NEUROMARKETING: A TOOL TO UNDERSTAND CONSUMER BEHAVIOUR

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ABSTRACT

This paper studies the concept of neuromarketing in consumer behaviour, emphasising the fact that consumers are not entirely rational in their decision-making process, because emotions influence their behaviour. Consequently, the neuromarketing field emerged as a way to understand the subconscious motivations of consumers. The scientific problem of this paper is to analyse how neuromarketing techniques can be effectively integrated with traditional marketing research methods to provide a comprehensive understanding of consumer behaviour. It emphasises the fact that traditional marketing research tools may not reveal all essential insights into consumer behaviour research. Therefore, market research practices should employ neuromarketing tools such as eye tracking, facial expression analysis, biometrics and neuronal activity measurements. First, six principal neuromarketing research areas are identified: branding, product design and innovation, advertising effectiveness, shopper decision-making, online experiences, and entertainment effectiveness. Next, a simplified human behaviour model, consisting of three phases, unconscious, conscious and observable, is discussed. Finally, the paper focuses on criticisms of neuromarketing and ethical issues.

KEY WORDS: *neuromarketing, neuromarketing tools, consumer behaviour.*

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Introduction

Comprehending consumer behaviour consistently is one of the foremost concerns for marketers, as it is very challenging to understand consumer behaviour in a dynamic environment. Consumer responses vary depending on different situations (Arora, Heena, Jain, 2020). Thus, neuromarketing has become a significant advance in comprehending how the unconscious mind influences consumers' decision-making processes. The fields of consumer behaviour and neuromarketing are complementary. Traditional consumer behaviour research examines the conscious layer of information, whereas neuromarketing research addresses the subconscious. Although neuromarketing is not new, it is still a novel approach to investigating consumer behaviour (Bhatia, 2014; Ramsoy, 2014).

In addition, the field of neuromarketing has garnered considerable attention from academia and professionals, driven by its capacity to offer more precise insights into consumers' unconscious responses, a realm beyond the reach of conventional marketing methods like questionnaires. This interest stems from the potential to enhance marketing theory and practices (Alsharif et al., 2022). It is important to emphasise that neuromarketing aims not to substitute traditional marketing approaches, but to offer unique and complementary insights (Mansor, Salmi, 2020).

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The field of neuromarketing on consumer behaviour is chosen as the research subject. This paper explores neuromarketing supporting traditional consumer behaviour research and compatibility with neuromarketing research, explaining neuromarketing tools and emphasising the challenges due to ethical issues.

Scientific problem: What is neuromarketing, and how can it be effectively integrated to provide a comprehensive understanding of consumer behaviour?

The author aims: to discuss the concept of neuromarketing and its research areas, and identify neuromarketing tools and criticisms focusing on ethical challenges.

To achieve this aim, the following tasks have been formulated: (1) to explain the concept of neuromarketing in addition to neuromarketing research tools; (2) to identify neuromarketing research areas and highlight neuromarketing criticism, with a special focus on ethical issues.

This paper provides a critical review and contributes to the marketing literature, by providing concise information about neuromarketing. Specifically, it aims to contribute to the academic dialogue concerning the dynamic interconnection between consumer behaviour and neuromarketing, cultivating a more profound comprehension of the mechanisms that influence modern consumer decision-making.

Research methods: scientific literature review, synthesis.

A comprehensive literature review was conducted to gather relevant and up-to-date information on neuromarketing. The following inclusion and exclusion criteria guided the review process.

- The literature should directly address the following tasks for this research:
  - What is neuromarketing?
  - What are the different neuromarketing tools?
  - What are the different areas of neuromarketing research?
  - What are the criticisms of neuromarketing, specifically focusing on ethical issues?
- *Recent:* The literature should be relatively recent, covering the latest research findings and developments in the field, preferably published within the past five to ten years.
- *Quality:* The literature should be from reputable sources, such as peer-reviewed journals and academic books.
- *Credible:* The literature should be written by experts in the field of neuromarketing.

