UNIVERSITY OF LJUBLJANA

SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

CONSUMER ATTITUDES TOWARD THE ETHICS OF NEUROMARKETING IN THE WESTERN BALKANS

Ljubljana, September 2019 AIDA ZUKIĆ

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LIST OF ABBREVIATIONS

EEG - Electroencephalography
fMRI- Functional Magnetic Resonance Imaging
dlPFC- Dorsolateral prefrontal cortex
MEG- Magnetoencephalography
MPFC- medial prefrontal cortex
NCC- nucleus accumbens
NMSBA -Neuromarketing Science & Business Association
OFC- orbitofrontal cortex
SST- Steady State Topography
TMS - Transcranial Magnetic Stimulation
vmPFC- ventral medial prefrontal cortex

INTRODUCTION

Since the first reports on the use of neuromarketing came out in June 2002, neuromarketing techniques have been increasingly used to explore preferences of consumers (Murphy, Illes & Reiner, 2008; Sue, Netty & Yazdanifard, 2013). By 2015, the number of neuromarketing companies exceeded 300 worldwide, including a 20% increase in the number of neuromarketing companies from January 2016 until February 2017, making it one of the fastest-growing fields of marketing (Neuromarketing Science & Business Association, 2017).

Neuromarketing generally refers to "a new field of research, championed by both academics and self-labeled companies using advances in neuroscience, that permit powerful insights into the human brain's responses to marketing stimuli" (Murphy, Illes & Reiner, 2008, p. 293). The main goal of neuromarketing research is to remove subjectivity and ambiguity in consumer opinions by measuring observable brain behavior (Randall, 2009).

The three measures developed from consumers' reactions to stimuli including behavioral, verbal, and psychophysiological measures, according to Wang and Minor (2008). Marketing goals determine the type of neuromarketing research. Goals can vary from the product and brand development stage to the stage of pricing strategy, including also decisions about positioning of the product, promotion, and advertisement (Karmarkar, Shiv & Knutson, 2015). Companies such as Microsoft, Google, Coca-Cola, Toyota, and many others have realized the importance of neuromarketing and started to use and implement it in strategy development processes, testing of advertisements and logo creations (Lindstrom, 2008; Flores, Barua & Saldivar, 2014).

Using neuroscientific-based methods is the main difference between neuromarketing and traditional marketing (Randall, 2009). These methods allow researchers to detect hidden information in the consumer's mind (Krajnović, Sikirić & Jašić, 2012). Neuroscientific methods include Functional Magnetic Resonance Imaging (hereinafter: fMRI), Steady State Topography (hereinafter SST), Electroencephalography (hereinafter EEG), Eye Tracking, and Galvanic Skin Response.

In addition to providing marketers a way to "glimpse" into the mind of consumers, positive effects of neuromarketing have been demonstrated, such as its use to discover disorders such as compulsive buying and pathological addictions (Hensel, Iorga, Wolter & Znanewitz, 2017). However, several problems have been raised regarding neuromarketing. Ethical concerns are one of the most important aspects related to neuromarketing, regarding the opinions of marketing academics, neurologists, and marketing professionals (Eser, Bahar Isin & Tolon, 2010). Where the ethics of neuromarketing are concerned, opinions are split. On the one hand, researchers like Renvoise and Morin (2007) see neuromarketing as a tool for mind-reading and pursuing customers to buy a product (Stanton, Sinnott-Armstrong & Huettel, 2016) warn that neuromarketing research may create potentially serious ethical issues. The perception of neuromarketing as an effective tool for mind-reading and a potential manipulator of customers raises a lot of controversies. "A ripple of moral concern, recent opinions on 'neuromarketing' within the neuroscientific literature have strongly questioned the ethics of applying imaging

techniques to the purpose of finding the 'buy button in the brain' and creating advertising campaigns that we will be unable to resist" (Lee, Broderick & Chamberlain 2007, p. 199).

From an ethical perspective, such considerations can be compared with communication through subliminal messages, where there is a possibility of influencing the person's behavior without the person being aware of the influence through message and it is considered unethical while influencing people's behavior conspicuously might be considered ethical. Many scholars believe that neuromarketing is unethical because it represents a potential invasion of privacy and mind control (Fleming, 2006). The shortfall in consumer autonomy is pointed out as another important ethical issue (Murphy, Illes & Reiner, 2008).

On the other hand, some scholars think the ethical issue is overrated or is simply due to a misunderstanding of the actual techniques used. Eser, Bahar Isin & Tolon (2010), for instance, do not consider neuromarketing and the use of scientific technology and neurocognitive models in commercial purposes problematic.

Some researchers consider neuromarketing as unethical simply due to their misunderstanding of techniques and their application abilities (Lindell & Kidd, 2013; Stanton, Sinnott-Armstrong & Huettel, 2016). According to others, the actual use of neuromarketing methods is not problematic, but its potential uses could be problematic: Hensel, Iorga, Wolter and Znanewitz (2017), for instance, argue that ethical issues arise from the way that data is used (eg. using neuromarketing to influence political elections), not the way how they are collected, and which methodologies are used.

In response to these concerns, the Neuromarketing Science and Business Association (hereinafter NMSBA) established a Code of Ethics with 12 articles, defining the terms related to ethics of neuromarketing for neuromarketing companies researching for commercial purposes (Neuromarketing Science & Business Association, 2019).

Despite the proliferating research on neuromarketing ethics issues, most research on neuromarketing ethics has focused on two major ethical concerns regarding neuromarketing: the invasion of privacy and potential mind control (Thompson, 2003; Lindstrom, 2008). What is not well known is the attitudes of consumers themselves about neuromarketing and ethics of neuromarketing. One of the few studies of consumer attitudes about the ethics of neuromarketing, by Flores, Baruca and Saldivar (2014), demonstrated that consumers considered the use of neuromarketing for non–profit organizations more ethical than the use of for-profit organizations.

Additionally, neuromarketing as a global marketing trend is also slowly coming to the Western Balkan countries. Most marketing agencies in the Western Balkan region use services from neuromarketing agencies from abroad, because there are only a few neuromarketing agencies in this region (Promosapiens, 2018). Taking into consideration that neuromarketing is one of the recent trends in this region, not a lot has been written about this topic, and a lot of things are unknown, especially those related to customers (Krajina, 2016). As mentioned above, previous neuromarketing studies are done by analyzing populations far away from Balkans (mainly done

in the United States), and none of the studies so far were connected in the Western Balkan region (Flores, Baruca & Saldivar, 2014). Since a culture represents one of the fundamental determinants of decision-making processes and affects the individual perception of ethical problems and consequences, it is very important to deeply analyze the perception of different cultures on ethical issues (Hunt & Vitell, 1986). Because of the importance of the cross-cultural differences in ethical beliefs, this research aims to provide an insight into neuromarketing and ethics in the Western Balkan for the first time.

The **purpose** of the research is to examine neuromarketing from an ethical point of view and to understand the attitudes of consumers in the Western Balkans towards it. Since ethics and consumer opinions on neuromarketing in this geographic area have not yet been analyzed, this research may be used as a direction for further research, and may help to provide better guidelines on how to protect various parties who may be harmed or exploited through the process of neuromarketing research (Nemorin & Gandy, 2017).

The **goals** of the research are:

- to comprehensively review the ethical issues related to neuromarketing,
- to determine the level of awareness and the opinions of consumers about the ethics of neuromarketing in the Western Balkans,
- to develop recommendations and best practices concerning how consumers can be protected from potential invasion of privacy or abuse by neuromarketing.

The research questions include:

RQ1. What is the level of awareness when it comes to the ethics of neuromarketing among consumers in the Western Balkan region?

RQ2. What is the opinion of consumers in the Western Balkan region regarding the ethics of neuromarketing?

RQ3. What are the best ways to ensure the protection of consumers from a potential invasion of privacy, manipulation or abuse from neuromarketing?

The proposed Master's thesis includes a theoretical and an empirical part. The theoretical part of the master thesis looks at secondary sources obtained from reports, prepared by research scholars and universities, published in technical journals and books, as well as reports and publications of various organizations connected to the industry. The empirical part primarily relies on a quantitative analysis of a survey questionnaire conducted with more than 300 inhabitants from the Western Balkans. Most of the respondents were from Bosnia and Herzegovina (132), followed by Serbia (73), Croatia (51) and Montenegro (49). The purpose of the survey questionnaire was to assess the level of awareness and opinions of consumers towards neuromarketing. Qualitative data were also used in the form of expert in-depth interviews with several representatives of the marketing industry and a university professor working in the field

of neuromarketing in the Balkans, in order to obtain a better picture of the state of neuromarketing research in the Western Balkan region.

Following the introduction, the theoretical foundations are introduced: definitions of neuromarketing and its methodologies and techniques are gradually being introduced in the first chapter, narrowing down to the practical use of neuromarketing and its ethics in the second. The third chapter provides the methodology: it includes the description of survey data that was conducted with customers in Western Balkans and interviews, as well as the introduction of the research sample and data analysis. The fourth chapter aims to give readers a better insight into the state of neuromarketing research in Western Balkans, relying on in-depth interviews with experts, both academics and in the industry, working on neuromarketing in the region. The fifth chapter provides the main findings for the thesis: the opinions of consumers, gathered through an extensive survey questionnaire, towards neuromarketing and its ethics. Further research recommendations and limitations are drawn based on the survey and interview findings, in chapter six. Following the body of the document, the conclusion summarizes the findings of the Master's thesis concerning the originally proposed research questions. The thesis is closed with a list of references and appendixes.

1. DEFINING NEUROMARKETING

From 1957, when James Vicary, the marketing executive, announced that secretly flashed subliminal messages «Drink Coca-Cola» and «Eat Popcorn» had an impact on the increase of the sale of food and drinks in a movie theatre, started the interest for understanding the brain as the mediator of behavior (Karremans, Stroebe & Claus 2006). The human brain was considered a black box and it raised a lot of questions and desires to understand what is happening inside of it. It is the center of the nervous system, generating the human mind and has been defined as "the most complex structure in the universe" (Morin, 2011).

A combination of two sciences, economics, and neuroscience for investigating economic problems, brought a new discipline called neuroeconomics. Neuroeconomics engages in brain research methods for the investigation of economic problems. Sub-area of neuroeconomics that emerged to address marketing relevant problems and solutions by using the insights from the consumer's brain is called neuromarketing (Hubert & Kenning, 2008).

It was not a long time ago when Albert Einstein said: "It has become appallingly obvious that our technology has exceeded our humanity." The technology found its way to impact many fields, among them even marketing, and it started to be an answer to the questions that were a mystery a few decades ago (Ruanguttamanun, 2014). Beyond the traditional marketing research methods that are based on verbal reports and introspection, and are mainly subjective, scientists and marketers wanted to go deeper and try to find more objective human responses to different questions (Camerer, Loewenstein & Prelec, 2005).

One decade ago, the application of neuroscience to consumer psychology gained popularity, both in academic research and business practice, especially in branding (Plassmann, Ramsøy & Milosavljevic, 2012). To solve marketing problems, some companies were using neurophysiologic techniques, such as electroencephalography (EEG) (Fisher, Brown, Aron, Strong & Mashek, 2010). Psychologists and psychiatrists' desire to apply the newest technology in order to have a better understanding of the human brain, emotions and other psychological insights of individuals, that attracted the attention of marketing experts who also saw the potential of using the technology to achieve the same goals. With the use of functional magnetic resonance (fMRI), researchers were one step closer to the opening of the black box called the human brain, and investigation of how certain parts of the human brain respond to stimuli (Felipe-Barkin, 2013). Functional magnetic resonance (fMRI) was used in 1999 for the first time by Gerry Zaltman (Harvard University), and from then on, he has been considered as the real founder of neuromarketing. On the other side, the word "neuromarketing" was used for the first time by German professor Ale Smidts (Erasmus University) in 2002 (Krajnović, Sikirić & Jašić, 2012).

1.1 Definitions

Nowadays, there are still many definitions of neuromarketing, but the one that appears most often is that neuromarketing is consumer neuroscience (Fortunato, Giraldi & Oliveira, 2014). The difference between neuromarketing and consumer neuroscience is that neuromarketing is involved in the practical implementation of neuroscientific knowledge, often gained from consumer neuroscience, in industry, for company-specific marketing insights. Consumer neuroscience is the term that refers to the academic literature, combining neuroscience, psychology, and biology to explain particular situations in human behavior, while neuromarketing as a term is used in the industry (Hubert & Kenning, 2008).

Among the many definitions of neuromarketing, some of them approach neuromarketing as a field resulting from the "fusion" of two or more sciences: marketing, and neuroscience (Ferrajão & Oliveira, 2014). Neuromarketing is also defined as "a new field of research championed by both academics and self-labeled companies using advances in neuroscience that permit powerful insights into the human brain's responses to marketing stimuli." (Renvoise & Morin, 2007). Even though, neuromarketing as a term is already widely used, there are many authors who use terms such as: "study of brain imaging" (Hubert & Kenning, 2008), "study of neuroimaging" (Cherubino et al., 2016), and "neuro-technology" (Fisher, Chin & Klitzman, 2010), when referring to neuromarketing.

According to Flores, Baruca, and Saldivar (2014) as a relatively nascent subfield in marketing, neuromarketing applies neuroscientific methods to study consumer reactions to specific marketing-related stimuli. There are three measures of consumers' reactions to stimuli, and those are behavioral measures, verbal measures, and psychophysiological measures (Wang & Minor, 2008). Explicit behavioral measures are the measures that are usually collected when providing process-based accounts of consumer behavior. Many processes in the human brain occur at the

unconscious or implicit level and it becomes difficult to measure them accurately because consumers are not able to articulate reasons for their behavior (Camerer & Yoon, 2015). Daniel Kahneman, the psychologist working in the field of neuromarketing and Nobel Prize winner in 2002 for economics, advocates that neuromarketing is seeking to find a way to unseen subconscious level and to quantify, explain and exploit unseen human subconscious. Most of these theoretical frameworks are based on the idea that there are competing cognitive systems at a decision-making, one that is often called system 1, on which human intuitive, mood-based, and emotional decisions are based, and second one called system 2, which is responsible for rationally based decision making processes, more carefully.

