

A Systematic Literature Review on Neuromarketing- A new Horizon of Marketing

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Abstract: In the last few years, Neuromarketing has moved from a promise to reality, although with ups and downs. Earlier traditional marketing research methods and strategies were used to analyze and study the consumer behavior. But in some cases it has been seen that the result is not that much effective and efficient. Now-a-days consumers are getting exposures to various information. It can be happened due to the exposure to the extensive use of advertisement, direct marketing or sales promotion. Therefore the wide availability of information makes a significant difference for the evaluation of products, selection of the product or decision making from the customer perspective. Therefore only by using the traditional marketing strategies were not enough to understand and study consumer behavior. In order to gain the competitive advantage and to sustain and grow in the intensified competitive market, market researchers began to work with the neuroscience. The application of neuroscience techniques helps the market researchers to understand and analyze various human activities which are related with the attitude formation, perception, learning or memory. The combination of neuroscience and traditional marketing strategies can give the result of studying consumer behavior which are more effective and efficient. This paper aims to do a systematic literature review from some of the National and International research papers in order to understand what kind of application of neuroscience has been done till date and what can be done in future.

Introduction

Neuromarketing deals with the fields of neuroscience, psychology and combines them with the marketing. Learning and solving problems is a biggest factor in the case of marketing strategies. Marketing strategies are basically formulated by understanding and analyzing the consumer behavior. By combining the advanced neurology techniques with the traditional and conventional marketing strategies, a better understanding and view of the consumer behavior can be achieved.

With the help of the scientific knowledge, Neuromarketing combines the fields of neuroscience, psychology and marketing. In order to gather knowledge in various areas such as learning, memory, impact of internal and external environment in brain's activities, information processing etc. Neuroscience can reveal the interdisciplinary side of the marketing strategies and consumer behavior. Neuroscience gives deep understanding about the complex information processing and thought process such as selection, decision making, reasoning, attitude, emotion and memory which has a great impact on marketing management. It has a great impact on various topics such as segmentation, targeting, positioning, brand equity, brand loyalty etc. Consumer perception and selection is also influenced by the above mentioned factors.

Both in the academic as well as corporate context, it can be observed that the application of neuroscience combining with the traditional marketing strategies has given an excellent result in the fields of consumer behavior and branding or brand management over the last few years. Even there is a significant increase in the instances, where neuroscience has been applied in the traditional marketing strategies. The advancement in the study of understanding human brain activities have enabled the development of innovative models and techniques for understanding the consumers' unconscious experiences.

There are various techniques have introduced in the neuroscience such as neuroimaging, functional magnetic resonance imaging (fMRI), eye tracker, EEG, EDA etc. These scientific techniques can give very minute details such as producing the images of the structure or the functioning of neurons. Through neuroimaging, researchers are able to directly observe brain activities while individuals engage in several mental tasks, that is, images of the consumers' brains are registered and the areas of the mind that are activated when people are exposed to brands, images, videos, products or advertisements are identified.

It is very important to understand and analyze the perception and unconscious responses of the consumers in order to understand their preferences, choice and selections. Neuroscience techniques enable the market researchers to understand and analyze the consumers' thoughts and experiences and thus to understand the entire decision making process of the consumers. And thus these techniques can improve the efficiency and efficacy of the traditional marketing research methods and their approaches such as qualitative, quantitative or both. Combining these techniques with the traditional marketing strategies the marketing methods can be improved or even the traditional marketing methods such as qualitative research methods, interviews and questionnaires can be substituted. The traditional marketing methods can give flaws or errors as the consumers may not express their emotions and feelings in rational manner. Neuroscience techniques are already being used in the strategy formulation by many of the companies.

Considering all the aspects regarding the use of Neuromarketing, this study aims to perform a systematic literature review in order to identify the work and progresses done in the field of Neuromarketing. Since, new horizons are coming up which allow the understanding of consumer behavior from the perspective of thoughts, ideas, perception, attitude, learning, memory, emotions, expectations, the application of neuroscience enables the market researchers to analyze the relationship among neuronal functions, brain structure, brain activities and human behavior. Thus Neuromarketing widens the way for innovative strategy inclusion in the marketing studies. After this brief introduction to the subject focused in this research, the method used in this systematic literature review is presented. Then, the fields and the area of research for the application of neuroscience has been discussed further.

Objectives:

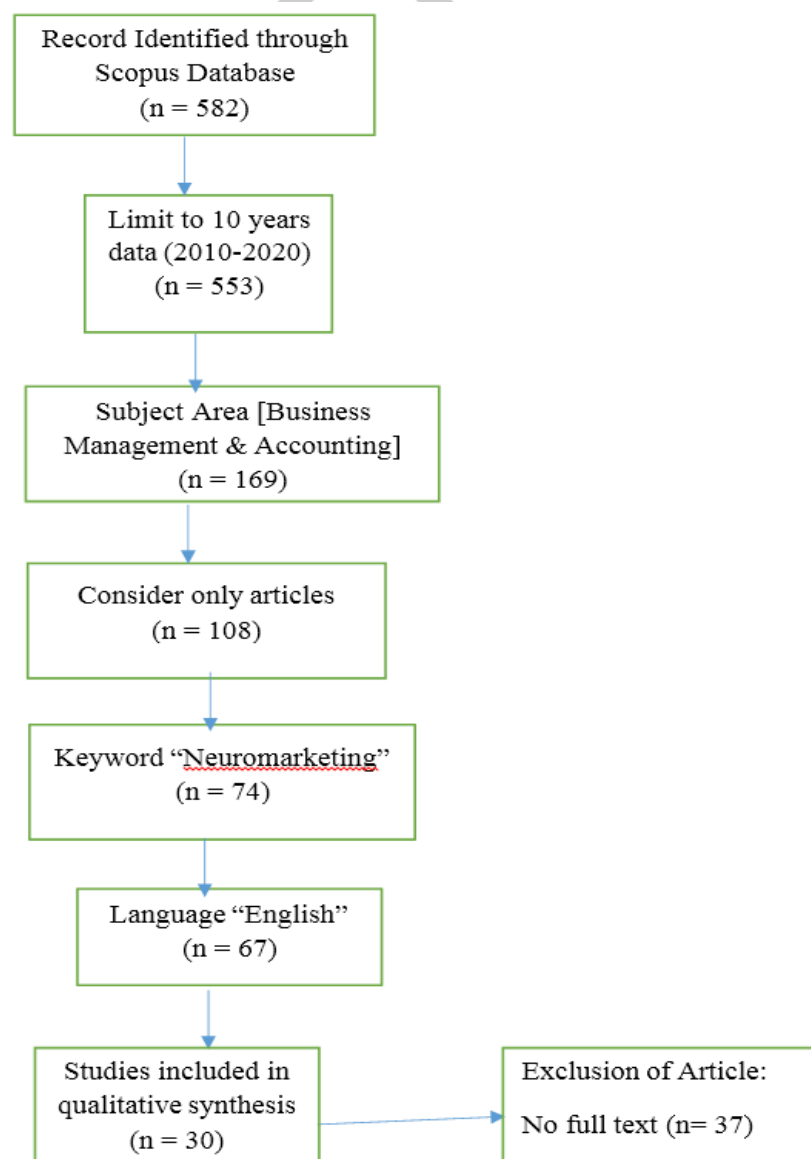
The main objectives for this systematic literature review can be framed as below-

1. To identify the areas at which the Neuromarketing techniques have been applied
2. To identify the different methodologies used by different researchers in carrying out the study of Neuromarketing as well as the various methodologies used in the application of Neuromarketing
3. To identify the industries and countries where Neuromarketing has been applied in a wider manner

Methodology:

For this study only SCOPUS database is used. A Boolean operator {neuromarketing OR “neuro marketing”} in SCOPUS returns with 582 results if the search is restricted to the field “article titles, abstracts and keyword”. In this study time frame is limited from 2010 to 2020 and thus the articles numbers have become 553. Then the subject area has been restricted to “Business Management & Accounting” and 169 articles have founded as the resultant. Then after excluding conference papers, book chapters, review papers i.e. by selecting only articles the number has become 108. Again by applying the keyword “neuromarketing” the article number reduced to 74 and by selecting the language English, the article number becomes 67.

PRISMA Framework:



Literature review:

Cognitive process and unconscious emotional attributes can affect consumer thoughts and actions. Nature of emotional responses differ and vary from consumer to consumer; as they are having specific behavioral choices and preferences. Interaction with several events and stimulus can impact the consumer selection and preference. Different consumption pattern and effect between stimulus types can be the important factors in case of determining the cognitive load. By identifying different cognitive and general emotions between the channels through which subjects are presented to the consumers, it can be observed that in some cases words can generate higher cognitive load and associate than images and videos can generate higher emotional responses. Various emotions such as memory, attention, perception and physical actions (either physiologically or linguistically). An assumption can also be formed that there might be a preferential link exist between the formation of mental imagery and memory (Michael et al., 2019). Even a question can also arise that whether Neuroscience has impact on various factors on the industry, as it has been projected. A matter of concern over the application of neuroscience in markets is the time and cost. To get an answer of a specific instance after the application of neuroscience, is quite time consuming and the cost of the application of neuroscience might not appear as feasible in most of the cases (McDowell & Dick, 2013). Even resolving the complex situations and application of neuroscience in day to day circumstances and situations in a market might not be feasible and cost advantageous from the commercial market perspective. Therefore it can come up as a concern that if neuromarketing has to compete with the traditional marketing strategies from the commercial market prospective, it should be more feasible by reducing the labor and overhead cost (Spence, 2019).

There is an associative link between the consumer behavior and recalling the past memory and experience (direct, indirect or both). The recalling of the past memory and experience can be varied depending upon the mentioning rate. This can be helpful in the application of the neuroscience in various fields. Use of pictures can be an important element in case of recalling any event or subject, even if the content of the picture is different from the previous one, which has been seen by the consumer previously, but the title and the frame of the picture can help to recall the subject associated with the picture. Use of colors can increase the rate of recalling the specific subject and even the position of the content in the webpage can influence the viewing pattern and recalling of a consumer (Monica et al., 2019). Branding is one of the most important factors for the business firms in order to sustain and grow in the ever changing and intensely competitive market and neuromarketing can play an important role in the establishment of a successful brand. Neuroscience can impact the cognitive processing to a great extent and can add value to the brand in order to make successful brand (Venkatraman et al., 2012) strategies. Cognitive processing and emotional dimensions are of great importance in case of selection and decision making regarding the brands through stimuli memorization, processing and evaluation. Application of neuroscience can help the marketers to evaluate various elements of the brands that can add value to the brand in order to gain the competitive advantage (González-Morales et al., 2020). Persuasive messages impact the consumer attitude and formation of attitude to a great extent. If a message can be communicated through a cognitive approach then it can be observed that the message has a long lasting approach on the mind of the consumer. Various attributes such as perception, liking, trust, gender gap, retention, facial expression, retention and trust; can be analyzed in order to understand the impact of persuasive messages on the attitude and behavior. It can also be observed that there is a significant difference in the attitude and behavior formatted by cognitive story and affected story. Therefore, by analyzing various tools such as galvanic skin responses, facial expression, eye tracking and biometric data; it can be observed by the mapping and area of interest that cognitive approach of a message has a long lasting impact on the attitude and behavior of the consumer (Hamelin et al., 2020). Advertising plays an important role in gaining and retention the customer base and to analyze what kind of advertisement can attract new customer base and retain the existing customer base, marketers apply neuroscience to study various aspects from customer perspectives. But an important question can arise in this circumstance that whether there is any legal implication in case of using neuroscience in advertising where the marketers get the exposure to various attributes of customer as well as to analyze and use those attributes in the commercial purpose. Although it can be said that due to the strict impose of regulations, advertisers have become more creative and cautious regarding the communication and message which is being transmitted to the audiences (Brierley et al., 2020).