Criteria for excluding literature:

- *Off-topic:* If the literature does not directly address the research questions.
- *Outdated:* If the literature is from outdated sources.
- *Unreliable:* If the literature is from disreputable sources. In addition, the literature should not be from sources that are not credible or have no proven track record of producing reliable research.

In conclusion, the criteria for including and excluding literature for a scientific literature review on neuromarketing are defined and aligned with the research questions and objectives, which ensures a transparent selection process.

1. The concept of neuromarketing

Neuromarketing was introduced in 2002 by the Dutch marketing professor Ale Smidts as ‘the study of the cerebral mechanism to understand consumer behaviour to improve marketing strategies’ (Lim, 2018). It emerged as a field in the early 2000s. However, over the years various interpretations of the definition of neuromarketing have emerged. As Mansor et al. (2020) stated, neuromarketing comprises three fundamental domains: neuroscience, marketing and psychology. Its central objective is to investigate and comprehend the consumer’s subconscious mind in the context of the meaningful decision-making process (Javor et al., 2013; Khushaba et al., 2013; Sebastian, 2014). Generally, through the adoption of neuromarketing, marketers can strategise and implement more thoughtful strategies, enhancing the overall efficacy of their marketing endeavours. In addition, integrating neuromarketing can be a powerful tool for forecasting consumer habits (Mansor, Salmi, 2020).

Neuromarketing has become an emerging area for corporations, prompting substantial investment in neuroscientific technologies. These companies aim to comprehend the effects of branding, advertising and external stimuli on the human brain. The insights from this investment is then leveraged to formulate marketing strategies that effectively influence customer perceptions in the targeted market (Gupta et al., 2022). All in all, the potential significance of neuromarketing is immeasurable. Considering that the expense associated with certain advertising campaigns or product development often exceeds several million euros, using neuromarketing techniques appears rational, if it reduces the risk involved in investment in marketing (Cenizo, 2022).

2. Neuromarketing tools

The tools used in neuromarketing range from magnetic resonance imaging to recording eye movements through sensor technology (Nazarova, Lazizovich, 2019) According to Mansor and Salmi (2020), the fundamental instruments employed in neuromarketing can be categorised in three groups: those capturing the metabolic activity of the brain, those capturing the electric activity of the brain, and those not involving the recording of brain activity. Based on a similar classification, Bitbrain (2019) introduces the classification of neuromarketing tools in three layers: neuroscientific methods, including neuronal activity within the brain (the central nervous system); neuronal activity of the peripheral nervous system; and other techniques, such as eye tracking.