The need for neuromarketing emerged because the main shortcoming of traditional marketing is that people usually do not know what they want, and their answers to the questions in focus groups may not be valid (Felipe-Barkin, 2013). The main goal of neuromarketing research is to remove subjectivity and ambiguity in consumer opinions by measuring observable brain behavior (Randall, 2009). Both industry and science recognize the potential of neuromarketing, and it can be seen from the facts that from 2002, when it was mentioned for the first time, until 2015 - the number of neuromarketing companies exceeded 300 worldwide, and recently, it has become one of the fastest-growing fields of marketing, including the 20% increase in the number of neuromarketing companies from January 2016 until February 2017.

In 2011, a leading neuromarketing company Neurofocus was acquired from Nielson as one of the world's largest market research firms (Hsu & Yoon, 2015). Also, the rise in interest in neuromarketing appeared among researches. One of the examples is the publishing of special issue on neuroscience and marketing in The Journal of Marketing Research, in 2015 (Camerer & Yoon, 2015). Marketers are eager about neuroimaging mainly because of two reasons: they hope it will provide a more efficient trade-off between costs and benefits and that it will provide more exact marketing methods which will be implemented before the product exists.

Besides the theoretical framework, in practice, there are many uses of neuromarketing. Possibilities of use of neuromarketing are different, in the literature review most recurrent purpose of neuromarketing is to understand consumer behavior and consumer buying process (Arely & Berns, 2010).

Nowadays, neuromarketing became a popular technology to establish the probability of purchasing decisions, as well as, to understand how consumers make choices during the purchasing processes (Lee, Broderick & Chamberlain, 2007). Neuromarketing can also be very useful when it comes to branding, positioning, pricing and product development strategies, it helps to examine how decision-making is affected by the brand information (Hubert & Kenning, 2008; Lee, Broderick & Chamberlain, 2007). Marketing areas that have benefited the most from the use of neuromarketing techniques are publicity and advertising. It enables companies to identify advertising elements that trigger positive feelings, helping companies to identify neurologically engaging elements in a TV ad. At the same time, helping companies to avoid

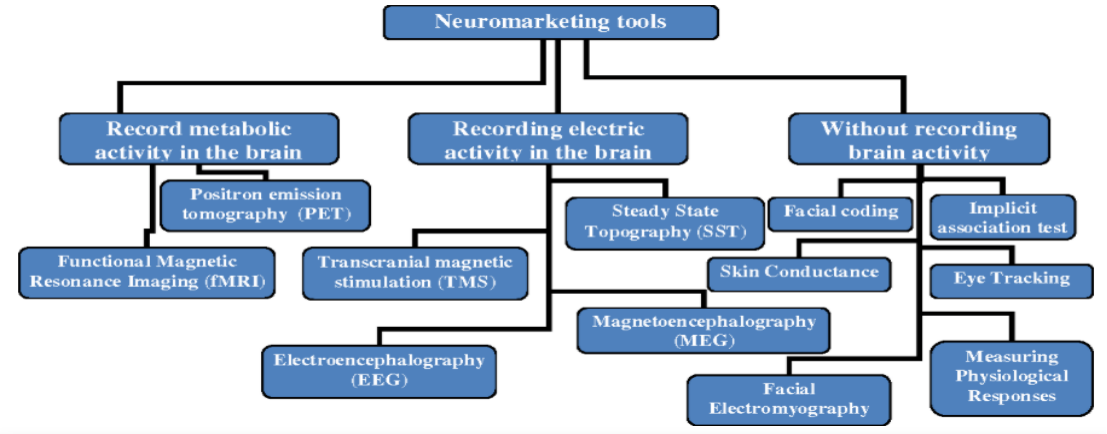
elements that should not be present in communication because of its ability to identify the brain areas that activate during a marketing stimulus and cognitive processes that occur in those areas, neuromarketing has a huge potential to positively affect society, by helping to identify the causes of purchasing disorders, and developing more effective social campaigns.

Marketing areas that have benefited the most from the use of neuromarketing techniques are publicity and advertising (Fugate, 2007; Lee, Broderick & Chamberlain, 2007; Orzan, Zara & Purcarea, 2012b). Using the neuroscientific based methods allow detecting hidden information in the consumer's mind, representing the main advantage of neuromarketing in comparison with traditional marketing (Krajnović, Sikirić & Jašić, 2012). Attention, memory, emotional processing, and reward processing are four neural circuits commonly studied in consumer and decision neuroscience. They are used as a simplified abstraction of neural circuits and brain areas to organize scientific knowledge (Shaw & Bagozzi, 2017).

1.2 Neuromarketing techniques and methods

Neuroscience serves as a base for the theoretical research in neuromarketing, different neuroimaging techniques are used so that researchers can test a hypothesis, effects of marketing stimuli on the brain of consumers and to get more knowledge about this field. When researchers are using neuroimaging methods, they are doing it to compare activities of the brain during the specific task and the control task (Reimann, Castano, Zaichkowsky & Bechara, 2012). According to Zurawicki (2010), neuromarketing techniques are divided into those that record metabolic activity and the ones responsible for the recording of electric activity in the brain. The classification of neuromarketing techniques can be seen in Figure 1 below.

Figure 1: Neuromarketing techniques, classification



Source: Bercea (2012).

fMRI, EEG, eye tracking, SST, MEG, and galvanic skin response are neuromarketing techniques that will be further explained why they are used, what they measure and what are their advantages and limitations.

1.2.1 Functional magnetic resonance (fMRI)

Functional magnetic resonance imaging is the most used neuroscientific method for scanning the human brain through powerful radio and magnetic waves to create high-quality brain images with good spatial resolution making it easier to pinpoint areas of the brain activity. It measures the level of oxygen in certain brain areas (Krajnović, Sikirić & Jašić, 2012). BOLD that stands for Blood Oxygen Level Dependent represents the key measure to track the change of oxygenated blood flow to find which parts of the brain are using the most oxygen when they are tested on specific stimuli (Morin, 2011). Using the fMRI scanner will record in minute detail by the scanner, resulting in most frequently in colored brain areas. Even though fMRI results seem easy to understand and read, especially because of the colors, they should be only interpreted by a specialist who understands the analytic methods through which brain images are generated (Krajnović, Sikirić & Jašić, 2012).

One of the branches of neuroscience is cognitive neuroscience. The main responsibility of cognitive neuroscience is to look at the capabilities such as emotions, language, memory, decision making, awareness, attention, action, perception, cognitive control and sexual behaviour (Babu & Vidyasagar, 2012).

Final data of fMRI scanning can provide information about what person who did the scanning was thinking, whether he/she was scared, excited, happy or sad, and did that person pay attention or not. All of that is possible because of the ability to determine the neurobiological correlation of behaviour by locating the active parts of the brain during the experiment in the brain and interpret how the brain processed information. Empirical studies (60–70%) use only one method when applying neuroscience to the behavioural decision-making process. fMRI is used to measure brand loyalty, recall and preference, memory encoding, the valence of emotions, sensory perception, craving, and trust (Kulich, Maciewcz & Scrivani, 2009).

The main reason to use fMRI, according to Babu and Vidyasagar (2012) is to avoid wasting time and money on the promotion of brands and products. Also, it is used when companies want to test new products, campaigns, packaging design, prices and advertisements, to identify needs, predict choices, and reposition a brand. Due to its spatial resolution, it enables to see details of deep brain structures, since it can localize brain activity changes within 1-10 mm of deep brain structures, making it possible to localize neural processing during consumer choices and consumption experiences (Plassmann, Ramsøy & Milosavljevic, 2012). In addition to this, because of its ability to follow the metabolic activity in the brain, it can detect changes in chemical composition or in the flow of fluids in the brain (Wang & Minor, 2008; Perrachione & Perrachione, 2008).

According to Wang and Minor (2008) fMRI is considered as a reliable and valid measure for cognitive and affective responses. Besides its advantages, fMRI bears very high costs. Costs of the equipment are around 800,000 € while operating costs on yearly bases are around 80,000 to 200,000 €, and analysis cost is around 50 to 100 € per subject (Plassmann & Niessing, 2010; Ariely & Berns, 2010). Such high costs lead to the use of small sample sizes, making it non-scalable. fMRI can capture dynamic changes with a temporal resolution of 1-10 s, making it a

low temporal resolution neuroimaging tool (Kenning, Richelsen, Evanschitzky & Ahlert, 2007). Along with high costs and low temporal resolution, fMRI is also limited because it uses reverse inference from brain activation to brain function (Reimann, Castano, Zaichkowsky & Bechara, 2012) and it carries high complexity in data analysis (Plassmann & Niessing, 2010; Savoy, 2005).

1.2.2 Electroencephalography

The first EEG human recording happened in 1924 by Dr. Hans Berger (Ciorciari, 2012). After functional magnetic resonance, the most commonly used neuroscientific method is electroencephalography (hereinafter EEG). To measure the electrical activity of the neurons, this method uses electrodes placed on the skull (Ariely & Berns, 2010). "EEG measures the frequency of the brain's electrical currents (Ohme, Matukin & Paluca-Lesniak, 2011) and changes in voltage via electrodes placed on the scalp, which are then amplified to facilitate appropriate statistical analysis (Ahlert, Kenning & Plassmann, 2006).

EEG is responsible for recording brain waveform variations from cortical areas (Nunez & Srinivasan, 2006), different frequencies imply different brain waveforms of varying lengths (Ohme, Matukin & Paluca-Lesniak, 2011). Delta (δ, 0.5–4 Hz), theta (θ, 5–7 Hz), alpha (α, 8–14 Hz), beta (β, 15–30 Hz), and gamma (γ, 30–50 Hz) are the five main EEG frequency bandwidths (Harris, Ciorciari & Gountas, 2018). EEG has a poorer spatial resolution, but it has a very high temporal resolution (Krajnović, Sikirić & Jašić, 2012), making it easier for researchers to precisely detect changes in the brain activity when connected to promptly changing stimuli (Ohme, Matukin & Paluca-Lesniak, 2011). On that account, EEG is not able to measure brain activity that is significantly distal to the skull (De Martino et al., 2006). However, it can make a comparison between brain hemispheres, left and right (Plassman, Ramsøy & Milosavljevic, 2012), measure approach-related tendencies or withdrawal-related tendencies (Ohme, Matukin & Paluca-Lesniak, 2011).

Another advantage of EEG is that EEG asymmetry is strongly correlated with personal traits (Plassman, Ramsøy & Milosavljevic, 2012). In contrast to fMRI, EEG is the most cost-effective, the most suitable neuroscientific measure, and simpler for the use than fMRI. All of this makes EEG more used in comparison to fMRI (Krajnović, Sikirić & Jašić, 2012). Costs of EEG equipment are around 7.500 € (Plassman, Ramsøy & Milosavljevic, 2012; Ariely & Berns, 2010) costs of analysis are much lower than fMRI, because it follows relatively straight forward data analysis (Kenning, Plassmann & Ahlert, 2007). EEG can measure attention, engagement, excitement, memory encoding, recognition, excitement, and boredom.

Marketers use EEG for the testing and development of advertisements, testing of new campaigns, movie trailers, website design and usability, in-store experience and taglines. Even though it has a lot of advantages, at the same time EEG has some limitations, it is hard to retrieve the exact location for each recorded signal, because of the different electric conductivity from person to person (Zurawicki, 2010; Kenning, Plassmann & Ahlert, 2007). Due to the low spatial resolution, EEG is able only to record active data from superficial layers of the cortex. Furthermore, it is non-scalable and it can only determine if subjects' emotion is positive or negative (Zurawicki, 2010).

1.2.3 Eye tracking

From 1924 and 1940, started the era or eye-tracking, when, for the first time, eye movement patterns were documented in responses to views on print advertising stimuli (Ciorciari, 2012). Eye-tracking is a technique that measures the target of gaze and pupil diameter. It is used as a unique measure of attention and because of its relatively low costs and excellent temporal resolution, it is affordable and widely used (Venkatraman, Clithero, Fitzsimons & Huettel, 2012). With an eye-tracking, researchers can study subjects' behavior and cognition without measuring brain activity. Focus is on the subjects' gaze, where the subject is looking at, for how long, the path of the view and changes in pupil dilation, allowing to measure the attention focus and with that monitor behavioral types (Laubrock, Engbert, Rolfs & Klingl, 2007). From the early 1990s to the present, the development of eye-tracking technology greatly contributed to the neuromarketing research (Wedel & Pieters, 2008). Saccades, smooth pursuit, nystagmus are three basic eye movement types. Saccadic movement occurs between "/50 to 1/10 of the second", smooth pursuit movement occurs because it follows a moving object and because of fixation, while nystagmic movements are involuntary oscillations such as "slow horizontal sweeps and quick returns to the original eye position" (Andreassi, 2006).

Four types of eye movement data commonly recorded with eye-tracking are: "the duration of first fixation (DFF), the latency of first fixation (LFF), the number of fixations (NOF), and the total contact time (TCT) on each ROI" (Ho, 2014). Measuring visual attention processes, eye tracking has become increasingly popular in advertising research as a behavioral measure (Ciorciari, 2012). So, eye tracking is capable of measuring eye movement patterns, excitement, attention, pupil dilation, search and visual fixation.