In order to sustain in the ever changing and intensified competitive market, it is important to understand how neuro marketing tools can be used effectively and efficiently in order to improve the sustainability factors of a business firm. Eye tracker and electroencephalography tools can give better results in case of analyzing and interpretation of the consumers' actions and behaviors than the traditional marketing methods such as survey method. By using these tools, the marketers can also analyze that how various product attributes such as labeling, packaging, graphics, image, size, shape etc can influence the purchase decision of the consumers. Besides that, from the perspective of stakeholders, it can also be used by marketing managers to understand the brain mechanisms which are related to the consumption pattern of the consumers' in order to formulate the strategies for new product development as well as for sustainable decision making (Pagan et al., 2020). Market research is the most important factor for any brand (weak or strong); and without a proper market research no brand can enter into the target segment. Application of neuroscience can add value to any brand, but the main concern is that whether the application of the neuroscience is feasible as compared to that of the traditional and conventional market research methods. Although there is a significant impact of neuroscience in the selection and decision making of consumer, but as compared to the conventional marketing research methods, it is way more expensive. By the application of neuroscience, it might be possible that marketers will get access to the hidden data about the customer's preference and choices, but it is not cost effective for many of the marketers (Meyerding & Mehlhose, 2020).

Advertisement is one of the most effective mediums through which the marketers can communicate the message about the subject to the target customer. But the elements of the advertisements that is content, language should be organized and presented in the most effective way in order to the effective and efficient transmission of the message. It can be observed that psychological elements, linguistic elements and most importantly the application of the neuroscience in the advertisement can make the storytelling more effective and efficient. In order to create a long lasting impact on the target customer base, the marketers need to enhance the effectiveness of the content of the advertisement by applying the neuroscience elements effectively and efficiently (Kılıç & Yolbulan

Okan, 2020). Social advertising including public service messages has a great impact on the mind of the consumers. Therefore it can be a significant question that whether we can combine neuroscience with traditional marketing methods and quantitative approach to increase the effectiveness of the advertisement containing social message. By using different research tools where neuroscience can be applied, such as focus group discussion or EEG or fMRI or MEG, researchers can understand better the consumer brain activities and interpret those activities and analyze them so that the attitude and the perception of consumers towards any specific advertisements can be studied and formulate strategies accordingly so that the efficiency and effectiveness can be improved. Although it has been observed that different tools provide different results as there are various procedure of analyzing and interpreting the data based on the variety of the research tools (**Gountas et al., 2019**).

Marketing communication plays an important role in transmitting the message and information about the subject to the consumer. The marketing communication can be of any form; it can be advertising, sales promotion, direct marketing etc. The marketing communication is formulated depending upon the choice and preference of the product or services of the consumer. For example, the mindset of the consumer is now-a-days is changing towards the healthy and nutritious food products. But in reality it might be possible that although the customer base is interested in knowing about the healthy products but in real scenario they are not actually buying the product. Therefore it has become the matter of concern that strategies can be made where neuroscience can be applied in order to understand the mindset of the consumer and thus formulate the strategies so that the marketing communication can be made in such a way that it can attract the customer base towards a specific product where may be the consumption rate is low (**Grandi et al., 2019**). Consumer behavior is one of the most important factors in product selection and decision making of the consumers. Marketers want to gain new customer base and retain the existing customer base by enhancing the product experience. Now the main concern can be whether it is possible to determine the responses and neural mechanisms in prior with the help of neuroscience. With the help of neuroscience application it might be possible to determine and analyze in advance that if a consumer has an individual preference regarding a specific brand then whether it can impact the brain activity during the product experience and tasting. Again there can be impact of external environment also in the product experience and thus it can affect the cognition process and decision making of the consumer which can be dependent upon the product experience (**Alvino et al., 2019**).

Music and image used in the advertisement are one of the most important factors of brand recall. In this case, if sensory marketing can be combined with neuroscience, that the results can be more efficient and effective; as sensory marketing is about how the five senses of human being can be used in marketing of a brand, product or service. And if with the application of neuroscience, the preference and choices of consumers can be analyzed in prior, then with the help of sensory marketing the strategies can be formulated in such a way so that it can be linked with the successful brand recall (**Levrini et al., 2019**). There exists a strong association between stimulus and preference and choice of the consumers and the sensory attributes can be analyzed by the application of neuroscience. In some cases the stimulus can have impact on the brain activity and thus influence the decision making of the target consumer base. The combination of the sensory attributes and neuroscience can be a game changer for the marketers to make a sustainable strategy (**Hsu & Chen, 2019**).