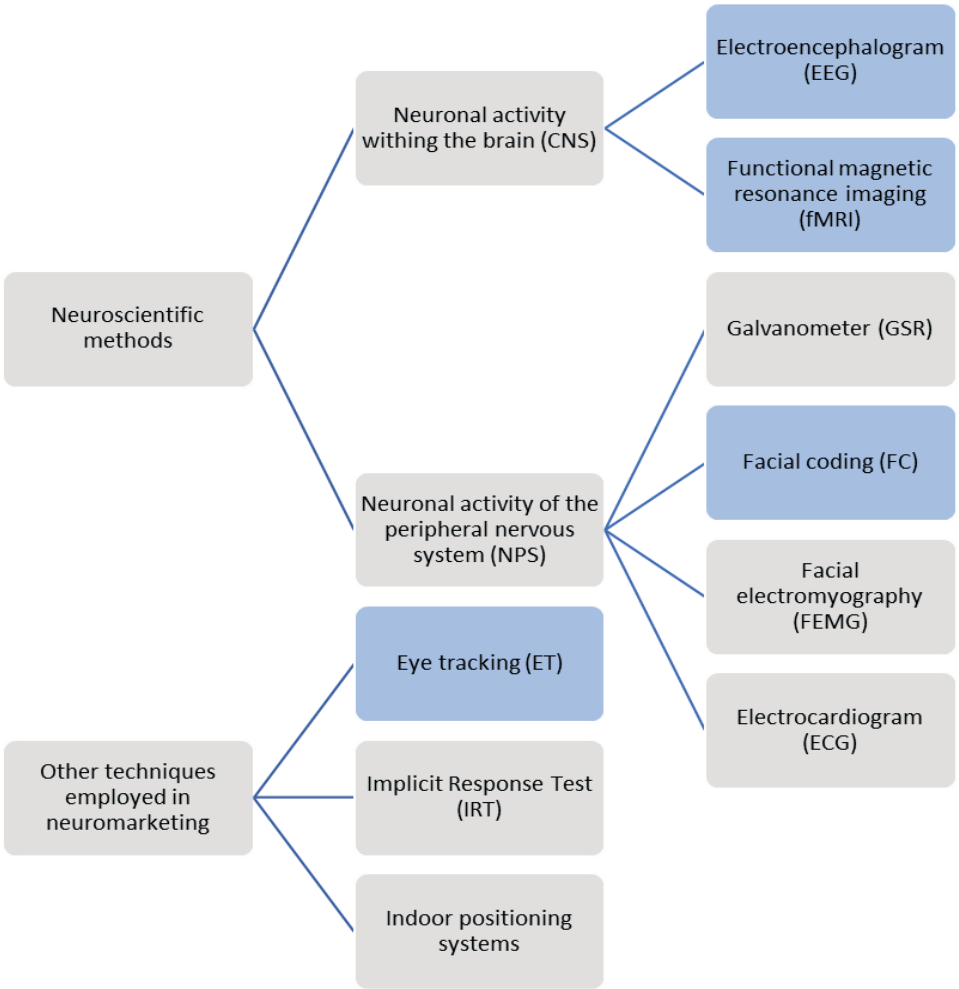

Figure 1. The classification of neuromarketing tools. Blue identifies frequently used tools in neuromarketing practice based on the literature review and the author's practical background

Source: Retrieved and adapted from Bitbrain, 2019.

Generally, neuromarketing includes: eye-tracking experiments, which track eye gaze patterns on a landing page; facial expressions, conducting behavioural experiments to see how changes in product colour affect customer opinions; biometrics, to measure signals such as perspiration, respiration, heart rate and facial muscle movement (EMG); and neuromeric techniques, to measure brain signals such as electrical activity (EEG) and blood flow (fMRI).

Table 1. Neuromarketing tools

Tool	Explanation
Eye tracking	Measuring eye gaze patterns, for example, on a landing page
Face reader/facial coding	Analysing facial expressions
Biometrics	Measuring body signal measures (for example, perspiration, respiration, heart rate, and facial muscle movement (electromyography [EMG])
Neuromeric	Measuring brain signal measures (for example, electrical activity (electroencephalography [EEG]) and blood flow (functional magnetic resonance imaging [fMRI])

Source: Kolyovska, Maslarova, Maslarov (2016).

Eye-tracking technology is evolving rapidly and adapting to user experiences like mobile screens and other devices. For example, research participants can walk past store shelves wearing glasses that track where and for how long they look at certain products. According to Iloka and Anukwe (2020), eye-tracking is a commonly adopted neuromarketing tool that helps understand the human brain's functionality during marketing activities.

Another tool is facial coding, which involves recognising and analysing facial expressions linked to human emotions. Pioneering research in facial coding has been conducted by Dan Hill, a prominent researcher in this field. This research involves identifying, interpreting and applying practically specific stimuli and their corresponding facial expression patterns in marketing (Solomon, 2018).