Eye-tracking has become very widely used in industry and in academic marketing research, because the devices use an "infrared corneal reflection methodology", having both adequate temporal and spatial resolution and being able to measure one's level of attention of all industry "products" (advertisements on TV, outdoor billboards, web pages, branding logos, etc.) (Wedel & Pieters, 2008). Particularly, it is used for testing of in-store reactions, packaging design, website and user-interface effectiveness, prints, and image design, advertisements and video materials, product placement and shelf layout.

Main advantages of eye tracking are that it is portable, so it can be used in any location, it provides accurate information of subjects' involvement and the degree of excitement due to the changes in pupil dilation and blink rate speed, and at the same time it non-invasive method with an ability to detect spatial attention (Zurawicki, 2010; Perrachione & Perrachione, 2008). High equipment costs of around 25.000 € (eye tracker, host computer, monitor, software and technical support) are considered as one of the main limitations of eye-tracking (Plassman, Ramsøy & Milosavljevic, 2012).

1.2.4 Steady-State Topography (SST) and Magnetoencephalography (MEG)

Steady-State Probe Topography (hereinafter SST) and Magnetoencephalography (hereinafter MEG) are variants of EEG. SST is used for measuring the speed of information processing in the brain, while MEG measures neural magnetic field activity (Silberstein, Harris, Nield & Pipingas, 2000). Due to its fast temporal resolution, steady-state topography is mostly used for testing of TV commercials (Orzan, Zara & Purcarea, 2012a). As a difference of EEG, MEG has greater spatial localization which enables it to record brain structures at a deeper subcortical level. Through the years, it has been used in advertising researches and to measure cognitive and affective appeals of advertising messages and decision-making processes (Ahlert, Kenning & Plassmann, 2006). Also, MEG is used for testing of new products, packaging design, and for identifying needs, because it can measure perception, attention, and memory

According to Wang and Minor (2008), MEG is a reliable and valid measure for cognitive and affective responses. Also, it can distinguish changes in the flow of fluids in the brain and chemical composition. Even though it has a good temporal resolution, it has a limited spatial resolution, but better than EEG (Ariely & Berns, 2010; Kenning, Richelsen, Evanschitzky & Ahlert, 2007). Besides limited spatial resolution and the need for a special room that is free of earth's magnetic field, expensive equipment of around 150.000 € and quite complex data analysis are among the main limitations of MEG (Zurawicki, 2010; Kenning, Plassmann & Ahlert, 2007). Unlike MEG, SST measures consumer behavior, the effectiveness of video materials, encoding of long-term memory, engagement, attention, emotional intensity, and valence, and it processes visual and olfactory inputs.

Due to its ability to measure a lot of consumer responses, it is used for testing of advertisements, movie trailers, prints and images, and brand communication. Its huge advantages are that it can track fast changes in brain activity over an extended period and to track changes in the speed of neural processing in different parts of the brain, because of its high temporal resolution (Silberstein, Harris, Nield & Pipingas, 2000). Along with that, SST can tolerate high levels of inference as movements of the head, the tension of muscle, eye movements, blinks, and noise, but low spatial resolution is considered to be its main limitation (Silberstein, Harris, Nield & Pipingas, 2000; Gray, Schoelles, Bringsjord, Burrows & Colder, 2003).

1.2.5 Galvanic Skin Response (GSR)

In the 1970s started the measurement of skin conductance in response to advertising stimuli (Ahlert, Kenning & Plassmann, 2006). Galvanic Skin Response (hereinafter GSR) is the method that uses electrodes to detect the changes in electrical activity resulting from changes in sweat gland activity. The electrodermal activity includes all the changes in the skins' electrical activity, and electrodes used for GSR are connected to a galvanometer. GSR is rarely used alone, it is usually used with other neuromarketing tools, including ECG, EMG, EEG, and fMRI (Farnsworth, 2018).

According to LaBarbera and Tucciarone (1995), GSR has been widely used in a variety of ways such as pre-test advertising and measure emotional responses such as like or dislike, marketing communications' effectiveness, copy testing, non-self-report physiological responses, and emotional activation. GSR can highly contribute to previously mentioned revealing, but on the other side, its major limitation is that it is not able to detect positive or negative valence of the level of emotional arousal (Ohme, Matukin & Paluca-Lesniak, 2011).

1.3 What neuromarketing can say about our brain and behavior

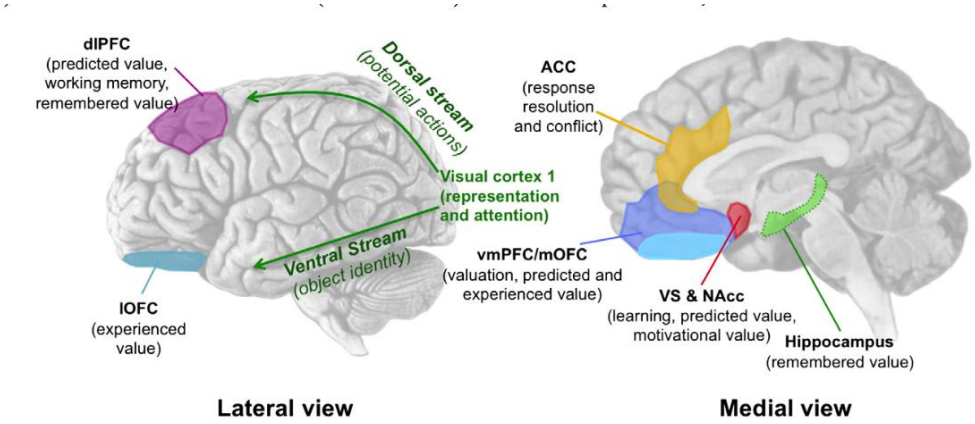
Even though it only weighs 1.4 kilograms, the human brain is the most complex organ in the human body. It is the place where human thoughts, memory, action, feeling, and experience of the world are produced. It is composed of grey and white matter. The grey matter represents the cell bodies of the neurons, while the white matter is the branching network of thread-like tendrils – called dendrites and axons – that spread out from the cell bodies to connect to other neurons. The human brain consists of one hundred billion nerve cells called neurons (Philips, 2006). It is divided into 4 major parts, four lobes frontal lobe, parietal lobe, temporal lobe, and occipital lobe.

The frontal lobe, the part of the brain that is responsible for personality, emotions, judgment, planning, problem-solving and reward. The parietal lobe is the interpreter of signals from vision, hearing, motor, sensory and memory, also it in charge of spatial and visual perception. The temporal lobe is the part of the brain positioned below the frontal and parietal lobe, accountable for memory, hearing, sequencing, and organization. Fourth and the last lobe is occipital lobe, positioned behind the previous three lobes and it interprets visions, colors, lights and movements (Giliam, 2012).

Part of the brain called the cerebellum is in charge of the things that we are doing without thinking about them, repeated tasks. Also, midbrain and brain stem - the most primitive parts of human brains, are controlling body functions that people do not have conscious control of, such as sleeping, breathing, heart rate, and blood pressure. The limbic system is the part of the brain positioned beneath the forebrain. In the limbic brain are positioned hippocampus – responsible for new memories, the thalamus – sensory relay station, and hypothalamus – part that normalizes bodily functions via hormone releases from the pituitary gland. Amygdala, caudate nucleus and putamen are the structures of the brain that are narrowly linked with emotions. An enormous part

of the brain's activity is subconscious. Considering its ability to go deeper into the human brain and human minds, neuromarketing techniques were used both in industry and in academic researches. Visual respresentation of human brain is shown in Figure 2.

Figure 2: Overview of prominent brain areas involved in brand decisions



Source: Plassman, Ramsoy & Milosavljevic (2012).

When valuing brand preferences, there are four basic components to pay attention to (1) representation and attention, (2) predicted value, (3) experienced value, and (4) remembered value and learning (Plassman, Ramsøy & Milosavljevic, 2012). Since humans are predominantly visual creatures, most of the incoming information humans receive is visual (Koch, 2004). The human visual system contains two cortical routes that are involved with visual processing, the dorsal visual pathway, and the ventral visual pathway. The dorsal visual pathway is involved with the spatial deployment of attention (the "where/how" pathway) and proceeds from the primary visual cortex V1 in the occipital lobe, through the posterior parietal cortex, to the dorsolateral prefrontal cortex (d1PFC). The ventral visual pathway is responsible for object recognition (the "what" pathway) and it originates in V1, then it continues to the inferotemporal cortex and the ventrolateral PFC.

Visual processing involves two cortical routes that are consisted of our visual system-the dorsal visual pathway and ventral visual pathway. The dorsal visual pathway also called the "where/how" pathway is responsible for the spatial deployment of attention. It goes from the primary visual cortex V1, positioned in the occipital lobe, through the posterior parietal cortex, to the dorsolateral prefrontal cortex (d1PFC). The ventral visual pathway or the "what" pathway is involved in object recognition, and it proceeds from V1, through the inferotemporal cortex, and to the ventrolateral prefrontal cortex. Another feature of the visual system is that it is also responsible for rapid brand and product identification. MEG study showed stronger activity in the occipitotemporal region between 130 and 180 ms. when female participants were exposed to the image of the shoes (in comparison with motorcycles) (Junghöfer, Bradley, Elbert & Lang, 2001).

The study by Milosavljevic, Koch and Rangel (2011) showed that it takes up to 313 ms. for consumers to identify two different food brands and make up their mind which one they prefer. Attention as the mechanism responsible for the selection of information that has preference over other available information has four conceptual components bottom-up saliency filters, top-down control, competitive visual selection, and working memory (Knudsen, 2007). The dorsal cortex is the brain area that activates when expectations modulate what consumers pay attention to (Egidi, Nusbaum & Cacioppo, 2008). When the subject shifts the attention between different object features it leads to an activation of the parietal lobe (Nakamura, Hanakawa, Konishi, Fukuyama & Shibasaki, 1999; Cavanna & Trimble, 2006). The quality of incoming information is enhanced by visual selection and eye movement. People spend more time examining options (i.e. fixating on) than they eventually choose, in favor of this goes the fact that 54% more time consumers spent looking at the ads of businesses than they ended up choosing (Lohse, 1997). Regarding that, according to Steward, Pickering, and Shurt (2004), consumers spent 200 ms longer investigating implausible brand extensions than plausible brand extensions. The predicted value represents consumers' thinking about the experienced value of that brand in the future.

According to the previous studies, three brain structures: the dorsal prefrontal cortex (dlPFC), the ventral medial prefrontal cortex (vmPFC), and striatum might have particular importance when consumers evaluate predicted values, or other types of desirable objects, such as money. Through the studies, the striatum was the part of the brain that was investigated the most.

According to the study of Schaefer and Rotte (2007a), when a person imagines a pleasant experience, which can be, for example, driving a car of a brand that is linked to the favorable brand association, it leads to an activity change in the striatum. It is important to mention that it is still unclear what caused this reaction in the striatum, whether it is based on a difference in the pleasantness of the predicted experience, or the difference in brand information. An additional weakness of the study can also lay in the fact that the attractiveness of the car is closely related to its price, and driving an expensive car might represent pleasurable experience by itself (Plassman, Ramsøy & Milosavljevic, 2012).

The study of Plassman, Kenning and Ahlert (2007), concluded that it will come to more activation in the striatum when consumers need to choose between buying identical clothes of different retail brands (eg. Nike vs. Adidas, or H&M vs. Zara). Also, it comes to the activity in the striatum when consumers are more loyal to the brand (measured by real purchasing behavior such as amount spent, frequency, etc.) than those who are less loyal. According to the above-mentioned findings, it can be said that activity in striatum correlates with brand loyalty with retail brands. Saliency or intensity of objects such as money and sounds is in correlation with neural activity in the dorsal and ventral striatum (Zink, Pagnoni, Chappelow, Martin-Skurski, & Berns, 2006). Making decisions in social context, such as charitable donations and behavioural measures of consumers' positive and negative predicted values for a range of different branded products indicates correlation with the neural activity in vmPFC (Hare, Camerer, Knoepfle, & Rangel, 2010; Chib, Rangel, Shimojo, & O'Doherty, 2009; Plassmann, O'Doherty & Rangel, 2010). It comes to an increase in vmPFC when a person needs to choose between a favorite brand

compared to other or lower-ranked brands (Deppe, Schwindt, Kugel, Plassmann & Kenning, 2005). Behavioral preferences are encoded by the brain systems consisted of vm PRF and dlPFC (Camus et al., 2009; Wallis & Miller, 2003).

While, on the other side, when consumers are exposed to the set of choices consisted of consumers' favorite brand compared to a set of choices of two non-preferred brands, part of the visual system involved in object recognition and the part of the dlPFC involved in working memory were less active (Deppe, Schwindt, Kugel, Plassmann & Kenning, 2005). Increased activity changes in the vmPRF, PRF and striatum are induced by the branded products associated with high social status (Erk, Spitzer, Wunderlich, Galley & Walter, 2002; Schaefer & Rotte, 2007b). Experienced value is the "true value" that should matter the most for value-based decision making (Kahneman, Wakker & Sarin,1997). It consists of valence and intensity of the consumer experience (Plassman, Ramsøy & Milosavljevic, 2012). Results of the fMRI study for in-factory experiences, musical rewards Blood & Zatorre (2001) have shown the activity in the medial part of the orbitofrontal cortex (OFC) (see Figure 1), it is in correlation with subjective reports about the pleasantness or valences of the experience, at the time a reward is being enjoyed visual rewards, pleasantness of touch and secondary rewards such as money (Anderson et al., 2003).

