






# “Neurotechnologies in the advertising industry: Legal and ethical aspects”

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# NEUROTECHNOLOGIES IN THE ADVERTISING INDUSTRY: LEGAL AND ETHICAL ASPECTS

## Abstract

As a result of technological and information development, there is a rapid spread of neurotechnology in the advertising industry, which sparks debate among law and marketing scholars regarding ethics, reasonability and legality of their use. The paper aims to identify possible ways to increase the effectiveness of regulatory and ethical aspects of using neurotechnology in Ukraine's advertising industry. Based on a systematic analysis of theoretical experience and regulatory legal acts, the main threats to the development of neuromarketing are identified. The lack of a neurotechnology law, the distinguishing between "neuro data" and "personal data", cyber-hacking risks, the lack of an interaction model between the state and advertisers are deemed to be regulatory shortcomings. Possible ways to optimize the legal regulation of the neurotechnology use are the development of a neurotechnology law, the legislative enshrinement of the neuro data concept, the introduction of restrictions on neuro data use depending on the industry and purpose, increased cybersecurity level. Threats to the ethical use of neurotechnology include low public awareness of neurotechnology and personal rights of citizens, lack of training activities for marketers and advertisers in the field of neuroscience. It is possible to overcome ethical threats through educational and informational work for marketers, advertisers and citizens. A comprehensive solution to the ethical and legal shortcomings of neurotechnology use will increase the neurotechnology development level, the proficiency level of marketers and advertisers, as well as improve the legal system in Ukraine.

**Keywords** neuromarketing, confidentiality, law, personal data, Ukraine

**JEL Classification** K23, L15, M30, M37

## INTRODUCTION

The field of technology in the modern world is developing rapidly; the latest technological advances are penetrating our public life. The marketing and advertising industry is no exception. One of the newest technologies is neuromarketing. Neurotechnology allows us to assess human behavior, brain activity, schemes and patterns of choice of goods and services. Using neurotechnology, a person's views and intentions are analyzed. Such information is especially important for creating an effective marketing strategy and successful promotion of goods and services.

However, the other side of using neurotechnology should be taken into account – ethical and legal aspects that are ambiguous and provoke discussions among scientists in psychology, law, economics and marketing. Data obtained from the use of neurotechnology should remain confidential and not violate the personal rights and freedoms of citizens.

Ethics and legal regulation of using neurotechnology in the advertising industry is a controversial issue, since neuromarketing technologies are developing rapidly and are implemented in the advertising

industry. The legislation of Ukraine sets certain restrictions in regard to the advertising of alcohol and tobacco products, prohibits the advertising of goods that are prohibited from being imported into the country's territory. At the same time, there is no legal regulation concerning the use of technologies used to obtain information about the target audience of goods and services.

In addition to the use in marketing, neurotechnologies are important for the development of legal sciences and their practical application in criminal, civil and administrative proceedings.

Therefore, the assessment of the opportunities to use neurotechnology in the advertising industry in terms of ethics and legal regulation in Ukraine is a topical issue today.

The paper aims to identify possible ways to increase the effectiveness of regulatory and ethical aspects of the neurotechnology use in the advertising industry in Ukraine based on the analysis of theoretical experience, regulations and their discussions in Ukrainian society.

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## 1. LITERATURE REVIEW

The main issue for modern business is not how to make a product, but how to sell it at a profit (Sanakoieva & Kushch, 2017). The only option to establish oneself in the market is the transition to innovative development (Chesbro, 2008).

According to Infinium (2021), the global market of marketing solutions in 2017 was estimated at almost USD 1,033 million and is expected to reach more than USD 2,000 million by 2024 with a CAGR of 9.1% during the forecast period from 2018 to 2024. At the same time, the number of studies with application of small-scale technologies and methods based on machine training, including in the online environment, is expected to increase (Bukrieiev et al., 2020).

Many solutions developed in neuroscience are implemented in marketing practice. Among the companies that apply neuromarketing are: BBC, CocaCola, McDonalds, Ford, Heinz, Intel and L'Oreal, P&G, Hyundai, Microsoft, Yahoo, Ebay, Campbell's, Estée Lauder, Fox News, Delta, Procter & Gamble, Carlsberg Beer, ESPN (Burgos-Campero & Vargas-Ionescu, Romanelli, 2019), Google, CBS, Frito-Lay, and E-Television (Maksymiv & Gamova, 2017).

