

PRACTICAL IMPLEMENTATION OF NEUROMARKETING IN DIFFERENT BUSINESS INDUSTRIES: CHALLENGES AND TRENDS

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Abstract

Over the last decade, new technological progress has enabled the researchers to use neuroscience not only for scientific but also for marketing studies, so they can explore, at the same time, conscious and unconscious drivers of consumer behaviour in real daily situations. Applying brain science to consumer behaviour, neuromarketing—a new innovative marketing research discipline—examines consumers' response (sensory, motor, and cognitive) to advertising stimuli. This article focuses on three key areas: literature review, challenges and limitations of neuromarketing, and neuromarketing trends, with several concrete real-life examples in different business industries. Practical challenges and limitations within the neuromarketing research, such as ethics, accessibility, costs and timing, but also side effects, are discussed. At the end, this article emphasizes many practical implementations of neuromarketing in different business branches, with the adoption of academic and scientific neuroscience researches to commercial purposes.

Issue 2/2022

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JEL Classification: M31, M39, D87

Introduction

There are theorists that have suggested that the conscious mind is not the source or origin of human behaviour, they hypothesise that impulses to act are unconsciously activated and that the role of consciousness is as sense maker after the fact (Wegner, 2002). Since roughly 95% of processes in our brain are non-conscious, significant number of purchases are impulse driven (Stern, 1962; Fitzmaurice, 2008; Mohan, 2013), and the impulse buying costs the average U.S. consumer around \$5,400 per year (O'Brien 2018). So 95% of thinking and therefore purchasing decisions are made in the subconscious part of the brain. Trying to understand how it functions was like an enigma for the researchers in the scientific field, and also for the marketing specialists in the companies.

As an area of applied neuroscience, neuromarketing is committed to the research of subconscious responses of the brain to marketing stimuli, so one can find the answer. Combining the three disciplines—neuroscience, psychology, and marketing (Plassmann et al., 2012)—gives businesses a unique opportunity to create their own brand strategies and increase brand awareness. It is believed that the application of neuromarketing is stimulated by the commercial interest of companies that can use neurophysiological tools (such as positron emission tomography (PET), transcranial magnetic stimulation (TMS), galvanic skin response (GSR), electrocardiogram (ECG), electroencephalography (EEG), functional magnetic resonance imaging (fMRI), facial expression recognition system (fERS), voice pitch analysis, and eye tracking (ET)) to monitor the main neurophysiological signals and consumer behaviour, and based on that to create their own marketing campaigns (Wang and Minor, 2008; Fortunato et al., 2014; Harris et al., 2018; Lim, 2018; Alvino et. al., 2020). Exploring and mapping the brain functions and correlated neuromarketing points with different behaviours, companies are creating highly targeted advertisements that can provide high return on investments. Using neuromarketing techniques, big companies and institutions are able to explore the deepest levels of the human brain and to create personalized products that tap into the neurological processes underlying our mental responses.

Neuromarketing research techniques are currently applied to a wide variety of industries starting from technology, gastronomy, tourism, financial industry, pharmaceuticals, fashion, education, etc. The applications of neuromarketing are growing in the same way that neuromarketing research is paving the way toward a better understanding of human behaviour and helping us to learn more about it. Neuromarketing techniques will likely continue to expand as the field of consumer neuroscience grows and continues to study both the inner workings of the brain and the way it operates. The core and main goal of neuromarketing is the assimilation of theories and methods and their connection with theories and methods in the fields of marketing, economics and psychology, in order to develop neuroscientific explanations of the impact of marketing incentives on the behaviour of target consumers. Depending on neurosciences and the application of new technologies in the field of neurology neuromarketing research domain expands every year (Slijepčević et al., 2017).

Literature Review

Neuromarketing is a special marketing approach for the companies that prefer to take a modern approach to marketing research while studying consumer behaviour with the help of neuroscientific tools. Marketing experts and marketing managers use neuromarketing to assess consumer preferences for different products/services or brands. Owing to neuromarketing, the process of making a purchase decision can be precisely explained.

