

SCOPE AND IMPACT OF NEUROMARKETING IN LOGISTICS

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Summary

Neuromarketing, an advanced marketing technology, still faces many challenges even if it has higher potential than conventional marketing methods. This article analyses the scope and impact of neuromarketing in logistics by discussing its application, benefits, challenges, and solutions. The article finds that the benefit of neuromarketing technologies can multiply by using it with conventional methods and also applying the combined technologies. The article discussed the wide scope of neuromarketing in logistics by researching much scientific literature and research. The application of neuromarketing is highly expensive as many companies are in financial crisis at the time of machine installation of neuromarketing. This can be overcome by outsourcing the work and the proper execution of neuromarketing can multiply companies' profit and it will cause business enlargement too. Yet many companies are still using conventional marketing methods because of the lack of knowledge. This article narrates the scope and impact of neuromarketing in logistics in all aspects.

Keywords: neuromarketing, logistics, neuromarketing research, neuromarketing technologies, challenges, solutions.

Introduction

Customer relation is one of the key components of the logistics business. We have been researching and experimenting with several tools to boost better customer relationships. After the Covid pandemic, the urge to use advanced technologies also increased in the logistics business, especially in the area of customer satisfaction. Neuromarketing is not a new one in the logistics field as the algorithm index of the world's leading search engine of the internet, Google indicates a notable increase in the public interest in general about the subject from close to zero in 2004 to 100 in 2014 (<http://www.google.com.br/trends>). Even though it has significance among marketing technologies, there are disadvantages when comparing it with traditional marketing technologies. On the other hand, proper research and execution of neuromarketing in logistics can result in profit maximisation and business enlargement by scientifically understanding the consumer's mindset.

Logistics has undergone numerous innovations over the years and neuromarketing is the best among them which incorporates its futuristic goals along with new trends. As per mentioned, neuromarketing or consumer neuroscience is applied to analyse and understand human behaviour related to markets and marketing exchanges (Babiloni, 2012). Neuromarketing can be very useful in improving logistics by unifying and adding new and innovative features to it.

Research aim: to analyse the scope and impact of neuromarketing with the use of combined techniques in logistics, along with how combined techniques can be incorporated in neuromarketing to achieve the maximum output in logistics.

The following **objectives** have been set to achieve the aim:

1. To summarise the theoretical aspects of applying neuromarketing in logistics.
2. To explain the scope of neuromarketing in all aspects.
3. To identify the challenges that influence the application of neuromarketing in logistics.
4. To suggest possible solutions for the improvement of neuromarketing studies and logistic business.

Research object and methods

The object of the research: neuromarketing in logistics.

The research examines the scope and impact of neuromarketing in logistics, by reviewing the available scientific literature and international studies. The data were fetched by doing online research for studies and articles in ResearchGate and Google Scholar. There are plenty of research available online about the research data. Although, it was hard to find the proper research that helps in analysing the impact of neuromarketing in logistics. The methodology used in this study was to gather qualitative data by analysing existing documents and theoretically approaching the research object, so literature analysis and synthesis methods were applied.

Research results and discussion

Neuromarketing, an interdisciplinary field of science that uses different tools traditionally used in medicine, psychiatry, and psychology on neurofeedback, biofeedback, and metabolic processes measures, in conjunction with traditional marketing tools in the search to understand better the most diverse types of emotions, cognitions, physiological

reactions, behaviours and thoughts of economic agents, both conscious and unconscious related to typical issues of marketing and its various sub-areas (Henrique, 2017). Recently advertising and marketing professionals are using this advanced technology instead of conventional marketing technologies such as market research, surveys, and focus groups. The traditional marketing methods didn't give an exact idea of a person's real feelings about a product or service. These are only "articulated answers" and it is also hard to explain one's emotions precisely.

However, companies are still spending vast amounts of investment on it. The traditional methods for checking and predicting the effectiveness of this investment have commonly failed because it depends on customers' willingness and competency to narrate how they feel when they are exposed to an advertisement (Morin, 2011). The traditional marketing methods of logistics are focusing on customers' conscious minds to get their unconscious reactions. There were no huge developments in logistics by deploying these marketing strategies. This was not effective. Along with the development of technologies new strategies like neuromarketing also evolved. Employment of these strategies leads to extracting the reactions directly from the mind of consumers. This led to the realisation that neuroscientific research and implementation of neuromarketing in logistics can offer a giant leap in its accomplishment of marketing and has multiple benefits.

Neuromarketing as a business strategy in logistics

By using neuromarketing as a business strategy in logistics, we can observe and analyse customers' minds and find the way how people make decisions. Logistics companies create unique strategies by applying neuromarketing and execute those strategies effectively. That is, companies will get accurate information and they use this as a powerful tool to form their strategy in a more focused manner.

Companies should make strategies that can fulfil the needs and expectations of customers. Then only they get potential clients in the current scenario which is highly competitive. There are many logistics companies out there and it is very hard to hold the current clients and attract new clients in such a vying environment. By the application of neuromarketing techniques, businesses may strengthen their relationship with clients by tapping into their emotions and irrational ideas about their goods and services (Jayavardhan & Nisha, 2023). That's why it is focused on more objective information rather than subjective one. Therefore neuromarketing collects customer needs by creating less uncertainty. So, this valuable move enables the logistics business to create more innovative and developing marketing strategies that are also refined better.