Rainey et al. (2020) analyze the neurotechnology spread: "Kernel, a company located in Los Angeles, wants to "break the human brain" (Statt, 2017). They were joined by Facebook, which wants to develop a tool to control devices directly using

brain data (Forrest, 2017). "Neuralink" I. Maska is an enterprise whose goal is to "combine the brain with artificial intelligence" (Winkler, 2017).

The subject matter of neuromarketing is the study of unconscious sensorimotor, cognitive and human emotional reactions to external stimuli (Gugul, 2014). Woodwood (2013) analyzes the impact of neuromarketing on human behavior and notes that, 98% of all advertising information is not perceived at all, and the average duration of an advertisement perception is only 2 seconds.

The main types of neuromarketing are marketing studies concerning the determination of brain reactions, aroma marketing, audio marketing, and color psychology (Al-Tmeyzi, 2019). One of the main channels to achieve neuromarketing goals is the visual channel (Bakardjieva & Kimmel, 2017). Through the perception of visual images, the greatest amount of information can be obtained. The auditory channel of perception is more sophisticated in its work. When influencing this sensory receptor, the generally accepted psychophysiological laws are applied (Al-Tmeyzi, 2017). It is the most difficult to work with the olfactory channel. All people have different olfactory tastes. Eye tracking research is a new effective method of eye movement analysis that provides a more objective approach to assessing consumer's perception of advertising (Ducu, 2017).

Neuromarketing methods use the tools of neurosciences that allow finding an objective explana-

tion of human behavior as a potential consumer of goods, not from a rationalistic, but from a physiological point of view. For example, neuroeconomics and neuromarketing research by Kahneman and Smith (2011), who found a key to solving a number of important issues and answered the question of how a person makes a purchase decision, which is one of the key issues of advertising.

Ienca and Andorno (2017) analyze the efficiency of using neurotechnology in the advertising industry:

- 1) determining the intentions of consumers when ordering goods and services online, by deciphering information about the brain activity of consumers (Haynes et al., 2007);
- 2) determining the information obtained by consumers by scanning the brain when re-viewing the information (Smith, 2013);
- 3) identification of political views when analyzing the differences in the brain activity of different political force supporters by fMRI scanning (Schreiber et al., 2013);
- 4) identifying differences in consumer behavior of men and women, using analysis of brain activity and functional differences in the brain of men and women (Baron-Cohen, 2004).

Lewis and Brigder (2005) have shown that the human brain actively responds to visual images, resulting in changes in certain areas of the human cerebral cortex responsible for decision making.

Neuromarketing was created on the wave of “neuromania”, when the prefix “neuro-” became influential in research result reevaluation. Talis (2012) has quite an ambiguous attitude to the total fascination with neuromania, noting that the human being is different from the animal, and it is impossible to control its behavior.

In his study of neuromania, Sepetyi (2017) proved that humans are not animals that act “explicitly and whose natural environment is a community of intelligent beings that extends geographically across the globe and historically into the accumulated consciousness of the human race”.

Lilienfeld and Seidl considered the cases of thoughtless simplification and overestimation of the possibilities of neuroscience new methods as an explanatory tool of human behavior, as well as their primitive interpretation in various contexts: “If you cannot persuade others to your point of view, take the prefix “neuro” – and your influence will increase or we will refund your money!” (Seidl & Lilienfeld, 2016).

There is no consensus on the reasonability of using neurotechnology in the advertising industry. M. Rogers, D. Lewis, M. Lindstrom, and N. Coro are supporters of the use of neurotechnology in the advertising industry and justify its scientific value and practical significance (Kahneman & Smith, 2011). J. Chester, D. Ariel, J. Burns, J. Ailes, and R. McLean consider neuromarketing to be incorrect and emphasize the process of “consciousness manipulation” (Ariely, 2010).

In terms of legal regulation of using neurotechnology, it should be noted that the laws of different countries impose certain restrictions on advertising in radio and television programs. These restrictions are mainly related to the duration and frequency of ad units. In addition, restrictions are imposed on the advertising of certain groups of goods: tobacco, alcohol, medicines and weapons. In the Western countries, the regulation of relations in advertising is usually carried out by consumer associations and professional organizations of advertisers (Kukina, 2012).