Although application of neuroscience is not feasible by all the firms due to the cost, time and feasibility; moreover the concern about the data privacy is still prevalent in case of neuroscience. But the application of neuroscience gives the marketers a huge opportunity for a deep analysis of the consumer reaction towards image or sound to both subsequently. And based upon this marketers may formulate more effective and efficient strategies so that more appealing brands can be delivered to the right customer at the right time and at a right value. By integrating neuromarketing, survey and qualitative techniques, companies can triangulate and uncover unprecedented consumer insights business performance (**Sung et al., 2019**). Marketing strategies and plans are formulated on the basis of customer's needs, wants and desires. With the application of neuroscience, marketers can understand and analyze the various emotional attributes of the mind of the consumer. Based upon the analysis, the marketers can formulate the strategies for market segmentation, targeting and positioning which in turn helps the brand to be successful and to sustain in the market (**Malarvizhi & Kumar, 2019**).

Till date marketers try to understand and analyze the attributes of the consumers which can either be quantified or can be seen or understood. But in today's mostly intensified competitive market, to sustain and grow in this market; it is important to analyze consumer behavior and attributes more deeply. And this can be done by with the application of neuroscience combined with the traditional marketing strategies. Neuroscience can overcome the problems which arises when the consumers exhibit similar appearance or behavior. Neuromarketing is able to distinguish the processes that may appear identical, or broadly similar, using insights to the brain and reactions (**Lim, 2018a**). There is a significant difference between the strategy formulation of B2B and B2C marketing. Even the application of neuroscience in the strategy formulation for both B2B and B2C marketing is way different from each other as the customer base, type of marketing and relationship marketing, is different from each other. Although it has been observed that in case of B2B marketing; when neuroscience is combined with psychology and traditional marketing methods that can enhance the result of the strategy formulation. Thus with the help of the application of neuroscience in case of strategy formulation of B2B marketing; the barriers and the frontiers for the B2B marketing can be understood and analyzed by the marketers (**Lim, 2018b**).

In some of the cases our day to day events can also work as a stimuli and can impact the decision making of the consumer, such as popular movie with destination marketing content can impact the emotional information processing of the consumer. This responses can be very fast or unconscious, therefore a proper analysis with the help of application of neuroscience can help the markets to formulate the strategy and to make a long lasting impact on the consumer mind. Thus with the proper application of the neuroscience, the marketers can impact the selection and purchase decision of the consumers (**Bastiaansen et al., 2018**). Application of neuroscience basically paves the way for the traditional marketing methods to increase the efficiency and effectiveness of an advertisement. By applying current concepts and techniques of neuroscience and combining them with the previous ones, results into the best option for the advertisement agencies and marketers and enhances the credibility and strengthens the existing message of the brand (**Daugherty et al., 2018**).

By neuroscientific techniques it can be assessed that to what extent communication between the firms, marketers and consumers can be effective. On the other hand, if the required level of the attention can be increased, then it can lead to the increase effectiveness in terms of brand recognition and brand recall. Understanding and analyzing the customer base with the help of the neuroscience can make a brand sustain and grow in the market (Nijhof, Andre HJ Jeurissen, 2017). In neuromarketing strategy, the impact of high and low emotion advertisement on attitude is quite visible; high emotional advertisement linked with more stable changes in attitude than low emotional advertisement. Changes in technology can lead to more efficiency than the traditional technology (Hamelin et al., 2017).

Celebrity brand endorsement plays the role of one of the most important factors in case of brand recognition and brand recall. Although in some cases, the gender factor and even the celebrity associative image with the brand become the matter of concern, but in order to build a sustainable brand, application of neuroscience to understand the mindset of the consumer is a big game changer (Nijhof, Andre HJ Jeurissen, 2017). Emotion plays an important role in case of human cognitive process. There is a significant difference between the upward and downward communication and their impact in the human cognitive process. It can also be observed that human thoughts and actions are controlled by the emotions but human thoughts and actions cannot control the emotions. But research is going on the concept that whether the emotions can be controlled to some extent that is whether cognitive control of emotion is possible or not. Again it has been observed that emotional message can develop a strong and long lasting attitude and behavioral change. Marketers can combine the neuroscience techniques such as analysis of facial expression with the traditional marketing methods in order to understand and predict the efficiency even before launching the brand (Hamelin et al., 2017).

There is a significant difference between the brain activities when the consumer gets exposure to an attractive apparel as compared to that when the consumer gets exposure to an unattractive apparel. But again it is a matter of concern that if we apply neuroscience then it might be not that much feasible from the perspective of cost and time. Again if the traditional marketing methods are considered then to measure a consumer's emotion, the self-assessment method is valid, easy, and low cost. But the traditional marketing methods might not produce an error free result or it can be said that the traditional marketing methods deep understanding and analysis might not be present as compared to that of the neuroscience approaches (Touchette & Lee, 2017). Consumer information processing is of utmost importance in case of brand recognition and brand recall. It can be observed that if traditional marketing research methods can be combined with the neuroscience approaches, then it will be more efficient and effective. For marketing research and brand management, this field of consumer neuroscience can help to acquire new information about the psychology of branding and lay the foundation for new explorations in this field (Al-Kwafi, 2016).