According to O'Doherty et al. (2000) it comes to the reduction of the activity in OFC when consumers are fed to satisfy in a specific food. Furthermore, previous findings indicate that OFC is possibly an area of the brain where positively experienced values are computed. Moreover, areas such as ventral striatum and the pregenual cingulate cortex are the brain areas that are receiving inputs from the OFC areas and are also correlated with sensory pleasantness (Grabenhorst, Rolls & Bilderback, 2008; Rolls, Grabenhorst & Franco, 2009; Rolls & McCabe, 2007). Lateral OFC and left dorsal anterior insula/operculum are brain areas whose activity is correlated with the unpleasantness of taste (Small et al., 2003). The size of abstract punishments such as losing money elicits the activation of the lateral parts of the OFC (O'Doherty et al., 2000). Out of this, it can be concluded that OFC is mostly responsible for negative experiences, together with left dorsal anterior insula/operculum (Plassman, Ramsøy & Milosavljevic, 2012). In one of the studies, activity in the medial OFC in response to the consumption of wine depended on quality beliefs about its price (Plassmann, O'Doherty, Shiv & Rangel, 2008).

The study by Kurt, Dede & Ragbetli (2015) came to the results that accompanying engagement of the medial OFC and experienced values of work of art depended on whether the person believed they were created by an expert (i.e.an artist) or by a non-expert (i.e. experimenter). According to these findings, expectancies and beliefs recently referred as the "placebo effects of marketing actions and expectations" are determined by higher cognitive processes and that experiences modulation system is modulated by them (Shiv, Carmon & Ariely, 2005; Plassmann & Niessing, 2010).

The intensity of positive and negative chemosensory stimuli increases the activity of the amygdala (Anderson et al., 2003; Small et al., 2003). Explicit and implicit memories of prior

consumption experience are making remembered values (Plassman, Ramsøy & Milosavljevic, 2012). dlPFC in synchrony with the hippocampus and surrounding medial temporal lobe (MTL) are the brain regions on which explicit or declarative memory rely (EW "In a seminal paper by McClure et al. (2004), it was reported that an increase in preference for the beverage labeled as Coca-Cola, but not the one labeled Pepsi Cola, was paralleled by an activation increased in the hippocampus and the dlPFC. In other words, the brand-induced change in preference was mediated by regions implicated in declarative memory). Also, when a person imagines that he or she is driving a well-known car, that has been implicated in memory function and causes stronger engagement of the superior frontal gyrus of the PFC (Plassman, Ramsøy & Milosavljevic, 2012).

In the situation when subjects are exposed to their most beloved brands, then comes to a decrease in the activation of dlPFC and hippocampus and an increase in activation of reward regions, such as striatum (Schaefer & Rotte, 2007a). During the observation, on 6 out of 11 subjects, it came to significant activation in the fusion gyrus. The fusiform gyrus is mainly responsible for the recognition of faces, and it has a crucial role in color processing and word recognition (Kanwisher, McDermott & Chun 1997; McCarthy, Puce, Gore & Allison, 1997; Allison & Gorman, 1994; Howard et al., 1998; McCandliss, Cohen & Dehaene, 2003). To narrow it down, according to the above-mentioned information it can be said that activity changes in this brain region could be interpreted as a higher degree of visual attention and a more intensive visual processing of the attractive packages (Stoll, Baecke & Kenning, 2008).

Product preferences of consumers might scale the activation of nucleus accumbens (hereinafter NCC), while excessive prices cause on activation in the insular cortex, and deactivation in the medial prefrontal cortex (MPFC) before purchasing decision (Knutson, Rick, Wimmer, Prelec & Loewenstein, 2007). Different studies (mostly fMRI studies) were investigating consumers' reactions to various stimuli. Studies were ranging from those that were analyzing consumer perception of brands to those analyzing product packages, logos and store positioning. All of them brought significant results and gave a deep insight into consumers' brains and explained what trigger consumers the most and why they buy sometimes, and how they reject in some situations (Stoll, Baecke & Kenning, 2008).

According to Silayoi and Speece (2004), at the point of the sale, the product package represents one of the most relevant marketing instruments for fast-moving consumer goods. According to the statistics about two-thirds of all supermarket purchase decisions occur when the consumers are actually in the store, it leads to the conclusion that at this stage product package highly influences a purchase decision. In this lies the reason why companies often spend more on product packages than on product advertisements (Schoormans & Robben, 1997).

The study conducted by Kenning, Plassmann and Ahlert (2007), aimed to explore the impact of attractive versus unattractive ads on the perception of advertising and brought the conclusion that ad attractiveness inflects activations in the fusiform face area, high order visual cortices, posterior cingulateral cortex, NCC, and MPFC. Product packages might be indicated by the regions associated with reward processing, decision making, and episodic memory, based on the study on

single-subject level, where it has been shown significant activity changes in the MPFC, the orbitofrontal cortex, the anterior cingulate cortex, and the posterior cortex (Stoll, Baecke & Kenning, 2008). MPFC is the most responsible brain region, crucial for human decision-making, also it might reflect individual preferences, because MPFC is considered as the brain region involved in the evaluation of sensory stimuli (O'Doherty, Kringelbach, Rolls, Hornak & Andrews, 2001). In the process of testing the attractiveness of the adds, this brain area is also activated (Kenning, Richelsen, Evanschitzky & Ahlert, 2007). The activation of the orbitofrontal part of the MPFC indicates that emotions are triggered more by the attractive packages, than unattractive. The orbitofrontal part of MPFC seems to be responsible for the emotional evaluation of incoming stimuli, generation of emotions, and the prediction of expected rewards (Dalgleish, Spagnuolo & Douglas, 2004; O'Doherty, 2004). The area of reward and well-being is activated when heterosexual men see the picture of attractive women and when people are looking at pictures of children and puppies (Hubert & Kenning, 2008).

According to the research of Perrachione and Perrachione (2008), consumers' positive responses are reduced when companies are using irrelevant messages, while the advertisements that consist elements that consumers can relate themselves to cause positive responses. Moreover, the brain region that is responsible for the removal of behavior activates when expressing fear or danger (Hubert & Kenning, 2008). Studies of automobile attractiveness showed that brain areas linked with rewards are triggered when products are symbolizing social status or wealth (Erk, Spitzer, Wunderlich, Galley & Walter, 2002)

Automobile brands that consumers are familiar with maybe subconscious presentiments influencing the decision-making process before they even think about the advantages and disadvantages of the car (Schaefer, Berens, Heinze & Rotte, 2006). Part of the brain associated with rewards activates when it comes to the information about a favorite brand, also reward areas are stimulated with the human personalities (McClure et al., 2004).

People are the least analytical when under the influence of the favorite brand or the information about the brand (Deppe, Schwindt, Kugel, Plassmann & Kenning, 2005). Integration of the reward into decision making under indecision situations happens when the favorite brand is one of the offered ones. A favorite brand can also be a rewarding stimulus for loyal customers (Plassman, Ramsøy & Milosavljevic, 2012). The anterior cingulate cortex is in general associated with emotions, response selection, intuition, motivation, reward-based learning, and goal-directed behavior (Devinsky, Morrell & Vogt, 1995). As a result of its close relation to other brain structures, such as orbitofrontal cortex, this brain area might be connected with the integration of implicit information and emotions in the decision-making process (Erk, Spitzer, Wunderlich, Galley & Walter, 2002; Deppe et al., 2007). Moreover, it is involved in the regulation of emotional and cognitive processing, it might help to adjust corresponding emotional responses through the salience evaluation of emotional and motivational information (Deppe et al., 2007).

According to the report of Deppe et al. (2007), the anterior cingulate cortex is the brain structure that is important for the integration of emotions and implicit information in the decision-making

process. The posterior cingulate cortex is often characterized as “evaluative”, because it seems to be involved in supervising evaluative functions such as assessing sensory information or the organisms own behavior as regards spatial orientation and episodic memory (Vogt, Finch & Olson, 1992; Maguire, 2001; Bush et al., 2002). Analysing the perception of stimuli attractiveness and the processing of attractive objects, it was shown that cuneus and middle occipital lobe are the brain areas that are crucial for the processing of visual stimuli, and might have essential role for shape recognition, future extracting, and attention integrating functions (Grill-Spector, 2003; Kastner & Ungerleider, 2000; Vartanian & Goel, 2004). Therefore, it can be assumed that cortical activity changes in visual cortices are led by visual attention induced through the presentation of attractive packages (Erk, Spitzer, Wunderlich, Galley & Walter, 2002). Furthermore, the positive correlation between cortical activity in areas associated with shape and color recognition, and the shape and color differences depends on stimulus material (Grill-Spector, 2003).

A higher rejection rate of products with unattractive packages can be partially explained by the fact that the evaluation of unattractive packages is generally associated with negative emotions and uncertainty (Stoll, Baecke & Kenning, 2008). Lastly, neuromarketing studies also showed that advertisements with celebrities or people who are considered as physically beautiful stimulates the area responsible for the process of recognition and creation of a trust, which results in the purchase decision. The purchasing decision is mainly positively influenced by the presumed expertise of celebrities (Stallen et al., 2010).

1.3.1 Brief overview of the most significant neuromarketing research

Almost 30 years ago, Martin de Munnik, the founding partner and CEO of Amsterdam-based neuromarketing research and consultancy agency Neurensics says, “there is more to consumer decision making than what people say” (Khalil, 2014). To be more interesting, appealing and valuable for consumers, companies use the help of neuromarketing to improve their products and advertisements (Dragolea & Cotrrlea, 2011). By looking into cognitive processes, neuromarketing can help to give an insight into what consumers require. Many companies such as Microsoft, Hyundai, Yahoo, Google, Paypal, and Frito-Lay saw an opportunity in neuromarketing and decided to use it (Lindquist, n.d.).

One of the most famous snack companies - Frito-Lay have used neuromarketing to test their commercials, packages, and products in the United States and overseas. What they come out within the research is that as a difference of shiny packaging, the matte beige packaging of tomato chips, with the picture of tomato and other ingredients considered as healthy in the snack do not activate anterior cingulate cortex, better known as a brain area associated with the feeling of guilt. As a result of that, Frito-Lay has changed packages of the chips into matte beige. Moreover, they did brain-testing of commercial previously banned by focus group members.

Neuromarketing agency, NeuroFocus did the EEG testing of a particular ad, where it showed that women loved the commercial according to their brain activity, but they probably did not want to seem malicious toward the other members of the focus group. With the desire to test the TV

commercial before launching it, aiming to bring more users to Yahoo as a search engine, Yahoo also runs neuromarketing research. The respondents were doing an EEG testing, the results showed stimulation of the brain parts responsible for memory and emotional thoughts, called limbic area and frontal cortices. The ad, as a part of Yahoo's $100 million branding campaign was launched in September 2009. Microsoft is also among the companies that were using neuromarketing services. The goal of one of their researches was to convince advertisers to buy the spot on Xbox games with a duration of 30 seconds. The procedure of the research was to show the ads on the video game system, while the respondents were wearing EEG caps on their heads. All of that was done to see which parts of the brain are stimulated by the ads. The logic behind the testing was that the ads that attract more parts of the brain will most probably motivate more views to buy the advertised product.

EBay's PayPal did brain-wave (using EEG and occasionally MRI) testing to see what impact consumers to use PayPal the most, and how to see what persuade e-shoppers to use this online payment service. Results showed that the speed of online transactions has a higher impact on people than the safety and security of the transaction that was used as a theme in its previous ad campaigns.

In order to study consumer preferences that could lead to purchasing decisions, Hyundai did an EEG testing of a 2011 Hyundai model. 30 people, 15 men, and 15 women participated in the testing, and they were supposed to stare at specific parts of the vehicle for an hour. As a Dead Macko, manager of the brand strategy at Hyundai Motor America sad, "We want to know what consumers think about a car before we start manufacturing thousands of them" (Burkett, 2004).

Even though Google already knows a lot about its users through their tools such as Toolbar, Analytics, AdSense, Gmail, and Search, they decided to use neuromarketing to explore users' brains even more. With the use of NeuroFocus data, Google and MediaVest showed that YouTube overlay ads attract the attention of consumers and raise brand awareness. The study done by NeuroFocus had 40 participants, and they were looking at their reactions during the watching of YouTube InVideo overlay and banner ads from a cross-section of MediaVest advertising clients. The results of the study showed that consumers were highly emotionally engaged generating high attention during different types of videos. The ads scored 6.6 on the scale from 1 to 10 ineffectiveness, this result is considered as showing "high effect".

Coca Cola as one of the first neuromarketing users realized the importance of neuromarketing and made their in-house neuroscience lab. In the lab, they use neuroimaging techniques in real-time to test their commercials on volunteers. During the testing, they use subjects' unbiased neural responses to what they are hearing and seeing. These techniques allow Coca Cola to see which commercial or even individual shots affect volunteers the most. Coca Cola has been using neuromarketing techniques for their commercials for many years and they are still doing it. One of the recent ideas was putting people's names on the bottles, using Coca Cola's traditional font. The purpose of personalized bottles is to create a pleasant emotional lift and a strong relationship between customers and brands. This strategy has increased the brand preferences of consumers

when seeing an image of themselves using the product, also called the “doppelganger effect”. Also, this campaign may trigger another effect called “implicit egotism”, and it is demonstrated by the preference for things “like oneself” and it is explained as name-based behaviors and preferences (Dooley, 2013).

Other companies, such as Facebook, Mercedez-Benz Daimler, Campbell’s and 20th Century Fox used neuromarketing services during their marketing testing. Facebook has tested the neurological engagement of its user, trying to see how unconscious perception and emotions of the user could be influenced by its system. The pleasure center of the brain of Mercedez-Benz Daimler user was affected by the campaign where car fronts were stimulating human faces. It resulted in an increase in the sale of 12% in the first quarter. Campbel’s did the redesign of their shop labels according to the feedback of neuromarketing research. That all led to the creation of a new package of the soup consists of a more contemporary soap with the vapors, the spoon is excluded; key elements that users were looking at and perceiving as such: a hot soup with flavor and aroma. For packaging to be more pleasant to the eye of consumers and clear to minds, the size of the logo was reduced and typology, size, and color have been changed. 20th Century Fox with the help of neuromarketing came to the findings that saturation produces diminishing returns, by testing trailers of their films, video games and advertisements in outdoor advertising campaigns.