Discovered in 1929, electroencephalograph (EEG) is one of the most recognised and extensively employed techniques in neuromarketing research. Its fundamental principle revolves around placing electrodes on human skin, enabling the measurement of current pulses associated with neuronal activation (Klinčeková, 2016). The method serves as an electrical portrayal of brain activity, making it suitable for identifying alterations in the electrical field linked to particular areas of the brain (Solomon, 2018).

Finally, functional magnetic resonance imaging (fMRI) measures and displays brain activity, detecting changes related to blood flow (Solomon, 2018).

3. Neuromarketing research and its areas

Although marketing research tools are widely used to study consumer behaviour, they may not reveal all critical insights. This is because a significant portion of the decision-making process occurs subconsciously. Thus, traditional survey methods can be limited in their ability to capture accurate information about consumer behaviour, as participant responses may be influenced by conscious or subconscious biases stemming from stereotypes, cognitive biases, emotions, and social and moral norms, or simply because they cannot express their thoughts, feelings and motivations for making a purchase. Whether neuromarketing research will replace traditional market research is often debated. At this point, a firmly established opinion is that both categories of research complement each other, reaching different layers of consumer information, including the subconscious and the conscious.

Moreover, it is essential to emphasise the fact that traditional economic models have long held the view that the purchasing behaviour of consumers is mainly motivated by rational factors, and that individuals are

primarily interested in pursuing their own self-interest (Cenizo, 2022). As a result, the evolution of humanity, in terms of economics, begins with the concept of '*Homo economicus*', an entirely rational, knowledgeable and wise buyer, who makes good decisions in the long run (Hansen, Nielsen, 2023). While it is true that traditional economic models have long held that purchasing decisions are based mainly on rational factors and self-interest, some experts argue that purchasing decisions are more emotional than consumers tend to believe, and the idea that humans are always cognitive machines driven by rationality should be questioned (Lindstrom, 2010). Therefore, another term, '*Homer economicus*', is introduced, stating that consumers are not rational, and may sometimes lack knowledge or foresight. In the light of this, researchers strive to better understand consumer motivations, emotions and decision-making processes (iMotions, 2021).

In addition, a simplified model of human behaviour, which goes through all physiological phases and processes related to a specific action such as buying, helps explain the neuromarketing research logic sequence. It divides consumer actions into three phases: unconscious, conscious and observable. In the unconscious phase, consumers initially process and filter information from their senses, and then automatically evaluate its meaning or emotional value. Consumers evaluate the stimulus through internal and rational dialogue in the conscious phase. In the final stage of action, consumers decide and act accordingly (Genco et al., 2013; Bitbrain, 2019).