Modern neuroscientific studies have shown that most of the mental processes, including decision making, occur unconsciously. These unconscious processes explain why individuals fail to predict their future choices (Vecchiato et al., 2013). Neuromarketing applies neuroimaging tools in marketing research with the aim to better understand consumer behaviour towards marketing incentives (most of which are in advertisements), in order to further the business (Hakim et al., 2018). Therefore, the concept of neuromarketing is exclusively related to brain activities in order to monitor the unconscious mind of consumers.

In theory, a distinction is made between the term “neuromarketing” and “consumer neuroscience”, where the first term is related to marketing research conducted for commercial reasons, while the second term is used more in academia (Plassmann et al., 2015). The emergence of neuromarketing has significantly improved the sometimes predictable and expected outcomes of traditional marketing research, thus revealing how unconscious responses and feelings affect customer perception and decision-making procedures (Mileti et al., 2016).

Issue 2/2022

Neuromarketing can be described as a mechanism that makes customer relations easier to manage (CRM), and that is based on understanding of the fundamental functional mechanisms of the nervous system (Plakhin, et al., 2018). Neuromarketing offers a suitable replacement for traditional researches that are often not adequate to credibly convey the attitudes, beliefs and values formed by customers. In this way, researches often represent just a validation of mere consumer assumptions about products, services or advertisements. Luan and the authors (2016) proved that the consumer subconscious is difficult to measure by traditional research methods, so they advocated the application of neuroscience technology in marketing research in order to study in detail the consumer subconscious response to close the gap.

Neuromarketing has contributed to the evolution of marketing by illustrating how unconscious responses and emotions can affect consumer perception and the decision-making process. The studies of brain imaging solve these problems by giving researchers the opportunity to understand consumer decision-making process and shopping patterns, through reading and interpreting the unconscious mind. The American Marketing Association has defined consumer behaviour as the dynamic interaction of affect and cognition, behaviour, and the environment by which human beings conduct the exchange aspects of their lives (Ares et al., 2013), (Cherubino et al., 2019).

Over the last two decades, it has become noticeable that industries are adopting neuromarketing in their companies in order to improve the efficiency and accuracy of their marketing strategies. However, the approach and application of neuromarketing vary depending on the goals that a particular company wants to achieve (Stanton, et al., 2016).

In the *advertising industry*, Guixeres and authors (2017) conducted the research on metrics based on the consumer neuroscience in order to anticipate the rates of customer recalls, likes and follow-ups in online advertising. They found that neuromarketing-based techniques are efficient in predicting the success of advertising responses. Hamelin and authors (2017) examined the efficiency of emotions and advertising by developing a new approach to facial expression analysis. Grigaliunaite & Pileliene (2017), on the other hand, applied a neuromarketing approach to study the effect of a female celebrity as a spokesperson for FMCG advertising.

When it comes to the *food industry*, Jain (2010) focused on advertising, food marketing, and the emotional effects induced by food and beverages through neuromarketing research methods directly on a consumer. Bruce and authors

(2014) conducted the research on branding and advertising using the fMRI neuromarketing technique. They found that food logos can activate certain regions of the brain in the youngest population, thereby increasing the effect of the desire to buy a given food item. On the other hand, Wolfe and authors (2016) studied the differences in brain activity between familiar and unfamiliar foods by using also fMRI as a neuromarketing tool. Ramsøy and authors (2017) conducted the research on the topic of assessing consumer preferences and final decision to purchase a particular product, according to body posture and pupil dilation in consumers.

In the field of *pharmaceutical industry* neuromarketing is used in order to inform the target audience about new products, but also in a situation where it is necessary to achieve a strategic advantage over the competition (Nemchenko et al., 2020).

As part of the *political campaigns*, Crespo-Pereira and Legerén-Lago (2017) developed a study on the application of neuroscience in political science and on the role of emotions in voter behaviour. Owing to the supporting disciplines such as philosophy and political science, many studies in the field of *neuropolitics* examine the causal relationships between the political attitudes of the electorate and the brain functions of voters, which significantly affects the development of certain political activities after political elections (Kolev, 2017).