In the United States, there is the Federal Trade Commission (FTC), a state authority that oversees advertising activities, and is responsible for interpreting misleading advertising, surreptitious advertising, and regulating unfair competition practices (Maievskyi, 2006).

The legislation of Ukraine in the field of the advertising industry prohibits the dissemination of information on goods, which production, circulation or import into the customs territory of Ukraine is prohibited by law (in the EU it is regulated by Directive 2005/29/EU). According to the law, it is prohibited to advertise goods that are subject to mandatory certification in case of the absence of relevant certificates (The Verkhovna Rada of Ukraine, n.d.).

It should be noted that Ukrainian legislation in most cases meets European standards, although there are many unresolved issues today. There are no clearly defined functions of the state in relations with advertisers, as well as the rights of advertisers in relations with the state. There are no advertising standards and no relevant authority, such as the Advertising Standards Authority (ASA) in the UK, which would regulate the compliance of advertising with the set standards. Although this authority is not a state body and does not have the powers to issue and interpret laws, its codes of advertising practice reflect the law widely in many instances (Kukina, 2012).

“At the moment, more than 100 countries have a certain form of privacy and data protection laws. But no government can directly regulate brain data in accordance with the right to privacy” (Adams, 2020). The peculiarity of the legal regulation of using neurotechnology is that the data obtained can be regulated by the rights of citizens to private information, but there are no laws regulating the use of brain activity data, which may not relate to personal data.

Lenza (2004), when studying neurotechnology in terms of interaction with the legal aspect of the issue, offers the introduction of “neuro law”. Ienca and Andorno (2017) note that the basic idea of this field is that better knowledge of the brain will lead to clearer laws and fairer legal procedures. “Removing the memory of violent rapists-recidivists and victims of particularly traumatic crimes (for example sexual violence) is also mentioned as another opportunity opened up by our new knowledge of the brain (Goodenough & Tucker 2010)” (Ienca & Andorno, 2017, pp. 5-6).

Milevska (2016) notes that innovative technologies can improve the quality of life and make our existence much safer. For the purpose of the most effective application of neurotechnologies, the following is possible:

- 1) defining the issue associated with the use of psychopharmacology and neuroimaging in management, testing of marketing concepts and communication;
- 2) formalizing the limits of application of neuromarketing research normatively and legal-

ly and organizing an operational authority to oversee the implementation of developed rules and regulations;

- 3) organizing full-fledged educational activities.

Considering the use of neurotechnology to understand human brain activity and attempts to relate this work to mental states, it is important to remain vigilant about the social, legal, and political aspects of primary research and the simultaneous development of technologies (Mecacci & Haselager, 2019).

The socio-political consequences of widespread neural recordings may be profound. From these records, detailed predictions can be made about the private, intimate aspects of a person. For those who have access to them, this data will become a valuable asset (Robertson, 2019). These opportunities are a valuable resource, providing a rich link between overt actions and hitherto hidden brain activity. It should be noted that these data may also allow for personal manipulation, as well as social and political harm (Cadwalladr & Graham-Harrison, 2018).

It is very important to include public involvement, ethical discussions and a legal framework for work with neuromarketing research and mobile applications. France has tried to introduce the use of this technology into the legal framework, defining the use of neuroimaging technologies only for human health and well-being. The Council of Europe emphasizes the need for a new form of technical and scientific drivers and market forces management. In this respect, an inclusive process of social training is offered, which includes professional, social, political and ethical discussions and draws attention to the functions of intergovernmental committees and public (bio) ethical authorities, such as the Bioethics Committee of the Council of Europe and the European Group on Ethics for Decision-Making and Monitoring of Commercial Applications.

Ethical aspects of neurotechnology can be divided into bioethical, professional-ethical and humanistic. Manipulations involving the overt influence on consumer thinking displace the concept of personal responsibility for decision-making and self-government (Stanton et al., 2017). Data confidentiality arises as a collective issue (Véliz, 2019).

Determining the correlates of brain activity and their relationship with the state and behavior of a respondent require immediate resolution of the issue of ensuring the confidentiality of the information obtained in the legal aspect. At the same time, it cannot be said that these studies, if used correctly, harm society as a whole or even an individual person, because they are based on properly formulated goals and objectives.