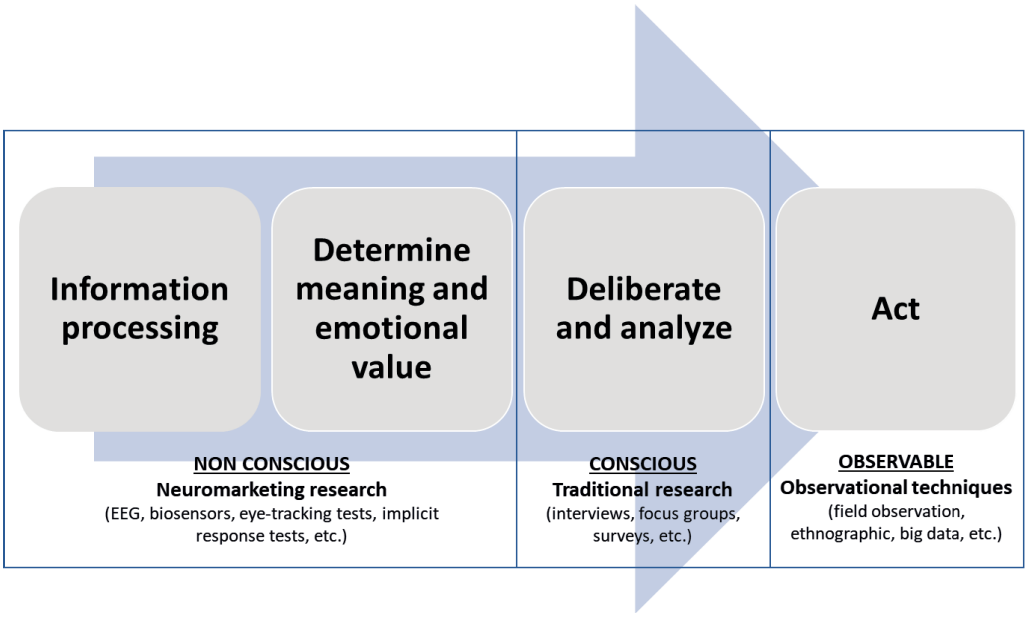

Figure 2. An adapted version of the human behavioural model

Source: Genco et al., 2013. Retrieved from Bitbrain, 2019.

Generally, neuromarketing is employed in six principal areas. The spectrum of neuromarketing research includes studies from evaluating label and package design and testing video and print advertising to product placement on shelves and the user journey in shopping centers (Bhatia, 2014; Kolyovska, Maslarova, Maslarov, 2016). One of the first neuromarketing researchers was the neurology professor Read Montague, who conducted a neuromarketing experiment using functional magnetic resonance imaging in 2003. This study continued a blind experiment conducted in 1975, in which participants rated the taste of Pepsi and Coca-Cola. The research demonstrated that the activation of distinct brain regions depended on whether the participants knew which brand they were using (McClure et al., 2004).

Neuromarketing can measure constructs such as emotional engagement, memory retention, purchase intention, novelty, awareness, and the attention of consumers (Sebastian, 2014; Genco et al., 2013). First, neuromarketing offers effective methodologies to assess brand associations. Second, neuromarketing can evaluate how consumers respond to product ideas and packaging designs that are mainly automatic, emotional and outside our conscious awareness. Third, neuromarketing clarifies the mechanisms through which advertising affects us, even though it may not be consciously perceived. Fourth, the retail scene and store environments have a direct impact on shoppers' decision-making and purchasing behaviour. Fifth, neuromarketing tools can analyse consumer behaviour online. Finally, entertainment can create experiences in individuals' minds that may impact their attitudes, preferences and behaviours. It explores how entertainment can transport people into an imaginary world, and the effects of such an experience (Bhatia, 2014; Kolyovska, Maslarova, Maslarov, 2016).

Table 2. An overview of the application areas of neuromarketing

Neuromarketing research areas	Explanation
Branding	Measuring brand associations
Product design and innovation	Measuring consumer responses to product ideas and packaging design
Advertising effectiveness	Measuring advertising impact
Shopper decision-making	Measuring store environment influence on shoppers' decision-making processes and purchase intentions
Online experience	Measuring online activity's influence on the decision-making process and purchase intention
Entertainment effectiveness	Measuring entertainment impact and effectiveness on attitudes, preferences and actions.

Sources: Bhatia, 2014; Kolyovska, Maslarova, Maslarov, 2016; Nazarova, Lazizovich, 2019; Sebastian, 2014; Genco et al., 2013.

According to Nazarova and Lazizovich (2019), neuromarketing can be used in various applications for businesses, such as design development, advertising and cinema, whereas employing neuromarketing in film production can pre-evaluate the potential success or failure of a film. Additionally, neuromarketing studies reveal the increasing adaptability of neuromarketing tools. In the latest *Neuromarketing Year Book 2023*, studies cover music, UX, video games, remote learning, alcoholic beverages, public campaigns, and colour psychology in advertising.