Again it is a matter of concern that whether to use neuroscience in present scenario by all the firms, is feasible. But the application of neuromarketing can give a better understanding and deep analysis of the activities and thought processing of the human mind. Also the combination of the traditional marketing methods and neuroscience can give more efficient and effective results as compared to when the traditional market research methods are using individually in case of providing a better understanding of the human brain activity (Cruz et al., 2016). Neuromarketing has emerged as an applied field which may transform traditional marketing research by means of various neuroimaging tools. Since many details about this emergent application are unclear, the use of neuroimaging technologies in the marketing field has not been scientifically and ethically (Stanton et al., 2017) convincing yet, in the light of human health and welfare (Ulman et al., 2015).

Problem solving is one of the most important factors of consumer's decision making process and selection. The matter of concern is that whether neural measures could make a valuable and significant contribution to the prediction of individual choice behavior and population wide commercial success. Even it can be observed that the advertisements or the trailers of a movie can impact the preference or selection of the consumers to a great extent. Therefore marketers try to understand and analyze the customer's attitude and perception even before launching and providing the product to the customers (Hill & Turner, 2014).

Analysis:

Bibliometric analysis and citation analysis have become one of the important methods of Systematic literature review. No such studies have used bibliometric analysis to analyze the conceptual structure of the topic. VOSviewer software is used for Co citation analysis in this research.

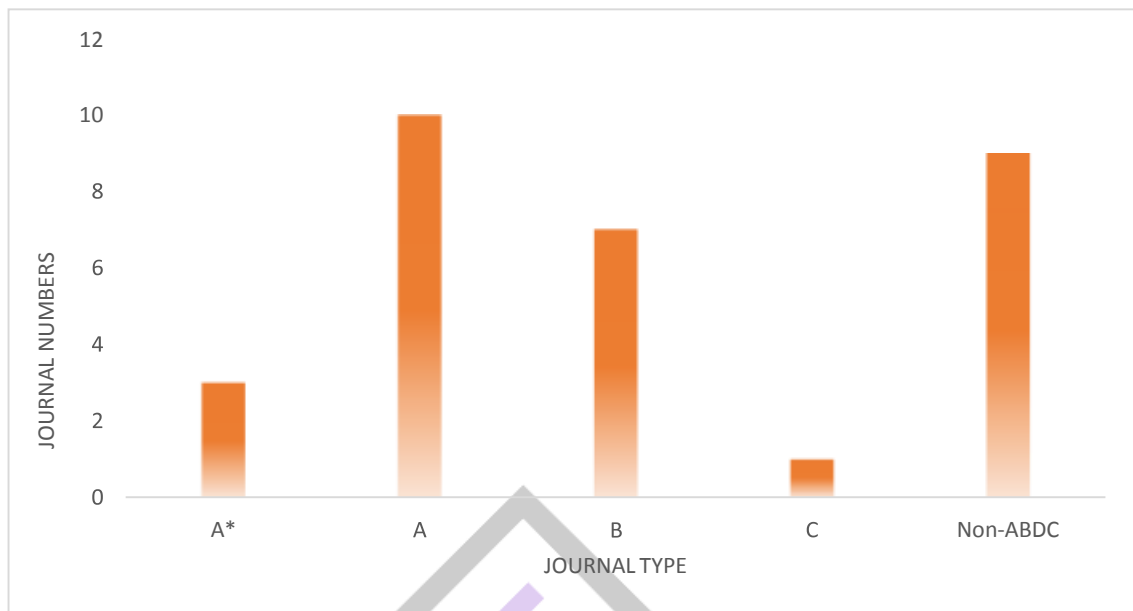


Table 1

Table 1 represents the journal types and the number of journals which are rated in ABDC publications (that is A*, A, B and C); as well as the number of journals which are non-ABDC.

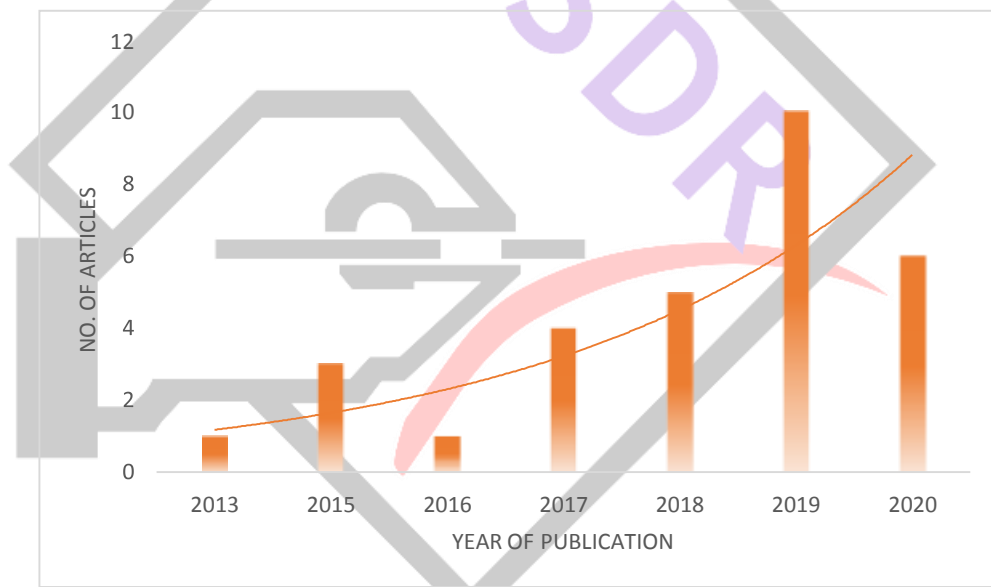


Table 2

Table 2 represents the number of articles published year wise and the time frame is taken in the graph is from 2013-2020