The aim of neuroscientific methods (from cognitive neuroscience) is to comprehend how brain activity regulates consumer behaviours like decision-making and cognition. The mechanisms behind a variety of brain functions, including pleasantness (approach and withdrawal motivation), memory, attention, and the reward process, in addition to the significant aforementioned emotional processing, may be understood using these methodologies (Sorrentino et al., 2023). These techniques can be used in the logistics business as marketers can combine conventional marketing techniques with the opportunities provided by neuroscientific research.

Comprehensive knowledge and rational strategies are required to work on the information that is considered in decision-making. EEG signals, for example, are a qualitative capability of neuromarketing that favours prediction and aids in decision-making. By utilising these neuromarketing techniques, the marketing industry has been able to observe the influence of stimulus content on preference as well as the relationship between brain electrical activity and client decision regarding the product (Golnar-Nik, 2019). So, logistics companies understand the complexity of decision-making and research their targeted consumers' emotions, situational aspects, and the information resources available to those customers. It is all surrounded by the consumers' brain and not only the neuromarketing tools can't maximise the logistics business. That is neuromarketing is not only limited to neuroimaging techniques but also used neuroscience and cognitive science which can multiply behavioural processes.

Scope of neuromarketing techniques in logistics

In logistics, neuromarketing techniques are not restricted only to the brain or to the body's central nervous system. We can apply all the advantages of neuroscience's diversity and it has a wide scope in the area of logistics. The diversity can be reflected in logistics: from the physiological aspects to the understanding of cognitive processes. Here physiological aspects mean perspiration, hormonal and neurotransmitter changes, skin's electrical conductivity, muscle movements, and movement and dilation of the pupil. The complex cognitive aspects mean the functional activity of the brain's specific regions. That is the analysis of various markers such as cerebral metabolism, blood flow, and electrical waves. There is a connection between neuroscience and marketing and this bond allows these techniques to strengthen their applicability which will help to solve various problems that are not responded to or partially responded to by conventional marketing techniques (Vargas-Hernandez, 2014).

Another important scope of the neuromarketing technique is valuable in all aspects. Because many sectors or various areas are developing or getting the benefits. Neuromarketing research and studies have a great impact on both academia and business. Considering the logistics business, both the companies and customers are getting benefits through the application of neuromarketing. Neuromarketing researchers such as Lindstrom (2009a, 2009b) and Dooley (2010) explained various benefits getting from these techniques by consumers and organisations. While applying the neuromarketing techniques to logistics, consumers' true opinions will get the perfect value at the beginning stage of the logistics process itself. Their decisions may be facilitated rather than manipulated. On the other hand, logistics businesses are getting various valuable benefits from this. Logistics companies can save a notable amount of their budgets which have been spent on ineffective and inefficient campaigns. By using these techniques, logistics businesses can ensure greater competitiveness and improvements to customers.

To obtain maximum results with neuromarketing technologies, it is preferable to use combined techniques whenever possible. Logistics businesses can use various techniques and the main neuromarketing techniques are:

- **Functional magnetic resonance imaging (fMRI):** with high spatial resolution this technique measures deeper and smaller structures of the brain. It is most commonly used with electroencephalography and it is the most employed technique that measures brain activity in the neural science field. The technique is expensive and the equipment is not portable though. In addition, it will take 6 to 10 seconds to record the processing of neurons. That is, it constitutes low temporal resolution and it is the great disadvantage of this technique (Ariely & Berns, 2011).
- **Electroencephalography (EEG):** in EEG, there are electrodes that can measure the brain waves related to various stimuli on an individual's scalp through bands or helmets. The waves from these bands can measure small intervals up to 10,000 times per second (Morin, 2011). Moreover, it is less invasive, cheaper, being more available, it gives more validate the measurement of emotional styles and the detection of psychopathologies (Yadava, 2017). The equipment is portable too. Yet, this technique has the disadvantage that EEG only records superficial electrical signals and it can't present deeper brain structures. Compared to fMRI, EEG has high temporal resolution and low spatial resolution.
- **Magnetoencephalography (MEG):** MEG is based on the expansion and mapping of the magnetic field through electrochemical signals and neural activities between neurons. MEG has a great temporal resolution. However, it is spatial resolution and it is not good for measuring subcortical and deeper areas of the brain (Morin, 2011). Unlike EEG, MEG uses hyper-sensitive sensors to measure the electromagnetic field without contact with the scalp. However, MEG is highly expensive.
- **Eye tracking:** Eye tracking helps to measure the focus of the consumer's attention, dilation of pupils, the pattern of visual behaviour of fixations of the gaze, and microfocus. Moreover, the equipment is portable. However, it is hard to understand what emotions are connected with the areas which were the focus of attention. A few data of interest to marketing in relation to eye tracking are the time the subject spends focusing on the object of the study, the areas, the measurement of pupils, and the frequency of observation of users in the stimuli presented (Nenad, 2011).
- **Facial recognition:** Facial recognition or electromyography measure facial muscle movements which are imperceptible to the human eye and it is done through electrodes placed on the mouth muscles and the occipitofrontal and orbicularis muscles. This will help to check the type of emotion: happiness, happiness, sadness, indifference, pain, etc. (Srivastava, 2023). This technique is not largely used in neuromarketing. Its high spatial resolution is a disadvantage. In addition, the electrodes fixed on the face may cause some facial movements and there is also a chance for double meaning of certain expressions. It invalidates the standardisation of single expressions connected with specific emotions.
- **Cardiovascular parameters:** this technique is used to record the blood pressure, heartbeat and its variability, and interaction between heartbeats and pulse transition time to infer the emotions and attention that state the research subjects (Fortunato et al., 2014).
- **The galvanic skin response:** this technique is used to measure the objective excitation caused by an emotionally relevant stimulus. Human's central nervous system is directly connected to their individual hands' reactions and through galvanic skin response, one can get the neural response that presents certain emotions like happiness, fear, anger, disgust, sadness, and indifference (Banks et al., 2012)