Martin Lindstrom as one of the main representatives of neuromarketing and researches in this field and his contribution to neuromarketing should be mentioned as well. His research discovered that what people smell or hear is more powerful than what people see, but that is in contradiction with previous learnings, that the most important sense is what people see. That leads to the conclusion that marketing campaigns should also include more emotional features, because visual media according to the latest study may not be enough (Lindstrom, 2008).

Also, two other far known studies are the study by Plassmann, O'Doherty and Rangel (2010) which investigated whether the price of wine has an effect on the taste of the same wine, or on consumer perception of the wine (they will think the wine is better). The study showed that changing the price of an identical wine does change taste processing and more specifically that part of taste processing that encodes the pleasantness of the taste. The most popular neuromarketing research study so far is the one from 2003, published in 2004 about the preference of Coca Cola and Pepsi, performed by Read Montague Professor of Neuroscience at Baylor College of Medicine in 2003. The results of this test are now part of the history of marketing. More than 50% of the respondents in the blind test said that they preferred Pepsi over Coca-Cola, but when the respondents knew the brand, there was a strong preference towards Coke (Plassman, Ramsøy & Milosavljevic, 2012).

1.3.2 Advantages of neuromarketing

With the emerging technologies, neuroscience can measure different neurological, biological and physiological signals in real-time. Technologies enable researchers to evaluate the emotional states of individuals through different algorithms that can decode and divide specific neurological

and physiological patterns related to different emotions. From the marketer's point of view, neuromarketing has potentially two main advantages; to be more efficient in the trade-off between costs and benefits, and to provide an accurate marketing research methods that can be implemented before products exist (Ariely & Berns, 2010). From the industry perspective, neuromarketing helps to suspect consumers' irrationality in situations where they are acting differently that saying. At the same time, it is not taking more time than traditional marketing research methods, while being more efficient and allowing creative solutions at the early stages.

Essentially, neuromarketing is giving the ability for marketers to study emotions relevant to human decision making and delivering more effective and creative solutions (Beganovic, 2019). From the researchers' perspective, neuromarketing can contribute to consumer research and psychology of branding for at least two reasons: it can provide access to hidden information without asking consumers directly about their emotions, decision-making strategies and memories (Ariely & Berns, 2010). Secondly, with the use of neuroscience, additional theories can be generated in the field of psychology, marketing, and economics (Plassmann, Kenning, Mohr, Backhaus & Ahlert, 2006). A combination of neuroscience and computer science with advanced statistical models leads to more accurate predictions of human behavior.

Furthermore, combining different neuroscientific tools can result in the establishment of brain-behavior relationships that are relevant to the psychology of hidden consumer choices. One example of such a study is by Knutson, Rick, Wimmer, Prelec and Loewenstein (2007) where subjects were scanned by fMRI and firstly they were exposed to the product (4s) itself, then to the price of the product and in the end, they made the choice. Results of the fMRI analysis showed that the respondents made a purchasing decision before the end of the run (4s).

Neuroimaging tools, such as fMRI can generate time-series data from different data points across the brain, allowing better predictions of decision-making behavior across domains (physiological, neural, predictors of behavioral in-store purchases, unhealthy behavior) (Milosavljevic, Koch & Rangel, 2011). Consumers' mental processes are observable in real-time, with the application of neuroimaging techniques. It represents one of the main advantages in comparison with traditional marketing methods because it investigates processes that are below consumers' awareness or processes that are difficult to verbalize. Plassmann, O'Doherty, Shiv and Rangel (2008) study serves as the best example of these advantages. Through the change in one of the marketing actions (change in price) researches can observe how it will affect the taste or cognitive processing. For consumers, at that moment it was hard to verbalize how the change in price affected how much they like the wine. More precisely, how much they like the wine, or how much they think they like the wine? But the results showed that the change in the price of an identical wine resulted in the change of taste processing, it affected the part of the brain responsible for taste processing. Besides the advantages that industry and academic researches have from neuromarketing, there are also benefits for consumers.

By fulfilling primary marketing goal to mere consumers' needs, the use of neuromarketing can help to deliver more desirable products, more engaging promotional material and make better

consumers' experiences (Plassmann, O'Doherty, Shiv & Rangel, 2008; Reimann, Zaichkowsky, Neuhaus, Bender & Weber, 2010). Even though all previous advantages with the use of neuroscientific tools can potentially increase the company's' profit, at the same time consumers might benefit by receiving more well-suited products for their needs (Stanton, Sinnott-Armstrong & Huettel 2016). Neuromarketing can contribute to delivering more effective ads, reducing the need for high ad volume. Moreover, through the segmentation, it can find a new segment of consumers that can be targeted more carefully and more directly (Stallen et al., 2010). Even though there is a fear that neuromarketing could influence consumers to spend more, making products irresistible, there is a neuroscientific technique that enables researchers to get better insights into the neurobiological mechanism of compulsive buying and deliver medical and pharmaceutical solutions to help people with this disorder (Fortunato, Giraldi & Oliveira, 2014).

Neuromarketing can also have a positive effect on intensifying and strengthening public safety campaigns, in the primary interest of the public. Falk et al. (2013) used fMRI to study which areas of the brain were most active in response to messages that were most likely to be socially spread. From this research, future public service announcements and campaigns could be assessed and filtered based on their likelihood of transmitting the core content of the public safety campaign.

1.3.3 Limitations of neuromarketing

Like any other new science, neuromarketing has its limitations. The main limitation of neuromarketing, taking into consideration surveys, is a lack of credibility of information (Murphy, Illes & Reiner, 2008; Fisher, Brown, Aron, Strong & Mashek, 2010; Perrachione & Perrachione, 2008; Hubert & Kenning, 2008; Eser, Bahar Isin & Tolon, 2010; Fugate, 2007; Javor, Koller, Lee, Chamberlain & Ransmayr, 2013). According to Mileti, Guido and Prete (2016), other limitations are the development of high-prices and time-restricted neuroimaging experiments, the development of experiments confined to artificial laboratory environments, the use of single neuroimaging technology at a time – fMRI, the use of single non-neuroimaging device at time, and the moral, social and ethical abuses of neuromarketing devices. The deployment of high-prices and time-restricted neuroimaging experiments is considered as a limitation because the majority of advanced neuromarketing tools carry out advanced statistical analysis to understand metabolic processes of the brain, accuracy, and reliability of these data depend on the neural and physiological activity.

The high cost of neuroimaging tools directly impacts the scope of the research, and usually protected experiments are avoided because of the lack of financial funds (Mileti, Guido & Prete, 2016). The cost of fMRI is $500 and more per hour, according to Perrachione and Perrachione (2008). The limitation is that costs practically determine the conditions of the research, because time is limited and predetermined, while the sampling is small (10–20 participants), and according to some researchers – inadequate (Kenning, Plassman & Ahlert, 2007). Also, temporal-limited testing delivers results that cannot reveal temporal neurophysiological variations and the

investigation of the rarest events that can be crucial for reliable diagnosis and as a consequence can lead to the over the interpretation of the obtained results (Hubbert & Kenning, 2008).

Another important limitation is the development of experiments confined to an artificial laboratory environment. The laboratory is the environment where subjects of the research cannot compare and imagine as, in everyday life, it has a lack of social, experimental, and contextual dimensions of consumption (Arnould & Thompson, 2005). Experimenting in such circumstances usually, limit body movements of study participants and cause difficulties in measuring of neurophysiological indicators prior to purchasing decision. Revealing the emotions of consumers toward the particular thing or the process is one of the main purposes of neuromarketing. The artificial and controlled environment of the experiments, despite new and leading perspective on theories of emotion, can negatively affect the integration of emotions in the process of making a purchasing decision. All of this can negatively impact the validity of neuromarketing experiments.

The third furthermore, limitation of neuromarketing is the use of a single neuroimaging technology at a time – fMRI. From the time fMRI was starting to be used, in the 1990s it was considered as the most advanced and predictive technique (Fortunato, Giraldi & Oliveira, 2014). 70% of neuromarketing experiments use fMRI as a single methodology making it the most used technology in empirical studies of consumer behavior (Kable, 2011). Even though the fMRI study had a huge impact on the revolution of neuromarketing, it has its limitations (Reimann, Castano, Zaichkowsky & Bechara, 2012). Some of the limitations are the uncertain reliability and validity of fMRI results (Kenning, Richelsen, Evanschitzky & Ahlert, 2007). The results of fMRI studies tolerate reverse inference from brain activation to brain function, during the accomplishment of certain tasks (Reimann, Castano, Zaichkowsky & Bechara, 2012). Interpretation of fMRI results can be highly error-prone, specifically in the situations when performance should be connected to related cerebral activity that is all caused by the absence of detailed cerebral map since various functions can be simultaneously controlled by different brain ideas (Yoon, Gutchess, Feinberg & Polk, 2006). Purchase decisions and cognitive processes have a complex relationship and cannot be limited to the activation of one brain area (Ariel & Berns, 2010).

Authors such as Kenning, Richelsen, Evanschitzky, and Ahlert (2007) and Zurawicky (2010) suggest that the simultaneous use of various tools could be beneficial for neuroscientific research on consumer behavior. Due to these reasons, the use of the single non-neuroimaging device at a time is considered as neuromarketing limitation, according to Mileti, Guido & Prete (2016). A combination of physiological measurements and neuroimaging tools can deliver useful information about the emotional state of consumers (Wang & Minor, 2008). The moral, social and ethical abuse of neuromarketing devices is another limitation. From its beginnings, neuromarketing as a field has been under the criticism because of its “possibilities” to “read” consumers’ minds and “modeling” purchasing choices, impacting human dignity, potentially a violation of bioethical principles and individual values. One of the reasons for such claims may

also be found in the current trend called “neuromania”, many scientists use it as a prefix to get the credibility of their results (Ulman, Cakar & Yildiz, 2015).

As explained by Weisberg, Keil, Goodstein, Rawson and Gray (2008, p.2), “People often find neuroscience information alluring because it interferes with their abilities to judge the quality of the psychological explanations that contain the information. The presence of neuroscience is observed as a strong marker for good explanation, regardless of the actual status of that information within the explanation.”

Neuroscientific information can have an encouraging impact on people, believing that they have got scientific information, but actually, they have not (Weisberg, Keil, Goodstein, Rawson & Gray, 2008). At the same time researchers try to find the reasons for the consumer behavior based on neurological processes, but usually, the results of neuromarketing researches are quite similar to traditional research methods (Javor, Koller, Lee, Chamberlain & Ransmayr, 2013; Huebert & Kenning, 2008; Senior & Lee, 2008).

2. ETHICS AND NEUROETHICS

According to Wilson, Gaines and Hill (2008), the problem with ethics is that it is connected with an individual and therefore differs from one person to another. Marketing academics, neurologists, and marketing professionals consider ethics as one of the three most important aspects related to neuromarketing (Eser, Bahar Isin & Tolon, 2010). Researchers and practitioners, such as Garcia and Saad (2008), Perrachione and Perrachione (2008) and Lindstrom (2008) have enthusiastically accepted neuromarketing as the new field of research, others including non-profit organizations and general media have criticized the phenomenon, considering neuromarketing as unethical (Thompson, 2003). According to Thompson (2003) and Lindstrom (2008), there are two major ethical concerns regarding neuromarketing; invasion of privacy and potential mind control. Looking at the commercial use of neuromarketing, according to Fisher, Chin and Klitzman (2010), the lack of transparency and consumer manipulation are the main issues. The shortfall in consumer autonomy is pointed out as another important ethical issue (Murphy, Illes & Reiner, 2008).

According to Murphy, Illes and Reiner (2008), ethical issues are classified into two groups: (1) to protect vulnerable parties from potential harm or exploitation by potential parties (marketing, deployment of neuromarketing) during the research, (2) to protect consumer autonomy in the case of the effectiveness of neuromarketing reaches its critical level. Hensel, Iorga, Wolter and Znanewitz (2017), went further and identified five points within two groups: “(1) protection of research subjects, (2) protection of vulnerable populations from marketing exploitation, (3) full disclosure of goals, risks, and benefits, (4) accurate media and marketing representation, (5) internal and external scientific validate” (Stanton, Sinnott-Armstrong & Huettel, 2016, p.4).

Others like Ulman, Cagar and Yildiz (2014), in their research set human dignity as a ground for ethical principles such as autonomy, self-determination, privacy, confidentiality, protection of

vulnerable groups, reliability and honesty interpretation of research findings in line with the risk of manipulation by commercial actors. Influencing consumer choice is another potential fear. Consumers are worried that might appear goods irresistible to buy or to find "buy button" in the brain. One of the problems for consumers might be a potential increase in the prices of products, due to the higher cost of researches, or the suggestions based on the research to increase the prices (Plassmann, Kenning, Mohr, Backhaus & Ahlert, 2006). Another problem might lie in fuelling consumerism, which can be seen, for example, if advertisement would be neuroscientifically tested to determine the design of an advertisement that will have an impact on the attention and motivation to buy. That is led by the idea that more powerful advertisements can be harmful if they create new desires for products that are inferior or that consumer does not need (Joffe, 2014; Maschke, 2008; Wagner, 2003).