As far as the *tourism industry* is concerned, Boz et al. (2017) studied the psychological influences of a tourism product or service on the customer, while citing examples of neuromarketing. In a recent research study conducted by means of eye-tracking as a neuromarketing tool, tourists' visual observations related to the hotel offer were analysed based on colour perception, aesthetics, text layout on social networks, as well as on final observations of potential tourists (Muslim, 2020).

Neuromarketing is more frequently used in the field of financial activities, especially in the *banking industry* whose users, in addition to traditional services, are increasingly turning to mobile banking (Eremenko & Kuzmina, 2019; Slijepčević et al., 2022). Owing to the use of neuromarketing techniques, many banks use more subtle ways to attract greater number of customers in order to gain a competitive advantage, by emphasizing primarily hedonistic and other important values (Korzeb & Niedziolka, 2020).

Theoretical Background

The significant application of neuromarketing in the 21st century has inevitably led to numerous discussions of ethical issues, primarily in the field of market research (Ulman, et al., 2015). Specifically, it is important to point out that

Issue 2/2022

neuromarketing research techniques are used to create more adequate and efficient products and services, and eventually to advertise them, but not to manipulate the minds of consumers (Stanton et al., 2016). In reality, the idea of neuromarketing is to help the companies create a better product or advertisement in order to attract consumers, but not to manipulate the mind of a consumer (Stanton et al., 2016).

Due to all the above, it is recommended to use the NMSBA Code of Ethics for the application of neuroscience in business. This code ensures the highest ethical standards for the study of neuromarketing to be respected, including the following ones: establishing public trust in neuromarketers' integrity and authority, protecting the participants' privacy, and protecting the neuromarketing service purchasers (Neuromarketing Science & Business Association, 2016). According to Ulman et al. (2015), one of the reasons used to emphasize the importance of keeping confidential and private information is to take care of the target groups of vulnerable consumers. These groups, such as mental health subjects, children and young adults, are prone to discrimination and exploitation, thus easier to be influenced.

Neuromarketing researchers often face different ethical challenges such as the need to protect research subjects, the need to prevent the manipulation of the target groups of vulnerable consumers and the need to provide accurate information to the public (Nyoni & Bonga, 2017; Lim, 2018; Slijepčević et. al., 2020). In this way, neuromarketing raises issues concerning human rights, i.e. the right to cognitive liberty, mental privacy, mental integrity, and psychological continuity (Ienca & Andorno, 2017). This means that, in addition to neuromarketing research, the way the media present the results to the public should be without any hidden intentions, because this is the only way that a positive message can be sent to the target audience in favour of neuromarketing activities.

The research conducted by Slijepčević et al. (2019) found that women have less confidence in neuromarketing research than men. There is an interesting difference observed in this research between female and male respondents in all categories. Regarding the stated view that "Neuromarketing is a manipulative way of selling products and services", as not being in accordance with the NMSB Code of Ethics, 43.2% of male respondents said that they had no opinion on this view or that they did not agree with it. According to the research data, 34.7% of female respondents agreed with the view that neuromarketing was a manipulative way of researching the sale of products and services, while the percentage of male respondents who agreed with this view was significantly smaller, 13.5%. It is also interesting that no female respondent disagreed with the stated view that "Neuromarketing is a

manipulative way of selling products and services“, while 8.1% of male respondents disagreed with that view. Table 1 shows that 41.6% of female respondents agreed more with the stated view than male respondents who expressed the same opinion as female respondents in only 18.9% of cases.

Table 1. Respondents’ views about the statement: Neuromarketing is a manipulative way of selling products and services.

Gender	Neuromarketing is a manipulative way of selling products and services					Total
	I completely disagree	I disagree	I have no opinion	I agree	I completely agree	
Male	3	11	16	5	2	37
Female	0	31	11	25	5	72
Total	3	42	27	30	7	109

Source: Slijepčević, M., Popović Šević, N., & Radojević, I., (2019). Limiting Aspects of Neuromarketing Research. *Mednarodno inovativno poslovanje. Journal of Innovative Business and Management.* 11(1), 72-83. <https://doi.org/10.32015/JIMB/2019-11-1-8>.