The issue of the ethics of using neuromarketing by brands and retail chains remains pending (Sanakoieva & Kushch, 2018). Ulman suggests three main ways for further perspectives of the neurotechnology use:

- 1) to establish a total ban or partial restriction of neurotechnology for commercial use;
- 2) to allow full freedom of use due to the absence of any regulatory standard;
- 3) to develop a regulatory framework (Ulman, 2015, p. 1281).

Regardless of the neuromarketing technology choice, any abuses should be excluded – scientific, ethical and legal, which can harm people, recognizing human dignity and health as an important value.

Important for research is the Brain Research program through Advancing Innovative Neurotechnologies (BRAIN). Their report, *BRAIN 2025: A Scientific Vision*, provided a framework for a suite of bold funding opportunities outlined in a thoughtful multiyear scientific plan for the NIH BRAIN Initiative. Here are the areas that are important to the NIH BRAIN Initiative:

1. Discovering diversity.
2. Maps at multiple scales.
3. The brain in action.
4. Demonstrating causality.
5. Identifying fundamental principles.
6. Advancing human neuroscience.

7. From BRAIN Initiative to the brain (Mott et al., 2018).

In Ukraine, research of consumer behavior is conducted using neuromarketing technologies (Data Research Center on the basis of Kyiv Academic University, Neuro Knowledge Research Center, Behavior Academy). Neuro Knowledge Research Center notes that the neuromarketing research efficiency when predicting real consumer behavior compared to traditional marketing research is 78-82% vs. 58%.

However, the relationship between data obtained using neurotechnology and the personal rights and freedoms of citizens need further research and clarification (Rainey et al., 2019). It should be stated that the data obtained is the person itself, as they reflect his or her thoughts, intentions, behavior. Information obtained using neurotechnology is the subject matter of debate related to the use of Big Data (Bollier & Firestone, 2010; Boyd & Crawford, 2012).

“New trends in neurotechnology are causing coordination changes in the current human rights system requiring either a reinterpretation of existing human rights or even the creation of new neurospecific rights” (Ienca & Andorno, 2017).

“The result of neurotechnology use should be considered to be personal data in the framework of data protection regulation” (Rainey et al., 2020). The issue of how the existing regulations should be interpreted and what further legal regulation may be required is open.

The first international neurotechnology use standard is the OECD Recommendation adopted in 2019. It aims to help governments and innovators anticipate and solve the ethical, legal and social challenges posed by new neurotechnologies, while fostering innovation in this area (OECD, 2019).

“Future research is appropriate to examine the consequences of proposed human rights for other levels of law, such as international humanitarian law, criminal law, tort law, property law and consumer law” (Ienca & Andorno, 2017). Ienca & Andorno (2017) emphasize the relevance of developing a legislation with the involvement of various

specialists such as lawyers, neurologists, IT specialists, psychologists, marketers, regulators.

The balance between the purpose of the use of neurotechnology, data processing method and the legal basis of its use is a complex problem. "If data is processed in a way that is incompatible with the purpose for which it was originally obtained, the processing is deemed illegal. If the data is used for a purpose that exceeds the one for which it was collected, it is considered to be "re-purposed" (Rainey et al., 2020).

Neurological studies contain various permissions in the text of the GDPR, but they may not fully protect the data obtained. Where there is personal data, even in the context of the study, the GDPR is applied. Nevertheless, the exact nature of the technologies that emerge from primary research is not necessarily very clear. Consideration should be given to the classification of the devices by means of which neurological examination is performed. "A consumer device can be classified as medical to avoid more stringent requirements for medical products. However, functionally the data can be classified as biometric or medical. Differences in the applicability of data protection rules may arise between these and other classifications of technology" (Rainey et al., 2020).

Yuste and Goering (2017) note that companies that develop devices for neuroscience research "should be responsible for their products and be guided by certain standards, the best practices and ethical standards." Yuste and Goering (2017) distinguish "four areas of concern requiring immediate action: confidentiality and consent, agency and identity, augmentation and prejudice" (p. 161). Yuste and Goering (2017) suggest teaching employees to "think more deeply about how to use achievements and apply strategies which are likely to contribute to society constructively rather than destroy it" (p. 163).