Neuroethics as a term has emanated from ethical issues raised by brain research and became a new and independent field (Fuchs, 2006). Neuroethics as a term was used in 2002 for the first time by William Safire (Sebastian, 2014). Nowadays, there are different definitions of neuroethics provided by different authors. According to Illes and Bird (2016), neuroethics should be responsible for social, legal and ethical issues raised by neuromarketing research. On the other side, Gazzaniga (2006), based on the prior knowledge about how the brain works, said that neuroethics should be solicitous about the way how society thinks and cares about issues including philosophy of life and lifestyle, or illness and fatality. According to Fuchs (2006), neuroethics is a new and independent field that has evolved, because of the ethical issues of brain research.

Due to all of the mentioned, a lot of academics and marketing professionals showed the interest and need for the development of a regulatory framework, especially for neuromarketing purposes (Ulman, Cakar & Yildiz, 2015). Considering the complexity of the neuromarketing regarding its use and the number of parties involved in the process of research, including the beneficiary companies, the research agencies, participants, general public and the difference between their viewpoints regarding the ethics of neuromarketing researches- it is important to take it all into consideration and integrate into a "big picture". (Stanton, Sinnott-Armstrong & Huettel, 2016). Because of that Neuromarketing Science and Business Association (NMSBA) has created a code of ethics and identified and incorporated seven more aspects for the implementation of neuromarketing studies in general (Hensel, Iorga, Wolter & Znanewitz, 2017).

Summing up, to better understand potential ethical dilemmas, Flores, Baruca and Saldivar (2014) turned to normative theories of ethics. Normative theories of ethics help to distinguish right from wrong (Shaw & Moraes, 2009), and it consists of two major perspectives-deontological and teleological moral philosophy theories (Hunt & Vitell, 1986). The difference between deontological and teleontological perspectives is that deontological accentuate actions "based on an obligation or moral duty to do what is considered to be morally right when seeking a specific outcome", while teleological perspective "emphasizes the consequences of an action as the basis upon which to determine the "rightness" or "wrongness" of an action" (Flores, Baruca &

Saldivar, 2014, p.82 and 83). When deontological moral act results with negative consequences, or when the teleological right act is associated with an action that is not moral to produce positive consequences, it comes to ethical dilemmas. When making a decision and creating perceptions of the ethicalness of actions, in this case, neuromarketing that can lead to ethical dilemmas, both perspectives are taken into consideration (Flores, Baruca & Saldivar, 2014). It is why Murphy, Illes and Reiner (2008) say that moral standards should be developed and follow the trends and development of new tools and methods.

2.1 Why neuromarketing is considered as unethical

As it is previously mentioned, many opinions have selected neuromarketing into the set of ethically questionable fields. According to McDowell and Dick (2013), there is a possibility that neuromarketing through marketing activities will allow companies an unprecedented level of manipulation. The roots of this idea lay in the assumption that consumers can be manipulated using specific stimuli to get specific physiological responses that can be seen through neuromarketing researches. With the growth of neuromarketing as a field, criticism and fears towards it have grown as well (Stanton, Sinnott-Armstrong & Huettel, 2016). According to Thompson (2003) and Lindstrom (2008) invasion of privacy and potential mind control are two major ethical concerns regarding neuromarketing. Invasion of privacy can be compared to subliminal advertising because when using subliminal messages as a way of communication with customers, the behavior would change without the person being aware of messages' influence. That leads to the conclusion that conspicuously influencing the behavior of people is acceptable and can be considered as ethical, while, on the other side, doing it undercover is considered unethical by many types of research.

Predicting consumer choices is another ethical issue that can be related to the previous two fears. There is a fear that neuromarketing can make consumer choices completely predictable. This is also based on the Knutson, Rick, Wimmer, Prelec and Loewenstein (2007) research, where it is demonstrated that consumers' choices (for food) could be predicted by the brain activity above and beyond self-reported information, about persons' preferences. That indicated that neuromarketing can highly contribute to traditional methods of marketing research (Hensel, Iorga, Wolter & Znanewitz, 2017). From this assumption arises fear that those companies who use neuromarketing and can predict choices of consumers, will treat customers as robots without freedom or dignity. Such a view on consumers, many people find it demeaning, dangerous, and immoral.

Another fear that consumers are facing is that companies, with the use of neuromarketing, can go beyond the predictions and influence choices of consumers. That is based on the assumption that with the help of successful neuromarketing research, companies can make goods irresistible (Stanton, Sinnott-Armstrong & Huettel, 2016). The results of the recent researches have shown that consumer behavior can be significantly influenced by subliminal, but unattended primes (Ferraro, Bettman & Chartrand, 2009).

According to Rogers (1992), even if neuromarketing cannot force anyone to buy the product, influencing purchasing decisions on the unconsciousness level is to some extent considered unethical. This logic can be applied to neuromarketing because with techniques such as fMRI when the human brain is scanned, by some researchers there is a possibility that companies will find the "buy button" in customers' brains and will be able to manipulate with consumers. The morality of such an action comes into question and should follow the strict code of ethics (Murphy, Illes & Reiner, 2008). Risk of harm and violations of rights are also considered as ethical objections to neuromarketing, including immediate effects on individual consumers and long-term effects on society as a whole (Stanton, Sinnott-Armstrong & Huettel, 2016). Advertisers agreed that the problem is in the way how data are used not in the way how they are collected, or which tools and methodologies are used (Ferraro, Bettman & Chartrand, 2009). Lack of transparency and shortfalls in consumer autonomy are other ethical issues (Murphy, Illes & Reiher, 2008; Fisher, Chin & Klitzmen, 2010). Adding to it, due to the commercialization of neuromarketing research, there is a possibility that data could be used in an unethical way (Satel & Lilienfeld, 2014).

Human dignity is one of the major ethical concerns regarding the implementation of recent technologies. Human dignity represents core instruments of human rights and as such it determines the protection of privacy and personal information (Article 12, Preamble, Article 1; Universal Declaration of Human Rights, 1948). Even though a lot of ethical issues regarding neuromarketing are common for traditional marketing as well. There is an ethical issue regarding the cost of neuromarketing research-price. Due to the costs of neuromarketing research or because of the increase of greater pricing power that the company received from neuroscience research it may come to an increase in the price of the product, regardless of its quality or specification (Plassmann, O'Doherty, Shiv & Rangel, 2008).

2.2 Why neuromarketing is not considered as unethical

Neuromarketing companies agree that consumer behavior is not completely determined, because consumers can stop themselves from buying the products. What neuromarketing companies can investigate is in which circumstances are consumers more likely to buy certain products, but that is also the main goal of all marketing researches, not only neuromarketing. Even if they are free, consumer behavior can be predicted only to a certain extent (Stanton, Sinnott-Armstrong & Huettel, 2016). Neuromarketing can help in achieving a common goal of marketing more efficiently by helping to get the products that consumers want (Keller, 2000). Hence, there is a difference between predicting the behavior of consumers and coercing them against their will that should not disable the rationality and dignity of consumers whose behavior is predicted (Stanton, Sinnott-Armstrong & Huettel, 2016).

One of the main fears among consumers related to neuromarketing is that through neuromarketing research companies will be able to find the "buy button", but according to Clithero and Rangel (2013), there is no current evidence of "buy button" in the brain. As it is already explained, every brain area has its responsibilities, and knowing that, though

neuroscience researchers might more successfully contribute to improving consumers' predictions, not finding the "buy button". For example, some area of the brain is responsible for encoding values and rewards. "Things that are more rewarding or more valued activate these areas more intensely, but this is not equivalent to a "buy button". (Stanton, Sinnott-Armstrong & Huettel, 2016, p.6).

Kenning (2008) agrees that there is no "buy button" in our brains, furthermore, he states that neuromarketing is not able to read consumers' minds and that oversimplification of neuromarketing should be avoided. Synonym for "buy button" is a "purchase key", and the general public is concerned about the possibility to find that brain area that is responsible for purchases.

Fleming (2006) in his interview explained that "neuromarketing is a concept based on fact plus a lot of assumptions and surrounded by little fear" and as such, it bears the risk of "being perceived as a sham science". Fears that with the use of neuromarketing technologies, especially fMRI, companies or researchers will be able to read customers' minds are unfounded. Kenning (2008) stated that fMRI contributes to a better understanding of consumer behavior if it is used for the purpose of marketing research, but the understanding is rather rough and preliminary than definite.

Moreover, Murphy, Illes, and Reiner (2008) stated that with present technology there is no way to "access" human brain with the purpose of manipulation and that it manipulation leads to an exact desired behavior. At the same time, some authors argue that only one brain region cannot be in charge of purchasing decisions, because of the complexity of the purchasing process and the number of factors involved in the purchasing process. Purchasing decision and consumer choices are associated with cognitive processes that are multifunctional and it is impossible to be reduced to a single area of activation because one brain area can be involved in multiple cognitive processes.

Besides all the above mentioned, neuromarketing should not be considered as unethical because, neuromarketing research can reveal only what is occurring in the brain, but cannot explain why it occurs (Krajnović, Sikirić & Jašić, 2012). More importantly, the potential of neuromarketing effectiveness is limited because "we are not zombies when we shop, mindlessly and unknowingly putting brands in our basket and stumbling to the checkout in a fog" (Flores, Baruca & Saldivar, 2014, p. 288)

2.3 NMSBA Code of Ethics

NMSBA, as the main regulatory body for neuromarketing researches on global level, has its Code of Ethics. It consisted of 12 articles. From time to time it can be revised, in order to ensure that it adequately reflects the highest ethical standards for the neuromarketing research industry.

"ARTICLE 1: CORE PRINCIPLES

a. Neuromarketing researchers shall comply with the highest research standards enforced in their respective countries and use accepted scientific principles.
b. Neuromarketing Researchers shall not act in any way that could negatively impact the reputation and the integrity of the Neuromarketing research profession.
c. Neuromarketing findings shall be delivered to clients without exaggerating or misrepresenting the neuromarketing insights beyond what is scientifically accepted.

ARTICLE 2: INTEGRITY

a. Neuromarketing researchers shall take all reasonable precautions to ensure that participants are in no way harmed or stressed as a result of their involvement in a Neuromarketing research project.
b. Neuromarketing researchers shall not deceive participants or exploit their lack of knowledge of neuroscience.
c. No sales offer shall be made to a participant as a direct result of his/her involvement in a project.
d. Neuromarketing researchers shall be honest about their skills and experience.

ARTICLE 3: CREDIBILITY

a. Concerns or critics about publicly known neuromarketing projects shall be first presented to the attention of the NMSBA before they are shared widely.
b. Neuromarketing researchers involved in functional brain imaging shall disclose a protocol for dealing with incidental findings.

ARTICLE 4: TRANSPARENCY

a. Participation in a Neuromarketing research project shall always be entirely voluntary.
b. Neuromarketing researchers shall maintain a public website describing their services and the credentials of their core team members as well as post a physical address where officers of the company can be contacted.
c. Neuromarketing researchers shall allow their clients to audit the process by which neuromarketing insights are collected and processed.
d. Neuromarketing researchers shall ensure that Neuromarketing research projects are created, delivered and documented with transparency and reported with as many details as the clients would require to understand the scope and relevance of the project.

ARTICLE 5: CONSENT

a. Neuromarketing researchers shall explain the tools they use to participants in layman terms.
b. Before providing consent, participants in Neuromarketing research shall explicitly express their understanding of the protocols as well as the general objectives of the study.
c. Participants shall be fully informed about the project before any Neuromarketing technique can be used to collect their neuromarketing insights.
d. Once a Neuromarketing study has commenced, participants shall be free to withdraw.

ARTICLE 6: PRIVACY

a. Neuromarketing researchers shall ensure that participants are made aware of the purpose of collecting insights.
b. Neuromarketing researchers shall have a privacy policy which is readily accessible to participants from whom they collect insights.
c. The identity of participants will not be revealed to the client without explicit consent.
d. Personal information collected shall be collected for specified Neuromarketing research purposes and not used for any other purpose.
e. Personal information may not be kept longer than is required for the purpose of the neuromarketing project.
f. Neuromarketing researchers shall ensure that adequate security measures are used to protect access to the insights collected during any project.
g. The Neuromarketing research data itself, including brain scans and brain data, shall remain the property of the research company and will not be shared.

ARTICLE 7: PARTICIPANT RIGHTS

a. Participants to any neuromarketing research project shall confirm that they are not obligated to participate in the project.
b. Participants to any neuromarketing research project shall be able to withdraw from the research at any time.
c. Participants to any neuromarketing research project shall be guaranteed that their personal data is not made available to others.
d. Participants to any neuromarketing research project shall be guaranteed that the insights will be deleted or modified upon request.
e. Particular care shall be taken to maintain the data protection rights of participants when personal data is transferred from the country in which they are collected to another country. When data processing is conducted in another country, the data protection principles of this Code must be respected.

ARTICLE 8: CHILDREN AND YOUNG PEOPLE

Neuromarketing studies involving participants less than 18 years of age shall only take place with the informed consent of the participant's parents.

ARTICLE 9: SUBCONTRACTING

Neuromarketing Researchers shall disclose prior to work commencing when any part of the project is to be subcontracted outside the neuromarketing researchers' own organization (including the use of any outside consultants).

ARTICLE 10: PUBLICATION

When results of a project are publicly shared, neuromarketing researchers shall clearly articulate which part of the report represents an interpretation of the data vs. which part of the data

represent the key findings. Neuromarketing researchers shall not associate their names to a Neuromarketing research project unless they have actively participated in the project and are able to defend the findings

ARTICLE 11: COMMITMENT

Neuromarketing researchers shall commit that they will apply this code and ensure their own clients and other parties will comply with its requirements. Failure to do so will result in the termination of their membership.

ARTICLE 12: IMPLEMENTATION

a. Neuromarketing researchers and their clients shall acknowledge that they know the code and also respect other self-regulatory guidelines that are relevant to a particular region or project; The Code is applicable for all involved in a Neuromarketing project.
b. The NMSBA Members shall show their acceptance of the code, by publishing the code on their website or by publishing a link to www.nmsba.com/ethics"(Neuromarketing Science and Business Association, 2019).