It is extremely important to establish special codes of ethics for each of the above-mentioned industries as well as for other industries that apply all the benefits of neuromarketing research, regardless of whether the clients are public or private organizations (Hensel et al., 2017). In establishing the codes of ethics, it is also very important to establish accurate procedures that cover all the processes in the course of neuromarketing research, which guarantee the respondents’ full protection and liberty (Luna-Nevarez, 2021).

One of the important limitations when it comes to the use of neuromarketing, concerns the costs of purchasing and maintaining the necessary equipment. Another limitation is related to the use of isolated research studies that require respondents to lie horizontally, often exposed to the noise of recording machines, which can be quite an inconvenience (Spence & Pikueras-Fizman, 2014). One of the basic barriers is that neuromarketing is not yet widely used and available in practice. It is inevitable to establish special laboratory conditions as a basis for the use of complex technologies, with continuous monitoring by experts in various

Issue 2/2022

neuroscience fields. The said further results in the fact that neuromarketing research cannot be used by companies with limited marketing budgets. However, high costs automatically limit the number of studies.

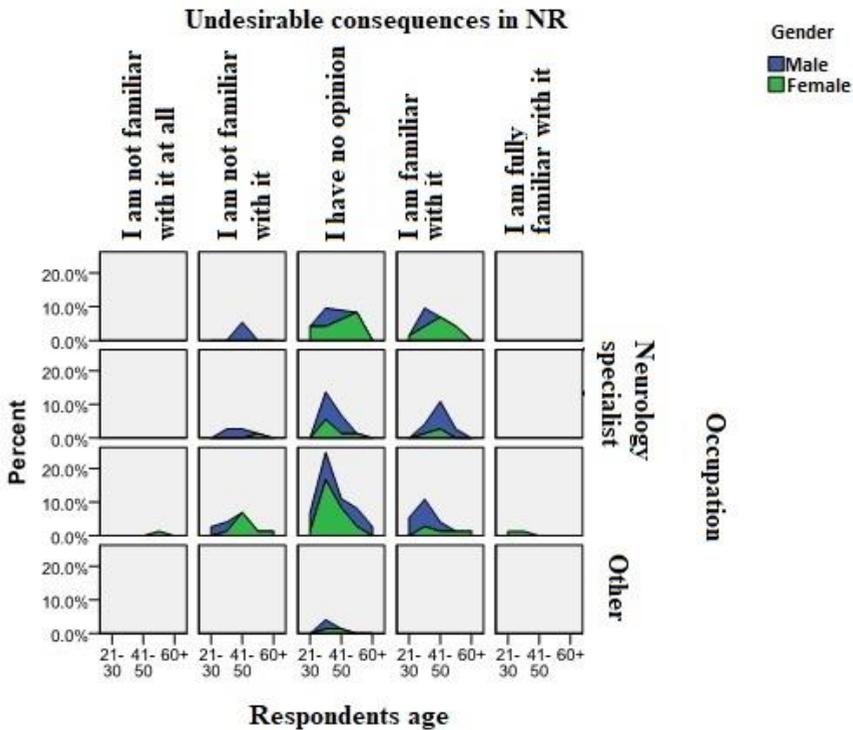


Figure 1. Attitudes of respondents regarding undesirable consequences of the use of specialized devices in the field of neuromarketing research.

Source: Slijepčević, M., Popović Šević, N., & Radojević, I., (2019). Limiting Aspects of Neuromarketing Research. *Mednarodno inovativno poslovanje. Journal of Innovative Business and Management*. 11(1), 72-83.

Most neuromarketing research are conducted on static and large machines installed in specialized rooms, which can potentially affect the atmosphere in which the research is done with test subjects. The barrier to conducting research in

extremely synthetic conditions is not negligible either. Neuromarketing research often challenges the reliability and validity of results - specifically, as the very procedure of this type of research is expensive, it is extremely rare to repeat and check it. Moreover, the validity of the results is questionable due to the frequent unrepresentativeness of the sample (mostly a small number of test subjects).