Kellmeyer (2021) identifies a threat of neurotechnology use such as "neurohacking", which can manifest itself in hacking the access to the brain data of neuroscience research participants. The aim of hacking may be to detain a person illegally to obtain a ransom or claim money in turn for the information stolen. To minimize this threat,

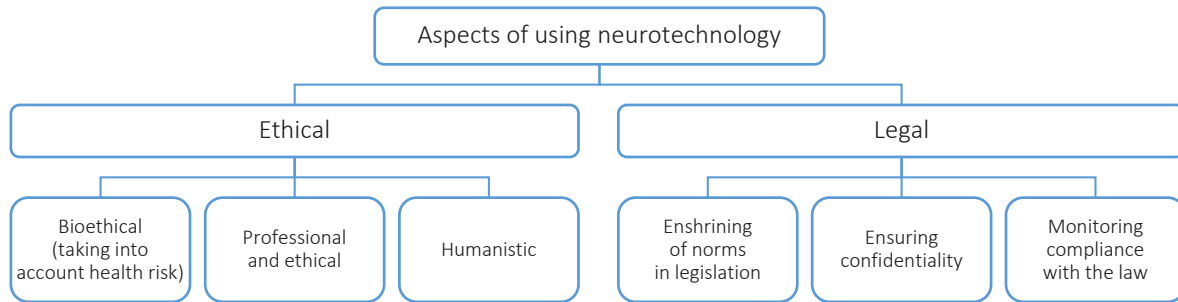
Kellmeyer (2021) recommends that legislators adhere to strict security requirements: encrypting at device, transmission, and storage servers level.

Seifullaeva et al. (2018) and Panasenکو et al. (2018) identified the following risks and dangers of using neurotechnology: the risk of possible restriction of human rights due to invasion of his or her personal space; dangers of manipulation, public use of individual neurodata obtained; the risk of a possible decline in confidence in neurotechnology in case of malicious abuse; information leakage, reducing the level of corporate social responsibility (Seifullaeva et al., 2018; Panasenکو et al., 2018).

Nyholm et al. (2019) analyze the article by Kreitmair (2019), in which he states that for the ethics of neurotechnology it is advisable for it to be: "safe, transparent in operation, respectful to confidentiality, appropriate, fairly distributed among people, providing proper supervision" (Nyholm et al., 2019).

Goering et al. (2021) developed recommendations for improving neurotechnology:

1. To establish "Neurorights" (e.g., mental freedom, mental privacy and mental inviolability).
2. To improve informed consent to neurotechnology.
3. To encrypt brain data.
4. To create default settings requiring active permission to exchange brain data.
5. To limit the data exchange about brain.
6. To recognize prejudice.
7. To combat prejudice actively.
8. To encourage commercial responsibility for the neurotechnology development
9. To promote equal access to neurotechnology.
10. To appoint a broad international commission to meet regularly and evaluate the development of neurotechnology in order to provide



**Figure 1.** Ethical and legal aspects of using neurotechnology

ethical advice and a shared commitment concerning the relevant innovations (Goering et al., 2021).

## 2. GENERALIZATION OF THE MAIN STATEMENTS

Analysis of the legal and regulatory framework of using marketing technologies in Ukraine shows that there are no legal regulations allowing or forbidding the use of neurotechnologies and obtained data in the advertising industry. There is no clear model of interaction between the state and advertisers, the functions of the state in terms of control and restrictions concerning the use of neurotechnologies in marketing are not established. Unlike Western countries, Ukraine has not developed consumer associations and professional advertisers' organizations participating in regulating the use of advertising and marketing technologies. It is important not just to continue to develop and use neurotechnology, which may raise issues concerning the process of obtaining and using data, but to develop and implement regulations at the legislative level to ensure the safety and ethics of such technology.

The use of neurotechnology in the advertising industry, without normative regulation and restrictions that would ensure the confidentiality and legal security of citizens, may cause various potential risks, including psychological, economic, and legal risks for companies using neurotechnology. Data confidentiality is becoming a collective issue that may threaten the personal

rights of citizens and, as a result, reduce the security of society.

In addition, the use of neurotechnology concerns the issue of personal data and the correlation of obtained information with it. It makes sense to define and establish at the legislative level the distinction between the concepts of personal data and unsold data. This is due to the fact that the data obtained as a result of neuroscience research can contain information not only about the individual, but also biometric, medical information, which should remain confidential.