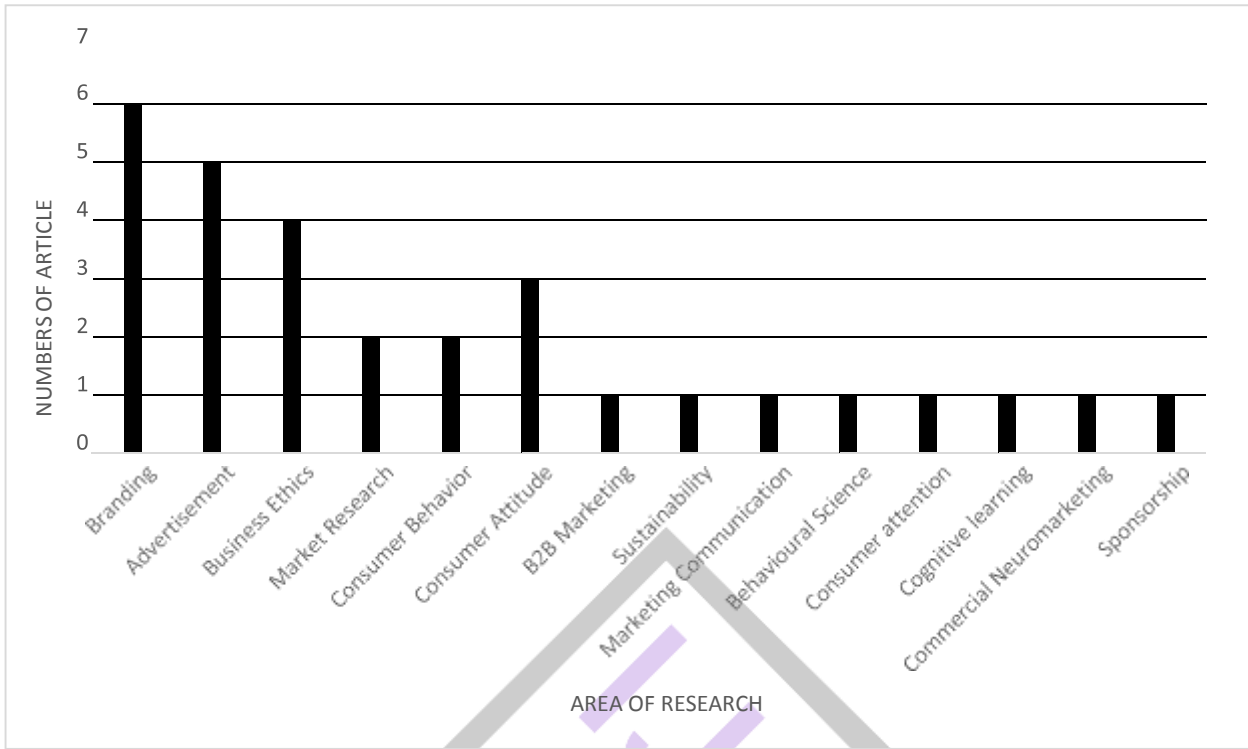


Table 3

Table 3 represents number of articles focusing on the research areas such as Branding, Advertisement, Business Ethics, Market Research, Consumer Behavior, Consumer Attitude, B2B Marketing, Sustainability, Marketing Communication, Behavioral Science, Consumer Attention, Cognitive learning, Commercial neuromarketing and sponsorship

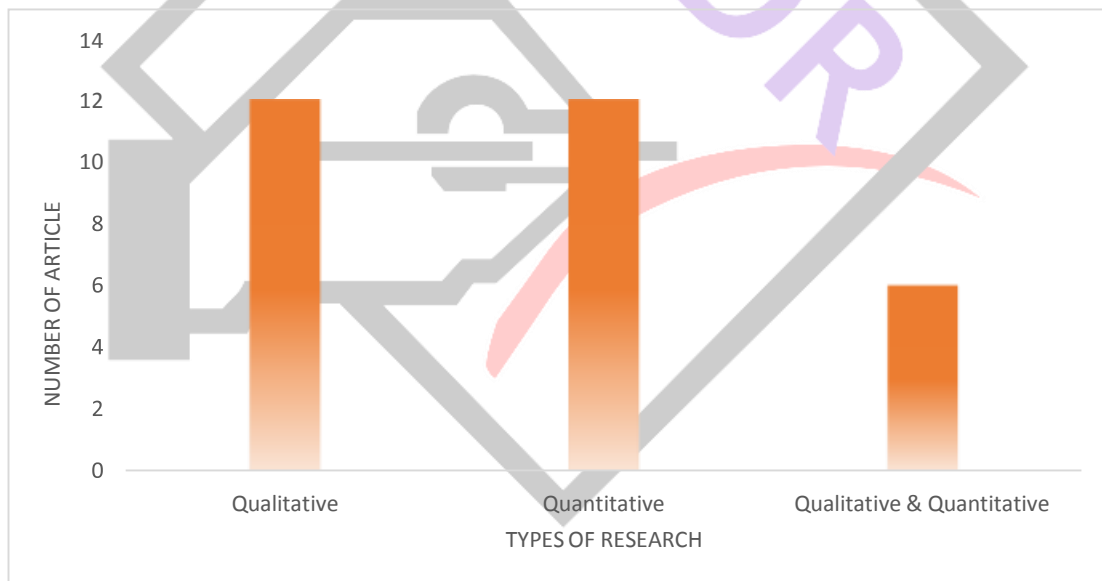


Table 4

Table 4 represents the number of articles using the various types of research that is Qualitative, Quantitative or both Qualitative and Quantitative.