3. METHODOLOGY

Due to the absence of data about neuromarketing in the Western Balkans, and for the purpose of a more insightful research, expert in-depth interviews were conducted with the representatives of the industry and participants of the academic community in the Western Balkans region. At the same time, in order to answer the main research questions regarding consumer attitudes toward the ethics of neuromarketing in Western Balkans, a survey questionnaire was conducted with consumers.

Expert interviews were done through e-mails, and questions were specialized for the interview participants. Eight interview questions for the participants of academic community were mostly focused on the academic researchers in this field, while questions for the industry representatives were more related to the use of neuromarketing for commercial purposes. The interview for industry representatives consisted of 13 questions.

In order to answer the main research questions, regarding consumer attitudes toward the ethics of neuromarketing in the Western Balkans, a **survey questionnaire** with more than 300 hundred people was conducted. Survey respondents were from Croatia, Bosnia and Herzegovina, Serbia and Montenegro. The majority of the respondents were from Bosnia and Herzegovina (132), followed by Serbia (73), Croatia (51), and Montenegro (49). The survey was done on 1ka platform in Croatian, Bosnian, Serbian and Montenegrin languages. The structure of the survey was such that it led the respondents from the basic questions about their purchasing habits, their attention toward the promotional materials, package design, and product placement, to more specific questions, regarding their knowledge about neuromarketing, and focused on their opinion and attitudes toward neuromarketing.

3.1 Expert in-depth interviews

In-depth interviewing is a qualitative research technique, aiming to examine perspectives, particular ideas, programs or situations of a small number of respondents. This technique is usually used to provide a more complete picture of what happened in the program and why, providing more detailed information than what is available with other data collection methods (Boyce & Neale, 2006). The purpose of in-depth interviews about neuromarketing in Western Balkans was to get better insights and first-hand information about the neuromarketing in this region. The interview participants, listed in Table 1 below, were chosen according to their involvement in this topic.

The research sample was chosen through convenience sampling; it is one of the nonprobability sampling techniques in which the researcher selects the sample based on their convenient accessibility and proximity. The subjective nature of choosing the sample makes it less representative of the whole population, but useful when a researcher has limited resources, time, and workforce (Etikan, Musa & Alkassim, 2016, p. 2). Aiming to achieve a high variability degree, the sample members are representatives of both genders and several age groups, with professional experience in this field.

Dalibor Šumiga is a behavioral marketing specialist and the founder of Promosapiens. Promosapiens is the first behavioral marketing agency in the Adriatic region, which aims to deliver marketing solutions applying knowledge in consumer psychology and neuromarketing. The agency is a member of NMSBA: Promosapiens and mBrain Train agency from Serbia are the only agencies that are part of NMSBA.

The first academic representative, doc. dr. sc. Vujičić, is a researcher in the field of neuromarketing. From 2012 she has been a part of NMSBA and she was national representative of Neuromarketing Science and Business Association (Ultrecht, Netherlands; from January 2013 until December 2015).

The second academic representative, Professor Husić-Mehmedović, has done research in the area of luxury spending, neuromarketing, lifestyle and culture, and her work has been published in various reference journals such as *Social Indicators Research, Journal of Business Research, British Food Journal, Journal of Fashion Marketing and Management, South East European Journal of Economics and Business*.

The interviewees were chosen because of their extensive knowledge of the state of the art of research on neuromarketing in the Western Balkans, to provide a more comprehensive picture of the current level of research development in the region. The data from these interviews were compiled into one chapter of the thesis called Neuromarketing in the Western Balkans, which covers opinions of experts, including some who were not interviewed for the thesis (such as Nikoalaos Dimitriadis) working on neuromarketing in the Western Balkans.

Table 1: Expert in-depth interview sample description

	Gender	Profession	Focus of research	Experience in this field
Dalibor Šumiga	Male	Marketing specialist	Behavioral marketing, neuromarketing, guerrilla marketing, consumer psychology	More than 5 years
Maja Vujičić	Female	Assistant professor	Researcher in the field of neuromarketing	More than 5 years
Melika Husić-Mehmedović	Female	University professor	Researcher in the field of luxury spending, neuromarketing, lifestyle and culture	More than 5 years

Source: Own work.

3.2 Survey Questionnaire

The fundamental objective of the research was to provide the answers regarding the level of awareness in terms of ethics of neuromarketing among consumers in the Western Balkans, and the consumers' opinion about the ethics of neuromarketing. To reach the objective, a survey was conducted. Even though surveys are considered as a traditional way of conducting research, they are useful for a non-experimental descriptive design that seeks to describe reality. Frequently, surveys are used to collect information on attitudes and behavior. What can be considered as the greatest advantage of a survey is that it has internal and external validity, it is efficient, can cover geographically spread samples, may have ethical advantages and are flexible (Mathers, Fox & Hunn, 2007).

The survey for this research was posted on 1ka.si platform and reached more than 300 people, and respondents were from Serbia, Croatia, Bosnia and Herzegovina and Montenegro.

The survey consisted of 22 questions starting with introductory statements referring to the purchasing habits of respondents and their perception of advertisements, packaging of the products and product placements. The aim of the introductory statements was to provoke respondents to think about their purchasing habits and to introduce them to the topic through their habits.

Further, the survey was followed with the questions about respondents' **level of knowledge** about neuroscience, neuromarketing and EEG, fMRI, eye-tracking, and what they truly represent. In case the respondents were not at all aware about neuromarketing and the techniques involved, they were provided with the definitions and explanations in order to be able to answer the subsequent questions.

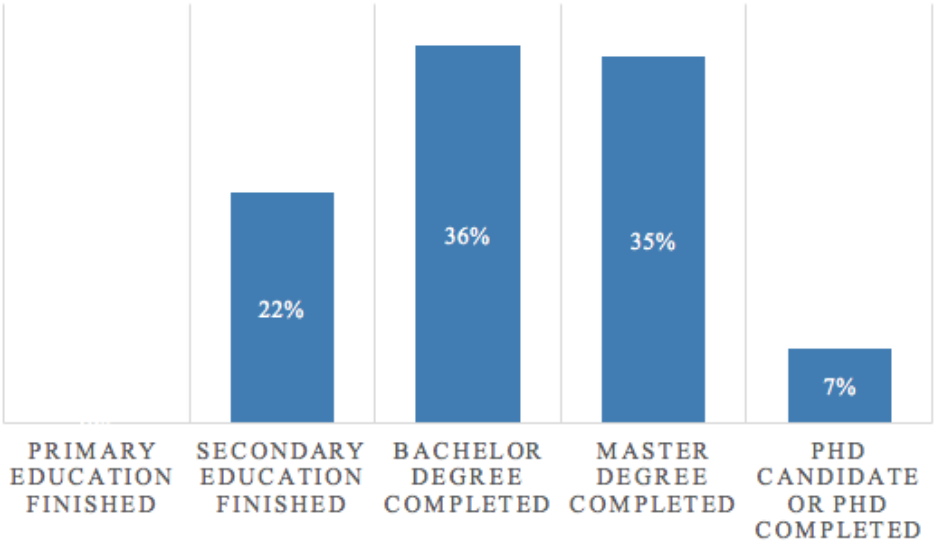
The next part of the survey in consisted of 20 statements regarding **attitudes toward neuromarketing and its ethics,** where respondents, as in the first question, had to rate to which extent they agreed or disagreed with the statements using Likert scales.

Question number 16 was focused on the respondents' opinions about their possible concerns for the use of neuromarketing in the future, or if not worried, why so. The last few questions were demographic questions, and in that section, respondents were asked about their gender, age, about their education, country of living, size of the city they live in, and their income. The whole survey with its questions is provided in the Appendix.

3.3 Questionnaire sample description

When it comes to surveying, according to Hoinville and Jowell (1978), the design and the structure of a survey cannot be determined until the purpose of the study, the population on which it should focus and the resources that are available, have not been clarified. Also, according to the above-mentioned authors, the basis for developing structured questionnaires is preliminary small-scale qualitative work to identify ranges of behavior, attitudes, and issues. This avoids forcing respondents' views into a false or irrelevant structure. The number of survey respondents for this research ranged from 470 to 302, 470 respondents respond on the introductory statements, while 302 finished the whole survey. Respondents ranged from 18 to 60 years. The average age of respondents was 30. 76% (234) of them were female and 24% (72) were male.

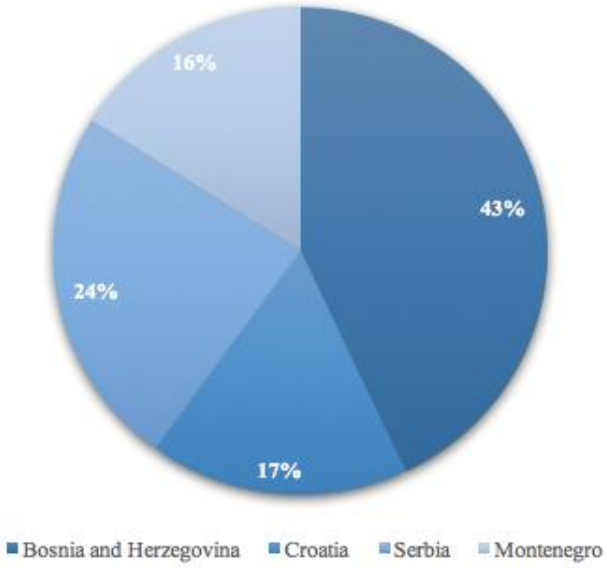
Figure 3: Level of Education of Survey Respondents



Source: Own work.

Fourteen percent of respondents have finished secondary education. The majority of the survey respondents have completed a bachelor's or master's degree, more precisely 36% and 35% of respondents have completed a bachelor's degree, and the same present of respondents have completed a master's degree. Seven present of respondents are Ph.D. candidates or have completed their Ph.D. Overall, based on the data from Figure 3 it can be concluded that the majority of respondents are highly educated individuals. Figure 4 shows the country of living of survey respondents. As can be seen from the figure, the majority of the survey respondents come from Bosnia and Herzegovina, 43%. Serbia follows with 24%, then Croatia and Montenegro with 17% and 16%.

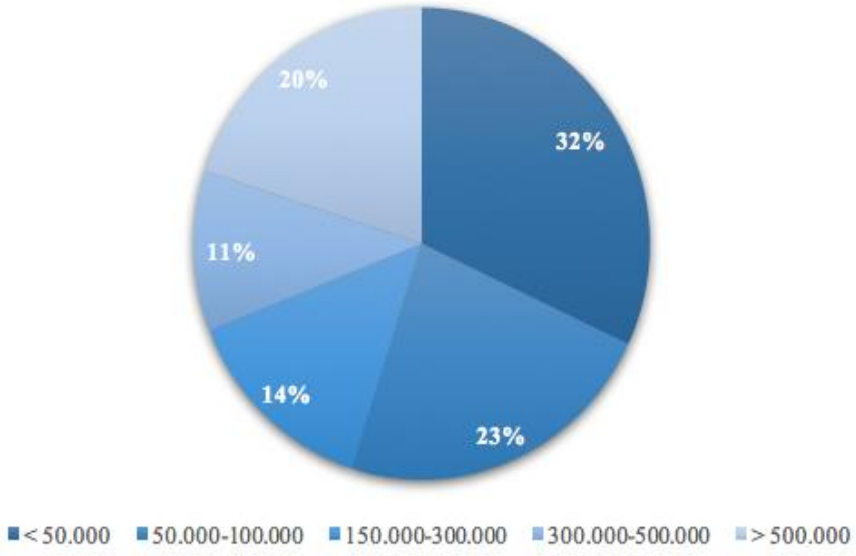
Figure 4: Country of Living of Survey Respondents



Source: Own work.

Due to the size of the countries and cities in this region, shown in Figure 5, it is not surprising that majority of respondents are living in the cities with less than 50.000 residents (32%), further 23% of respondents are living in the cities with 50.000-150.000 residents, while 20% of respondents are living in the cities with more than 500.000 residents.

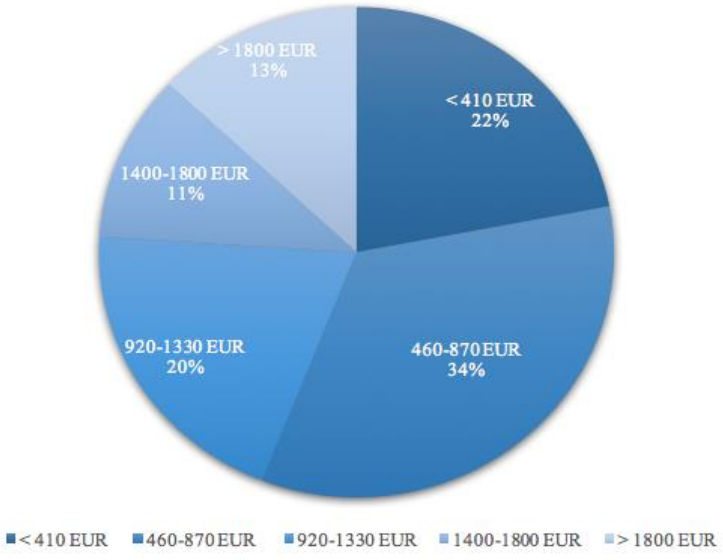
Figure 5: Size of the City in Which Respondents Live



Source: Own work.