The graph shows the results obtained after analysing the attitudes of respondents related to the fact that there are no unwanted consequences in using medical tools during neuromarketing research (for example, that the tools can endanger the health of the test subjects). Respondents aged 41-50 thought that there were no negative consequences, i.e. that the use of medical devices in neuromarketing research presented no danger to the health of test subjects, while other respondents said they had no opinion on this issue. A high percentage of marketing experts (56.6%) and neurology specialists (50%) took the same stand on this issue. The hypothesis is mainly supported by higher education experts (45.2%), followed by neurology specialists (36.4%) and marketing experts (18.9%). The same number of marketing experts (18.9%) disagree with the hypothesis, which means that the views of marketing experts are divided equally for and against.

Many critics of neuromarketing believe that since the results are obtained in a very complex way, it is very difficult to prove them. Specifically, it is considered that the analysis of consumer emotions following this type of research is created on the basis of a subjective feeling, and that it is very difficult to generalize consumer characteristics (Lajante & Ladhari, 2019).

Neuromarketing trends

The creators of many new products and services have been trying for a long time to figure out what is the backbone for shaping the consumer motivation to buy, mainly through a unique consumer experience. One of the possible reasons lies in the fact that consumer attitudes often differ dramatically with regard to what constitutes their final choice when shopping, which leads to the conclusion that the results of traditional research methods do not necessarily coincide with consumer purchases (Agarwal & Dutta, 2015). Since the traditional methods cannot include subconscious processing that takes place in the minds of consumers, this task is assigned to neuromarketing tools which can discreetly peek into the functioning of the consumer's brain and analyse subsequent procedures in the process of buying. It is recognized that traditional marketing research mainly defines and analyses consumer preferences, while on the other hand neuromarketing researches explain

Issue 2/2022

the consumers’ psychological aspects and very precise reasons for the purchase decision (Daugherty & Hoffman, 2017).

The development of neuromarketing techniques and trends therein has found its basis in the interest of economic organizations to continuously monitor and possibly influence the behaviour of their target groups. It is not easy to unravel the motives and discover the thoughts of consumers when it comes to buying the products and services. This is the reason why more and more companies understand the importance of neuromarketing, which makes it easier to identify consumer needs and, conversely, to adequately meet market demands.

Table 2. Attitudes of respondents regarding familiarity with the new methodology of neuromarketing research.

Occupation	Neuromarketing research as a new methodology				
	I am not familiar with it at all	I am not familiar with it	I have no opinion	I am familiar with it	I am fully familiar with it
Higher education expert	0,00%	3.23%	12.90%	58.06%	25.81%
Neurology specialist	0,00%	0,00%	36.36%	59.09%	4.55%
Marketing expert	1.89%	16.98%	20.75%	50.94%	9.43%
Other	0,00%	0,00%	66.67%	33.33%	0,00%

Source: Slijepčević, M., Popović Šević, N., & Radojević, I., (2018), Neuromarketing: A new discipline for a more effective understanding of consumer behaviour, *Turn Innovative Ideas into reality*, Reviewed extended abstracts of the 8th International Scientific Conference of the DOBA Business School, Maribor, November 12-13, 113-117.

Table 2 shows that the majority of respondents in all three categories are familiar with the stated view that neuromarketing is a new methodology. More than 80% of higher education experts are familiar or fully familiar with the stated view, a slightly lower percentage, about 64%, is recorded for neurology specialists who are familiar with it, while the percentage of marketing experts who are familiar with the stated view is somewhat above 60%. This shows that, when it comes to the

development and further implementation of neuromarketing research, the key actors have largely accepted this fact.

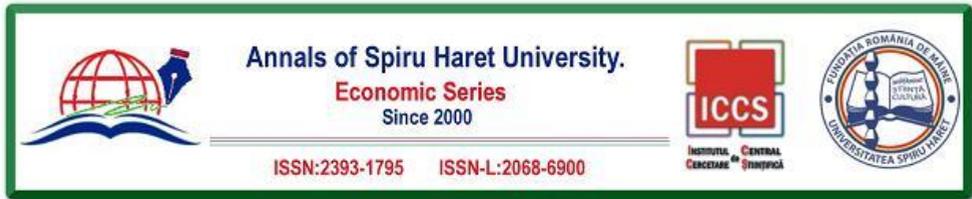
Due to the limitations of traditional marketing techniques and the growing demand for objective neural metrics to quantify consumer preferences and predict responses to marketing campaigns, neuroscientific techniques are making major inroads into the field of market research.