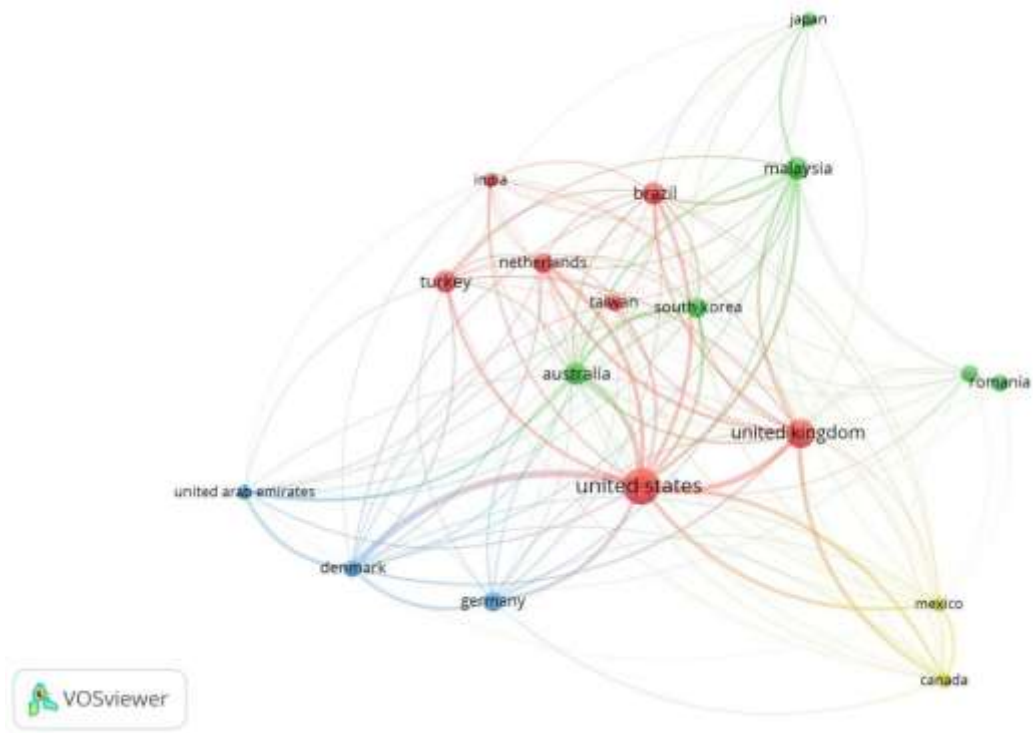


Fig 1

Fig 1 represents the Bibliographic Coupling of the countries where the research work of the Neuromarketing has been done (as mentioned in the selected articles)

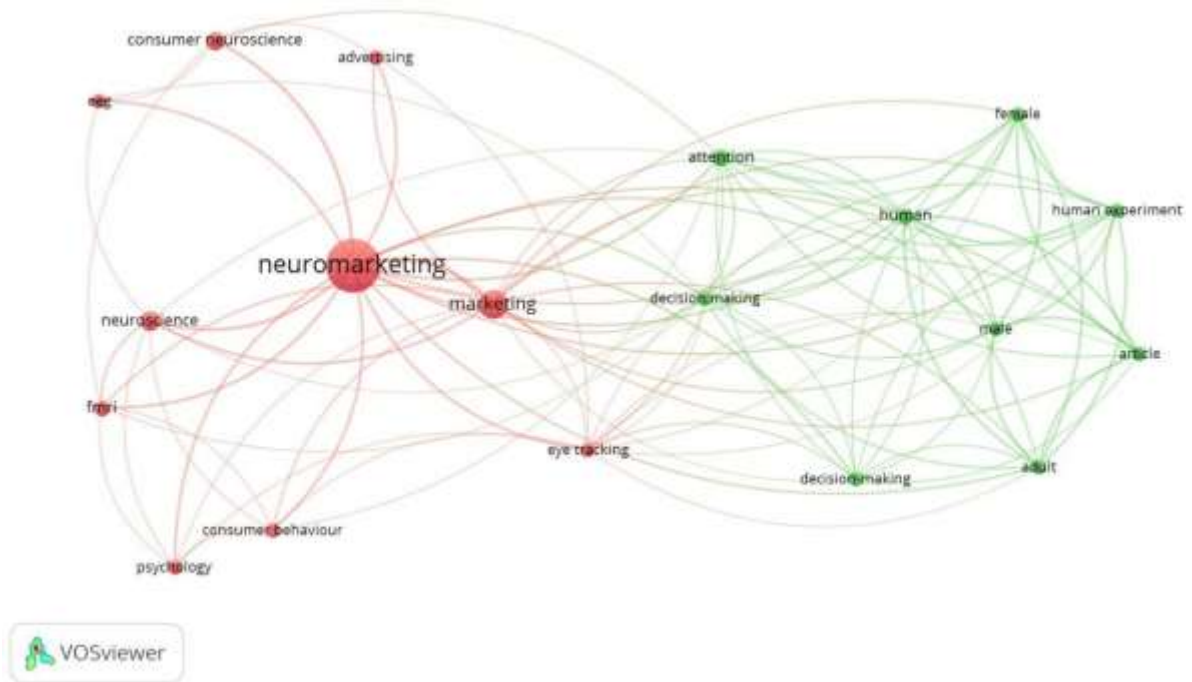


Fig 2

Fig 2 represents the Co-occurrences of the Keyword (as mentioned in the selected articles)