4. Criticisms of neuromarketing and ethical challenges

According to Cenizo (2022), neuromarketing has faced obstacles over the years, such as costs, sample size, lack of standards, and ethical regulation. Employing neuroscience-related methods comes at significant expense, covering the procurement of materials and the execution of experiments. Due to the considerable expense associated with methods like fMRI or MEG, consulting firms are choosing more economical alternatives, like EEG. However, these alternatives come with certain limitations, such as restricted spatial resolution and the absence of data from the deeper layers of the brain. The second most contentious element is the sample size. The number of individuals participating in the experiment impacts significantly the cost of the experiment. The lack of standardised practices in the field leads each consultant to apply their own methodologies in conducting experiments, adhering to individualised quality criteria for both data collection and the utilisation of technologies. Consequently, the analysis of the results varies depending on the consultant (Cenizo, 2022).

One of the most pressing challenges facing neuromarketing is the ethical question of consumer data protection and the ethical research process. In the literature, we often encounter catchphrases such as 'neuromarketing manipulates consumers and turns us all into zombies' or 'it will show the "buy" button in our brains' (Harvard Business Review, 2019). Various ethical considerations associated with the methodologies and procedures in neuromarketing research require careful attention. Critics contend that this field may infringe on an individual's free will. Marketers believe that introducing a diverse range of products can influence a person's purchasing decisions (Frederick, 2022). Thus, neuromarketing typically revolves around ethical considerations and public apprehensions regarding potential adverse effects on society, focusing on consumers (Javor et al., 2013). As stated by Mansor and Salmi (2020), the exploration of neuromarketing has given rise to numerous ethical considerations that demand attention from researchers. Ulman et al. (2015) identified that neuromarketing faces ethical challenges related to nonmaleficence, beneficence, autonomy, confidentiality, the right to privacy, and the protection of vulnerable groups. Additionally, there is an opinion that neuromarketing should not be used in political campaigns, propaganda, or other sensitive societal contexts (Harvard Business Review, 2019). It is vital that neuromarketing research should be conducted transparently, and that processes are legally regulated. Consequently, the Neuromarketing Science and Business Association (NMSBA) has implemented the Code of Ethics for the Application of Neuroscience in Business. This ethical code guarantees that neuromarketing research meets the most stringent ethical standards. It focuses on three primary elements: first, building trust among the public regarding the reliability of neuromarketers; second, ensuring the privacy of participants; and third, safeguarding the interests of neuromarketing purchasers in accordance with the guidelines set forth by the Neuromarketing Science and Business Association (Mansor, Salmi, 2020). Thus, as the field continues to evolve, it is crucial to address these challenges and limitations, to ensure the responsible use of neuromarketing research in the future.

Conclusion

In conclusion, the emergence of neuromarketing has significantly contributed to understanding consumer behaviour, providing valuable insights into subconscious factors that influence decision-making processes. Thus, traditional consumer behaviour research and neuromarketing complement each other by analysing different layers of consumer information: neuromarketing research reaches the subconscious layer of information. In contrast, traditional research reaches the conscious layer of information. By introducing neuromarketing tools, it is clear that neuromarketing is a promising area for understanding consumer motivations, emotions and decision-making processes, as it provides an insight into subconscious factors influencing consumer behaviour.

The tools employed in neuromarketing, ranging from eye tracking to electroencephalography (EEG) and functional magnetic resonance imaging (fMRI), offer extensive capabilities for capturing and interpreting various aspects of consumer responses. These tools are applied in diverse research areas, including branding, product design, advertising effectiveness, shopper decision-making, online experiences, and entertainment effectiveness.

Despite its promising potential, neuromarketing faces challenges, such as high costs, sample size issues, a lack of standardised practices, and ethical concerns. Ethical considerations in neuromarketing research focus on consumer data protection, research transparency, and adherence to ethical standards. As neuromarketing continues to evolve, addressing these challenges becomes crucial for its responsible and transparent use in the future.