This situation determines the expediency of reviewing and amending the laws governing the personal rights of citizens. Ienca and Andorno (2017) show that it is also appropriate to make amendments in criminal law, tort law, property law and consumer law, since the use of neurotechnology in marketing is the scope of regulation of these types of law.

At the legislative level, it is also important to differentiate the purpose, methods of obtaining and processing data. This is because neurotechnology is used in various fields – medicine, forensics, marketing, and in the future they can be used in politics. Therefore, it is advisable to set different restrictions on the use of neuroscience research in different areas of society. The solution of this issue can be the basis for developing a new branch of law – “jurisprudence of mind”, as it is called by Ienca and Andorno (2017). A possible way to increase the effectiveness of legal regulations development in regulating the use of neurotechnology is to involve specialists from various areas, such as medicine, psychol-



ogy, law, IT, marketing, to amend existing laws and create new ones. The solution to an issue of using neurotechnologies in marketing is possible by means of one of the following ways:

- 1) the introduction of a complete restriction on the use of neuromarketing technologies in the advertising industry;
- 2) making amendments to the legislation, establishing the limits of neurotechnology application and use of the data obtained by means of such methods;
- 3) permission to use neurotechnologies and data obtained with their help.

The first and the last ways to solve the issue are quite categorical. The introduction of a prohibition on the use of neurotechnology will restrict the rights of producers of goods, services, marketing and advertising agencies, which may provoke a negative reaction from them and reduce the economic efficiency of their activities. On the other hand, unrestricted permission to use neuromarketing technologies may violate the rights and freedoms of citizens. Therefore, the best solution is to define and establish the limits of using neuromarketing technologies, which will allow effective functioning of entities in the field of marketing and economic activity and protect the rights and freedoms of citizens.

To prevent the risk of unethical use of neuromarketing technologies, it is possible to develop and implement security measures that will help protect the rights and freedoms of respondents:

- 1) defining problems related to the use of neurotechnology in management, marketing strategy testing, concepts and communication;
- 2) determining normative-legal and legislative limits of neurotechnologies application;
- 3) organization of educational activities providing a conscious understanding by the population of ethically justified goals and objectives of neurotechnology use in the advertising industry;

- 4) studying the most important issues related to the risk of intrusion into the personal space of citizens.

### 3. DISCUSSION

Since the use of neurotechnology in the advertising industry is currently not permitted and at the same time is not prohibited in Ukraine, the issue of setting the limits for the use of neuromarketing technologies is controversial. It is possible to set boundaries in terms of goods and services for advertising of which neurotechnology is used. As neurotechnologies demonstrate rather high efficiency in advertising area, it may be reasonable to set restrictions for the use of such technologies for advertising goods and services that have advertising restrictions (alcohol, tobacco, online casinos), but at the same time their advertising may be available on the Internet. Restricting the use of neurotechnology at the legislative level in the advertising industry may take into account ethical aspects of its application.

The issue of ethics is quite complex in terms of considering not only the personal information confidentiality, but also the mentality, national and religious characteristics of respondents participating in neurotechnology research. On the one hand, respondents participating in such studies agree to use the information obtained from the experiment, on the other hand, advertising and marketing companies can use the obtained data for their own purposes. Therefore, in this respect, it is possible to impose restrictions on the use of the information obtained. To ensure the ethical use of respondents' confidential data, it is possible to establish legal liability for marketing companies and their employees who use the data with mercenary motives.

It is also important to ensure understanding and perception of using neurotechnology by the population. The solution to this issue can be implemented by informing the public. Ensuring the safe use of neurotechnology is possible through the training of marketing and advertising specialists. Such training can be aimed not only at the possibility of using neuromarketing technologies, but also at the legal and ethical aspects of their application.

The distinction between the concepts of “personal data” and data obtained using neurotechnology is an issue of concern that should be investigated in the future. On the one hand, the information obtained by neuroscience research is the personal data of the respondent, and on the other hand, its essence may include biometric and medical information. To differentiate these concepts, it is possible to establish standard indicators that will help distinguish between these two concepts.

