Limitations: SST has a low spatial resolution.

The above techniques explains some of the tools which measures the metabolic activity of the brain and electric activity of the brain. Apart from these there are other tools which can be used in conjunction with the brain imaging techniques which will enhance the internal validity of the experiment. Some of the more prominent techniques are explained below.

Eye Tracking Studies: It is one of the oldest method of studying behaviour of the consumer and cognition without measuring brain activity, which enables the researcher to identify duration of the attention of eyes and its path when he is looking at any marketing stimuli. Eye tracking is generally used with electroencephalography (EEG). O'Connell et al. (2011) states that eye tracking studies provides more accurate information than traditionally used self-reporting techniques, as there is significant difference between the data collected while recalling the viewing and the actual viewing. Eye tracking are used in analysing the advertisements, concept testing, packaging design. Zurawicki (2010) claims that eye tracking studies may be used to measure the impact of marketing stimuli and analysing the websites and browsing pattern of the consumers.

Physiological Responses: As the biological responses to the marketing or any other stimuli will provide the information on the consumer emotional effect. Measuring the psychological responses help in finding the emotional engagement of the consumers during choice processes. There are different types of tools already in existence to understand the emotions. Tolls like lie detectors. Monitoring the heart rate, blood pressure, skin conductivity, stress hormone from saliva, facial muscles contractions are used to analyse the emotional status of the respondents.

What it measures? : Physiological response tools measures the emotional engagement of the respondents.

Where it is used? : These tools are used for testing advertisements, testing movie trailers, testing websites design, identifying in-store reactions, identifying consumer behaviour in its natural environment.

Limitations: According to (O'Connell et al. 2011) physiological responses lag behind brain activity which makes it difficult to measure the emotions. Moreover the cost of the instrument will vary with the sophistication. (Plassmann et al. 2011)

Implicit association test (IAT): These tests are used to measure the hidden feelings or the emotions of the respondents and also to identify the hierarchies of the product. Houwer & Bruycker (2007) states that these tests are less biased as it may even reflect the attitudes which respondents are unaware. This method can be used in recall studies of brand, product, and association tests, measuring respondent's attitude when he is subjected to marketing stimuli.

What it measures? : These tests often measures the reaction time, underlying attitudes / evaluations

Where it is used? : IAT may be used to select brand endorsements like celebrity selection , segmentation, brand positioning, and packaging features.

Limitations: One of the major limitation of this methodology is the availability of the respondents and their focus.

Skin Conductance: This test is based on the changes which we can experience in galvanic skin response (GSR) when the autonomic nervous system is activated (Ohme et al. 2009) and these tests provides the better responses than the self-reports (Tucciarone 1995). It is used to measure arousal which predicts the market performance.

Facial Coding: Human face expresses the expressions when subjected any stimuli. Some of these expressions are conscious and some are nonconscious. Facial coding uses the video camera to measure the minute expressions of facial muscles. These facial coding provide a real time data. It measures 43 facial muscles,23 action units, 6 core emotions like anger, dislike, envy, fear, sadness, surprise, smile - that can be either genuine or social. Facial coding is used for testing advertisements, testing movie trailers. Limitations of the facial coding is the subjectivity in deciding when an action has occurred.

Facial Electromyography (Facial EMG): It measures physiological properties of facial muscles (Ohme et al. 2011). It measures voluntary and involuntary facial muscles movement which is reflected in conscious and unconscious expressions of emotions (Dimberg et al. 2000). Facial

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EMG is generally recorded on both sides of the face small surface electrodes records the activity of specific muscles which activates the expressions of basic emotions. Facial EMG is a more accurate and subtle method in identifying the changes in facial expressions than the visual observation. It measures emotional expressions, social communication, mood and emotional valence of the respondents. Facial

V. CONCLUSION

The term Neuromarketing is gaining a lot of interest in the recent past as many marketers are striving find and consolidate their pie in the market. As the traditional marketing research methods are unable to provide the more accurate data in many situations as most of the techniques are expressive techniques or self-reporting techniques in which marketers are unable analyse unless and until it is been told by the consumers. Hence the neuro marketing tools were able extract the untold part of the consumers that non conscious state of the consumers.

The application of the neuroscientific techniques to the marketing leads to use of unbiased valuable inferences ; an in-depth analysis of the cognitive and affective triggers of brand choice based on inner psychophysiological processes; the possibility to explore the unconscious component of shopping behaviour and better understand irrational decisions. These are the vital differences that neuro imaging and neuroscience other psychophysiological techniques will bring in understanding the consumers better than ever before. Each of the above techniques have their own strength and weaknesses which will make them suitable for different situations. Some techniques may be used in combination with the others. EEG or MEG may be used with fMRI , where both EEG or MEG have good temporal resolution, whereas fMRI has good temporal resolution. Using PET in combination with fMRI will enhance results with information on what happens at every moment (with PET) and where the change occurs (using fMRI). Using TMS with EEG or fMRI is also a good combination as TMS is used in studying causality of specific brain regions for specific mental processes whereas EEG and fMRI study only correlates the data acquired and marketing stimuli. Considering the pluses and minuses of the each of the Neuromarketing techniques we can come to the conclusion that some of the tools will definitely generate the significant insights in to the consumer decision making process which in turn help the marketer to develop a better strategies. Marketers are advised to combine traditional methods with the Neuromarketing techniques to have better results.

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