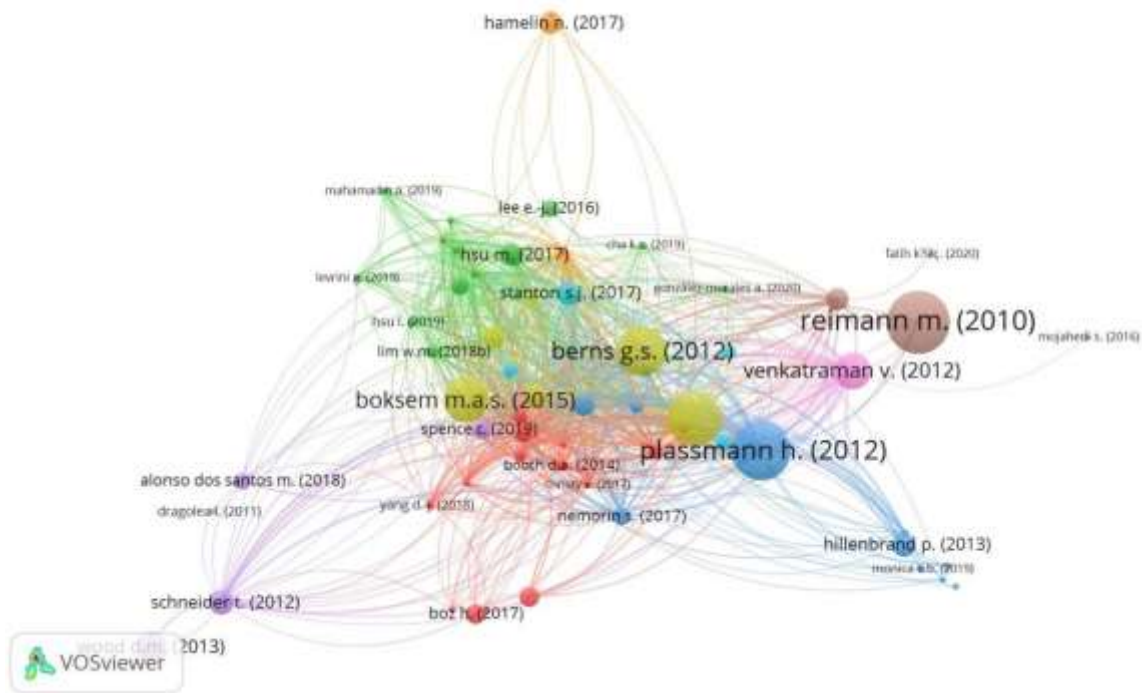


Fig 3

Fig 3 represents the Bibliographic coupling of the Authors (as mentioned in the selected articles)

Research Gap:

From the literature review, it can be observed that still there are few fields where the extensive research is not still happened. There are path breaking technologies in Neuromarketing such asfMRI, EEG, EDA etc. , but it might not be possible to apply those in day to day activities of a business firm due to the time and cost factors. Therefore a research can be taken up in future inorder to make this application field more feasible so that by applying neuroscience the businessfirms can improve the efficiency and efficacy of the business firms.

On the other hand there has been an extensive research and application of neuroscience in the Western countries as compared to that of the Asian countries. Therefore an extensive researchcan be carried out in order to find the ways and the applicability of the Neuromarketing in the business industry of the Asian markets. Neuromarketing has already been used by many of the industries, and there are various future scope of research in this field to make it one of the mostimportant factors of the strategy formulation.

Discussion:

It can be observed from the literature review that, Neuromarketing has been applied in many of the industries, especially, in branding and brand management. It is a matter of fact that Neuroscience techniques are widely used in the understanding the human brain activities. Neuromarketing has paved the way for new dimensions in the study of consumer behavior. The application of the neuroscience techniques are giving exposure to the hidden date related to consumer perception, memory, attitude, learning and responses. This hidden information is not always accessible and understandable to the market researchers if they are using only the traditional market research methods. But with the application of the neuroscience in the marketingmanagement studies, it is possible to understand and analyze the human brain activities to very minute details such as the image formation in the brain or relationship of neurons with the consumer choice and selection. Even it can be found out that several stimuli such as advertisement,movie trailers; a certain point of time or some specific activities can influence the consumer behavior. And by using various neuroscience techniques such as eye tracker, fMRI, EGE, EDA etc. can analyze the stimulus in order to understand how they can influence the consumer behaviorand how to use them in order to influence consumer preference, selection and decision making.

Although there is a matter of concern about the ethical implication in the application of the neuroscience in marketing strategies. As the consumers unconscious emotions are exposed to themarket researchers and they are widely used in order to use in improving the efficiency and efficacy of a marketing strategy. The ethical and legal implications are one of the most importantfactors which can be proved as an obstacle in the uprising of Neuromarketing. Apart from the ethical and legal issues, the feasibility of using Neuromarketing by all the business firms is quite questionable. Since, the application of the neuroscience techniques is very costly as well as it is time consuming to receive, analyze and understand the results generated by the techniques. And itis still way far for using in the day to day activities by the business firms as compared to that of the traditional marketing strategies.

Although there are ethical implications and feasibility issues regarding the application of the neuroscience in marketing management, but it can definitely be said that the future researches in neuroscience field will enable the market researchers to widen the way for new and innovative marketing strategies which will be of utmost importance to sustain and grow in the most intensifiedmarket.

Limitation:

Although, this paper has tried to highlight the areas where Neuromarketing has been applied and tried to discuss about the research gap and the future scope in this field, there has been a limitation of this systematic literature review, which is the articles has been collected from the “Scopus” database only.

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