Below we will present examples of the application of neuromarketing in practice, in various industries.

In one of the most popular neuromarketing research using fMRI scans, it has been proven that the choice between Coca-Cola and Pepsi largely depends on their brand knowledge, even more than on their taste. Information about a brand activates cerebral areas related to cultural influences, and that is the way the brands make a dramatic influence on behavioural preferences of their customers in cases when they have great cultural contemplation (McClure et al., 2004). In the first test, the test subjects consumed the beverages without identifying the brand. In this blind test, Pepsi taste was rated better than Coca Cola taste. When the brands were made visible, the Coca Cola brand activated significantly more areas of the brain than its competitor, and consumers' opinions dramatically changed. Coca Cola was now rated better. This led to the conclusion that "more positive associations and self-esteem are connected with the Coca-Cola brand" (Pispers et al., 2018).

Almost at the same time, similar brain scan studies were carried out for DaimlerChrysler in Germany, at the Ulm University. They were aimed at finding out how the brain is working when limousines, vans, small cars and sports cars are presented. The results made it clear that the nucleus accumbens—the brain region that plays a central role in the brain's reward system—was activated only in the case of sports cars. Therefore, sports cars triggered the most positive feelings of all cars (Häusel, 2006).

Research conducted by neuroscientist Christian Elger has shown that consumers will buy a product with a discount sign, even if the price is not exactly cheap. The subjects were shown pictures of different products and asked which of these products they would buy. Different prices were displayed for the products, some significantly expensive than usual, others cheaper. A yellow and red discount sign also appeared on some prices. It was found that the test subjects made their purchase decisions in favour of more expensive products as soon as the discount symbol lit up. The brain scanner showed that the financial control system in the brain shut down and the prospect of a "bargain" activated the reward system as



Issue 2/2022

soon as the discount sign appeared. (Raab et al., 2009). In this experiment, the discount sign was the framing that was carried out, which caused a change in the test behaviour of the subjects. Even though the price was higher, the discount sign signalled to the subjects' limbic systems that they would save or win money if they chose that product (Traufetter, 2007).

Conclusions

Neuromarketing has become a hot main topic and study field in many companies. There is a significant increase in interest in this field of science and in the application of neuromarketing as a tool for marketing research. A lot has been learned about this topic and there is still more to be learned. It is believed that neuromarketing can help to understand many types of complex consumer behaviour when shopping. Outdated beliefs are replaced by new ones. Neuromarketing helps one to understand the importance of subconsciously communicable content, because about 95 percent of what is perceived is implicitly perceived (Ahlert et al., 2011; Scheier & Held, 2013).

It can be concluded that, in the end, a large number of consumers will not be able to notice the distinction in the advertisements that are processed and created as an outcome of neuromarketing research. Neuromarketing standards have been adopted earlier on, but ethical issues will continue to rise to ensure they are respected and enforced.

The authors believe that this article provides a clear review of the challenges and trends in neuromarketing implementation process in different business branches. The aim of this paper is to help researchers and practitioners in making an accurate decision for the implementation of neuromarketing in their marketing agendas, by providing them with indispensable information to evaluate the challenges and opportunities of existing neuromarketing tools.

Neuromarketing research is expected to expand in the future, because it is believed that companies will benefit from time saving and efficiency of the results brought by this new marketing method. Owing to the possibility to predict consumer behaviour when shopping, neuromarketing is becoming an increasingly attractive method of market research. While providing the producers and sellers with useful information, neuromarketing is also efficiently providing the consumers with help in terms of self-awareness of the scale of preferences.

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Issue 2/2022

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Issue 2/2022

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Issue 2/2022

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