Thus, given these ethical and legal aspects of using neurotechnology in Ukraine, it is possible to identify shortcomings in Ukrainian legislation and ethical barriers posing a threat to the use of neuroscience research, as well as identify possible ways to overcome them.

The introduction of security measures for the use of neurotechnology in the advertising industry will create an atmosphere of understanding and public perception of using such technologies. Establishing standards for the use of neurotech-

nology in the advertising industry, legal regulatory restrictions and legal liability for violation of established restrictions and standards can positively affect the development of the advertising and marketing industry, ensuring the ethical use of such technologies.

That is, the consequences of optimizing the neurotechnology use in Ukrainian society may be as follows:

- developing neuromarketing technologies at a high level;
- advanced training of specialists in the marketing and advertising industry;
- increasing the economic efficiency of marketing and advertising activities of companies;
- introducing neurotechnologies in new social spheres (politics, various branches of law);
- improving the legal system.

**Table 1.** Disadvantages of using neurotechnology in the advertising industry and possible solutions

Threats from the neurotechnology use	Possible ways to overcome
<b>Legal</b>	
Lack of a neurotechnology law	Neurotechnology law drafting with the involvement of specialists in the field of law, medicine, psychology, IT, marketing and advertising industry
Lack of clarification regarding neuro data in the law on personal rights and confidentiality of personal information	Introducing amendments and additions to the laws on personal rights
No restrictions on the use of neurotechnology in various fields: medicine, law, marketing	1) Setting different restrictions on the use of neurotechnology for different industries 2) Enshrining the neurological research devices classification at the statutory level 3) Establishing compliance with the purpose of neuroscience research and methods of processing and use of neuro data
The possibility of cyber-hacking and neuro data theft	1) Increasing the level of data security in neuroscience research 2) Coding of information at all stages of neuroscience research 3) Increasing the level of cybersecurity at the state level
Lack of consumer associations, professional organizations of advertisers that would participate in regulating the use of neurotechnology	Conducting informative activities and training for specialists in the advertising and marketing industry on the possibilities of creating associations and professional organizations
Lack of a model of the relationship between the state and advertising organizations on the use of neuroscience research	Developing uniform communication standards between public institutions and advertising organizations
<b>Ethical</b>	
Lack of public understanding of using neurotechnology	Conducting informative activities among the population on the relevance, effectiveness and efficiency of neuroscience research use
Low level of awareness of the population about their rights, freedoms and responsibilities	Conducting educational activities in education institutions, enterprises and organizations, through the media regarding the rights and freedoms of citizens in accordance with the law
Lack of training for specialists of the advertising industry and marketing in regard to the ethics of neuro data use	Conducting education activities, trainings, advanced training for specialists in the marketing and advertising industry

## CONCLUSION

The rapid development of neurotechnologies is important for various industries – economics, marketing and advertising industry, law, psychology. The aim of the paper is to identify possible ways to optimize the legal and ethical aspects of using neurotechnology in Ukraine's advertising industry. It has been determined that in Ukraine, there is no legal regulation of using neurotechnology in the advertising industry and marketing. It was established that the threats for the development of neuromarketing are legal aspects (lack of a neurotechnology law, lack of statutory concept of "neuro data", lack of an interaction model between the state and marketing companies, the possibility of cyber-hacking and theft of neuro data, lack of consumer associations and professional organizations, participating in regulating the neurotechnology use) and ethical aspects (low level of public awareness of neurotechnology, low level of awareness of citizens about their rights and freedoms, lack of training for marketing and advertising professionals regarding the use of neurotechnology).

Overcoming these shortcomings is possible by amending legal and regulatory acts (drafting of a neurotechnology law, clarification of neurodata in the laws on the personal rights and freedoms of citizens, fixing restrictions on the use of neurotechnology in various fields, setting restrictions concerning neuroscience research, depending on the purpose of their conducting, raising the level of security system for conducting neuroscience research, establishing common standards of interaction between the state and advertising companies), as well as conducting education and information activities (training for advertising and marketing specialists, informing citizens about the use of neurotechnology and their rights and freedoms).

A comprehensive and systematic solution to the issue of using neurotechnologies in Ukraine can increase the level of development of the advertising industry, improve the skills of marketers and advertisers, expand the scope of neurotechnology in Ukrainian society, ensure the rights, freedoms of citizens and improve the legal system.

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