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NEURORINKODARA: VARTOTOJŲ ELGSENOS SUVOKIMO METODIKA

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Santrauka

Šiame straipsnyje nagrinėjama *neurorinkodaros* sąvoka vartotojų elgsenos kontekste, pabrėžiant, kad vartotojai savo sprendimų priėmimo procese yra nevisiškai racionalūs, nes veikiami emocijų. Taigi neurorinkodaros sritis atsirado kaip vartotojų emocijų suvokimo, jų motyvacijos ir dėmesio sutelkimo būdas. Visa tai leidžia užtikrinti reklamos efektyvumą. Taigi šiame straipsnyje nagrinėjama neurorinkodara, kaip geresnio vartotojų elgsenos suvokimo metodika. Aprašoma, kaip neurorinkodara gali būti integruojama su tradiciniais rinkodaros tyrimo metodais, siekiant geriau suprasti vartotojo sprendimo priėmimo procesą.

Šio straipsnio tikslas – pristatyti neurorinkodaros pagrindus, apibrėžti taikomus metodus, tokius kaip akių žvilgsnio stebėjimas, veido emocijų analizė, biometrikos ir nervų sistemos veiklos matavimas: elektroencefalografas (EEG) ir funkcinis magnetinis rezonansas (fMRI). Be to, sieksime apžvelgti neurorinkodaros tyrimų pritaikomumą. Pirmiausia aptariamos šešios pagrindinės neurorinkodaros tyrimų sritys: prekių ženklo, produkto dizaino ir inovacijų, reklamos efektyvumo, pirkimo sprendimų, internetinių patirčių ir pramogų efektyvumo. Toliau paaiškinamas supaprastintas žmogaus elgsenos modelis, sudarytas iš trijų etapų: pasąmonės, sąmonės ir stebėsenos. Galiausiai straipsnyje nagrinėjami neurorinkodaros iššūkiai, didelį dėmesį skiriant etikos klausimams.

Mokslinis tyrimo klausimas: kas yra neurorinkodara ir kaip šią sritį galima būtų efektyviai integruoti, siekiant geriau suprasti vartotojų elgseną?

Straipsnio tikslai:

- Pateikti glaustą *neurorinkodaros* sąvokos ir tyrimo sričių apžvalgą.
- Nustatyti neurorinkodaros tyrimų priemones, tokias kaip akių žvilgsnio sekimas, elektroencefalografija (EEG), funkcinis magnetinis rezonansas (fMRI), veido emocijų analizė ir biometrika.
- Aprašyti neurorinkodaros iššūkius, akcentuojant etikos aspektus.
- Pateikti rekomendacijas, kaip neurorinkodaros metodus efektyviai integruoti su tradiciniais rinkodaros tyrimų metodais.

Tyrimo metodai: mokslinės literatūros apžvalga, sintezė.

Neurorinkodara gali būti naudingas metodas rinkodaros specialistams, siekiant suprasti vartotojų elgesį ir priimti efektyvesnius rinkodaros sprendimus. Šis straipsnis prisideda prie akademinio dialogo apie neurorinkodarą ir jos taikymą rinkodaros praktikoje. Neurorinkodara akivaizdžiai prisidėjo prie vartotojų elgsenos supratimo, suteikdama vertingų žinių apie pasąmonės veiksnius, kurie veikia sprendimų priėmimo procesą. Tiesa, tradiciniai vartotojų elgsenos tyrimai ir neurorinkodara vienas kitą papildo, analizuodami skirtingus vartotojų informacijos sluoksnius: neurorinkodaros tyrimai pasiekia pasąmonės informacijos sluoksnį. Akivaizdu, kad neurorinkodara yra perspektyvi vartotojų motyvacijos sritis, siekiant suprasti jų emocijas ir sprendimų priėmimo procesus. Svarbu paminėti, kad neurorinkodara susiduria su etikos iššūkiais, akcentuojant vartotojų duomenų apsaugą, tyrimų skaidrumą ir atitikimą etikos standartams.

PAGRINDINIAI ŽODŽIAI: *neurorinkodara, vartotojų elgsena.*

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