Challenges that influence the application of neuromarketing in logistics

Many logistics companies are using neuromarketing techniques in their business and still, the research world is analysing different aspects of neuromarketing both theoretically and practically. There is yet another part of researchers who analyze and point out the challenges of neuromarketing at a practical level. Every technique has its unique advantages and disadvantages. The main challenge is the machines used in these techniques are too expensive and upcoming logistics companies can't afford the neuromarketing techniques in an effective way.

Many researchers still consider neuromarketing technologies as science fiction rather than reality. They believe that it is impossible to find people with identical thoughts as the thoughts and emotions may vary and change according to one's personal experience, values, and character (Hubert, 2010). Neuromarketing has been facing controversy related to its ethical issues. Neuromarketing technologies are reading consumer's minds and many analysts criticised that it is a violation of consumer policy (Fugate, 2007; Hubert & Kenning, 2008; Murphy et al., 2008; Senior & Lee, 2008; Perrachione & Perrachione, 2008; Javor et al., 2013).

In addition, many companies lack a resource person who has much knowledge about neuromarketing. The employees should know every aspect of neuromarketing in logistics and they should approach it scientifically, theoretically, and practically. Another disadvantage of neuromarketing is the lack of credibility of information. The researchers have been analysing for more than 10 years right now and still, there is only a few credible pieces of information available. Besides, studies and analyses based on the application of neuromarketing in logistics are also lacking in the research area.

Possible solutions for the improvement of neuromarketing studies and logistics business

New technologies always face many challenges and limitations at the budding stage. Neuromarketing studies are still at their budding stage and it wants deep analysis and scientific research. Comprehensive studies are essential for the development of neuromarketing applications in logistics. Then only the companies and employees can understand the core idea of neuromarketing which is the future of logistics. Proper research and investment of human resources and funds can lead to the execution of neuromarketing in logistics. It has been discovered that building robust collaborative networks, increasing knowledge through social media, hiring or inviting experts to train staff, providing labs and facilities,

increasing financial resources, complying with laws and regulations, and lowering the cost of tools and experiments will help resolve many problems related to the implementation of neuromarketing (Alsharif, 2023). Besides it is important to update the upcoming technologies such as the combined technologies that can help in business enlargement.

The researchers have had success using artificial neural networks. With the help of it, they were able to produce the simulated values of projected customer purchasing behaviour and calculate the influence of predictors on that behaviour. The researchers claim that brand and marketing managers may utilise this technique to evaluate the success of their marketing initiatives since it is a potent and affordable tool for neuromarketing studies (Ahmed, 2022). Furthermore, giant companies may have an interest in applying neuromarketing in logistics and the expensive side may not affect the company though. These companies can apply the neuromarketing techniques with proper research and proper implementation. In addition, these companies can give these services to budding companies and earn a profit through this. It will also help in profit maximisation. A particular department for neuromarketing in the logistics business can handle all these responsibilities as the data collected from these techniques have great importance and the companies should scientifically keep it safe.

Conclusions

1. The scope and impact of neuromarketing in logistics were identified in this article to achieve the research aim. This article analysed the application of neuromarketing in logistics; where the benefits can be multiplied by combining traditional marketing techniques with the vast opportunities of neuromarketing techniques. This paperwork found the main challenges of implementing the neuromarketing in logistics as i) it is expensive, ii) ethical issues related to customers' privacy and iii) the lack of research person.

2. The aim of this article was achieved by identifying both advantages and disadvantages of neuromarketing and suggesting the solutions for the challenges faced by this advanced technology in logistics. These are achieved by reviewing scientific research and articles. This article suggested the solution for the challenges has faced by neuromarketing researchers as i) use of combined techniques in neuromarketing, ii) use of artificial neural networks in marketing, and iii) create a strong collaborative network in the field of neuromarketing research. These solutions are more relevant in the literature where the scope and impact of neuromarketing in logistics were discussed.

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