The monthly income of the survey respondents, shown in Figure 6, reflects the already mentioned economic situation in the Western Balkan countries. The majority of the respondents have low to middle income 34%, while 22% of respondents are low-income people, which means that they have a monthly income below the nation's average income (Agency for Statistics of Bosnia and Herzegovina, 2019). Twenty percent of respondents have a fairly high monthly income in comparison to the average monthly income in these countries. Almost a four times higher monthly income than average have 13% of respondents, their income is higher than 1,800 EUR, which is around 3,500 BAM or 210,000 RSD.

Figure 6: Monthly Income Distribution of Survey Respondents



Source: Own work.

As can be seen from the demographic data from the survey, the average survey respondent is at the age of 30, highly educated, living in the city up to 150.000 residents and with an income of around 870 EUR, it means 1,700 BAM or 100, 000 RSD.

3.4 Data Analysis

Qualitative data provided by the expert in-depth interviews were analyzed using traditional content analysis methods. The quantitative data from the survey questionnaire were analyzed using descriptive statistics cross-tabulations in the statistical program SPSS.

4. NEUROMARKETING IN THE WESTERN BALKAN REGION

Bosnia and Herzegovina, Croatia, Serbia, and Montenegro are all positioned on the western part of the Balkan peninsula. According to the size of the population, Serbia is the biggest country in this region, with around 7 million inhabitants, followed by Croatia with around 4 million, Bosnia and Herzegovina with slightly less than 4 million and Montenegro with approximately 0.6 million of inhabitants. Countries are connected and bound with one another. Economically and politically, the most stable country in this region is Croatia, with the GDP per capita of $14, 878, being the only European Union country from this region. Serbia has the second-highest GDP per capita of $7, 134, followed by Montenegro ($6, 600), and Bosnia and Herzegovina ($4, 409) (World Bank Group, 2019).

Taking into consideration political risks, it can be said that in 2018 Croatia had the lowest political risk with 4.2 index points, followed by Serbia with 5.6 index points, Montenegro (6.4 index points) and Bosnia and Herzegovina (6.6 index points) (The Global Economy.com, 2018). Counties are very closely related, they share almost the same culture, values, and languages. Languages that are spoken in these countries are Bosnian, Croatian, Serbian and Montenegrin. Functionally, those are four different languages, but with a very high degree of mutual understanding (Cvetković & Vežić, 2009).

Culture represents one of the fundamental determinants of decision-making processes and affects the individual perception of ethical problems and consequences, and it is very important to deeply analyze the perception of different cultures on ethical issues (Hunt & Vitell, 1986). Due to the importance of the cross-cultural differences in ethical beliefs, an insight into neuromarketing and ethics in the Western Balkan for the first time has a special weight. Neuromarketing is a global marketing trend that is also slowly coming to the Western Balkan countries. Neuromarketing has been present in this region for approximately 5 to 10 years, within the industry, but even longer within the academic research (Dimitriadis, 2016). So far, there are only two registered neuromarketing companies at NMSBA, and those are Promosapiens from Croatia, and mBrainTrain Applied Neuroscience from Serbia (Neuromarketing Science and Business Association, 2019). As it is already mentioned, Promosapiens is focused on behavioural marketing, implicit association/reaction testing, eye-tracking, facial coding, UX testing, EEG, GSR, a consultancy. It is also well known because it has the most modern, mobile

neuromarketing laboratory in this part of Europe (Šumiga, 2019). While the main purpose of mBrainTrain Applied Neuroscience is to support brain research and improve quality of life through EEG software and hardware development (Neuromarketing Science and Business Association, 2019; mBrainTrain, 2019). Even though there is not much written information about this topic, there are people deeply involved in this field, and well known around the world because of their research and contribution in neuromarketing.

Besides Mr. Šumiga, Nikolaos Dimitriadis has been applying neuroscience and behavioral sciences in marketing, communications, leadership, and education for over a decade. Dimitriadis is one of the authors of the book "Neuroscience for Leaders: A Brain Adaptive Leadership Approach" for Kogan Page Publishers, London. He is a certified Neuromarketer, by SalesBrain USA, and an award-winning communication professional (International PR Association Award, SABRE Award by Holmes Report and other international and national awards). He lectured at the first Neuromarketing Manager Certificate Program at the Hamburg Media School among the top Neuromarketing experts in the world. He has worked with companies and institutions such as IKEA, IBM, Nestle, Banca Intesa Sanpaolo, Holcim, Pierre Fabre, Coca Cola Hellenic, Raiffeisen Bank, Plaza Centers, Rauch, Teekanne, USAID, GIZ, Merrill Lynch, UK Embassies in the SEE region, as a consultant, trainer and management coach Opportunity Bank and others (Project Management.com, n.d.).

On the other hand, there are some participants of the Western Balkans academic community who are very interested in this topic. Doc. dr. sc. Maja Vujičić from Croatia and professor Melika Husić-Mehmedović from Bosnia and Herzegovina have been researching this field for more than 5 years. Doc. dr. sc. Vujičić is a member of NMSBA and she already conducted neuromarketing research in Croatia using fMRI technique.

Interviews were conducted with these experts because of their extensive knowledge of the state of the art of research on neuromarketing in the Western Balkans. The remainder of this chapter summarizes information gained from interviewing experts who are working on neuromarketing in the Western Balkans.

4.1 The state of neuromarketing research in the Western Balkans

According to Plassmann, Ramsøy and Milosavljevic (2012), neuromarketing is an area of active research for academics, and at the same time source of profit for more than 200 neuromarketing companies worldwide. Even though they are all researching the same area, their goals of research differ. The primary goal of academic research is the dissemination of knowledge publicly (eg. publishing of protocols and data in peer-reviews journals), on the other side, the primary goal for the industry is the developing of competitive advantage of one’s competition.

Maja Vujičić, doc. dr. sc. at the Faculty of Economics in Rijeka, Croatia, and professor Melika Husić-Mehmedović, from the Faculty of Economics in Sarajevo, Bosnia and Herzegovina, have been interested in neuromarketing for about a decade. According to the words of professor Husić-Mehmedović, in 2014 research agencies started to do neuromarketing researches in Bosnia and

Herzegovina. At the same time, she as one of the rare researches on this topic, prompted by industry researches, has intensified her research toward this field and since then, neuromarketing became the primer area of her research. Doc. dr. sc. Vujičić highlighted that the most intensified period of her research in neuromarketing was when she, in collaboration with polyclinic Medico in Rijeka, conducted fMRI testing, in 2013. Besides this research, there is no other evidence of fMRI testing for the purpose of neuromarketing.

Academic representatives agree that neuromarketing is the area that enables an exact insight in the result of the research, and it gives insight into the reactions of individuals on different stimuli, also helps to get insight information that cannot be collected during focus groups or surveys. More precisely, it enables the measuring of the attention and intensity of emotions, which is very difficult to measure with traditional methods.

According to the words of industry representative Dalibor Šumiga, EEG and eye-tracking are the most used techniques, mainly because they can be applied to the largest spectrum of research. Also, GSR and facial coding are used very often. Both academic representatives agreed that there is no academic community or formal center that would connect academics from diverse fields; everything is left on individual research interest and their engagement for this field. The interest of companies in the Western Balkan region for neuromarketing services exists, which can be concluded from the number of agencies offering neuromarketing services. There are on average 2 agencies per country offering these services in Western Balkan.

Furthermore, agencies such as Nielsen Consumer Neuroscience, which operate globally, have opened their offices in Western Balkans (Croatia, Serbia, and Montenegro). With the use of neuromarketing, companies usually get an insight into the pretesting phase of promotional materials or products. Companies' or clients' requests are almost similar to those of traditional marketing and market research projects-companies want to understand better the needs of consumers, analyze their own creative solutions and their effectiveness, and based on the feedback create marketing and selling campaigns. Unlike the companies from abroad operating on bigger and more competitive markets, where they cannot afford to wait for someone else to go before them with the research, especially when the benefits are obvious, the market here is very small and not so competitive in this sense.

According to the words of Nikolaos Dimitriadis, his agency TrizmaNeuro is led by the idea that understanding both business and brain is the winning formula, and that with neuromarketing consumers' emotions, that are drivers of behavior, and unconscious reactions can be revealed (TrizmaNeuro, 2019).

Neuromarketing also helps with brain-friendly communication. When companies have products that are very good, but are not followed with good advertisements, package designs or websites, so that consumers' brains can understand, accept and buy it, that may be missed opportunity of neuromarketing (Dimitriadis, 2019). Also, according to his words, in the Western Balkans, the market has started to react positively to the application of neuromarketing methods and to accept a "brain-centric" approach to marketing. (Dimitriadis, 2016). Both academic community and

industry emphasized that neuromarketing is giving deeper insights about customers measuring reactions and emotions of the respondents which are not the case with traditional marketing research and that all leads to the conclusion that with the use of neuromarketing, companies are able to meet needs of their customers in a better way. Companies in this region, according to their words, have recognized the benefits of neuromarketing, and its use has increased in the last few years. However, the only limiting factor for companies is that it has a higher price than traditional marketing methods. At the same time, they have agreed that neuromarketing is not an invasive research method that harms customers.

4.2 Expert opinions about the ethics of neuromarketing in Western Balkans

Different goals of the research between academics and industry, different approaches to interpretation and implementation, and different approaches are reasons why neuromarketing researches are prone to significant ethical challenges (Stanton, Sinnott-Armstrong & Huettel, 2016). When it comes to the ethics of neuromarketing, both industry and academics in the Western Balkans are agreeable that there are misconceptions about neuromarketing. Neuromarketing cannot read minds or see thoughts, but only the processes that generate thoughts (Dimitriadis, 2019; Šumiga, personal communication, January 17, 2019). Neuromarketing can neither "brainwash"; meaning that if a consumer does not like something or does not want something, neuromarketing cannot force them to do so (Dimitriadis, 2019).

Doc. dr. sc. Vujičić pointed out that her attitude toward the neuromarketing is the same as for any research area – it is important how data are used and that the results of the neuromarketing research should serve to customers, because the aim of marketing should be to overcome market gaps, to understand customers and afford them good products and adapt the demand to supply. Regarding the ethics of neuromarketing, professor Husić Mehmedović said that she completely agreed with the study of Statson, Sinnott-Armstrong and Husttel (2016), Neuromarketing: Ethical Implications of Its Use and Potential Misuse. Promosapiens agency, as a member of NMBSA, is a signatory of the ethical codex.

Šumiga also said that neuromarketing cannot manipulate human behavior, but it can help interpret and explain it. He said that bigger problem regarding the ethics of neuromarketing is in misinterpretation of results, or false promises that neuromarketing is the miraculous solution for all the problems in business and questionable methodologies used. Professor Husić-Mehmedović has the same opinion and suggests to set realistic expectations from neuromarketing, to use the combination of neuro and behavioral methods. Doc. dr. sc. Vujičić added that sometimes it is a bigger problem when consumers are not well informed about the products (e.g. loans) or about the products that consumers can become addicted to (e.g. bet shops).

According to the words of the owner of Nikolaos Dimitriadis, as in all other business spheres, there is an ethical code that should be followed. By looking at the bigger picture of the whole story about neuromarketing, it can be concluded that neuromarketing can help in the creation of better products and messages to consumers, reducing the losses and costs of everyone involved in

the process. Saying that this is a much more ethical approach than the one currently existing in the market (Dimitriadis, 2016). What Šumiga and Vujičić suggested is to educate people about neuromarketing, not with an aim to change them, because essentially marketers are not able to do so, but to give them a possibility to change their habits. For example, if enough people were informed that instead of going shopping hungry, and go with the previously written list of products, they would probably get the possibility to avoid impulsive buying.

The only interview question which the Western Balkan's academics and industry representatives have disagreed on is the one related to what populations should be avoided in neuromarketing researches. Academics suggested that neuromarketing researches should not be done on children, because they do not have well-developed critical thinking. On what Šumiga, as an industry representative, pointed out is that it is more important what products should the research be done for, and their ethical codex is very clear- not to do the research that will have a product promotional and consumption benefit, yet harmful for children.

However, if a company is developing, for example, a useful didactical tool for children, it is logical that children participate and give an insight that will help to make the best possible tool.

Mainly due to the high costs of some of the neuromarketing tools (such as fMRI, MRI), and the lack of the information and the research about neuromarketing in this region, which results in poorly informed people about this topic-this field in the Western Balkans is still in its infancy. According to the information above mentioned, especially related to the increscent companies' interest in this field, it has a high potential to grow.

4.3. Results of in-depth interviews with Western Balkans neuromarketing experts

The following themes emerged from the interviews, which will be discussed in greater detail below:

- Neuromarketing has been present for about 5 to 10 years in this region;
- Companies in Western Balkans are interested in neuromarketing, but the price of neuromarketing research is what "limits" them the most;
- Academic community interested in neuromarketing is very small;
- Neuromarketing is considered as an important additional method of market research;
- There is no clear administrative or legislative procedure for neuromarketing research;
- With the use of neuromarketing research methods companies can get valuable insights, that they cannot get with traditional marketing research;
- With the use of neuromarketing research methods companies cannot "read minds" or manipulate with customers, but read signals that are already in use;
- Neuromarketing cannot find the "buy button" in customers' brain;

- Attitudes toward the ethics of neuromarketing are the same as for any other research area;
- Academicians would ban neuromarketing research on kids, while the industry does not agree with that;
- It is not up to the population what research should be done, but the product the research should be done for;

4.3.1 The demand for neuromarketing in the Western Balkans

According to the words of Mr. Šumiga, requirements of clients are the same as for the traditional marketing research or marketing research projects-companies want to know better needs of customers, better analyze their creative solutions and their efficiency, and based on the feedback to create more efficient marketing and sale campaigns.

On the other hand, according to Šumiga's opinion, companies in Western Balkans are not using neuromarketing services because they do not know that they exist here, because they think that they are extremely expansive and intended only for the biggest brands, or they have heard stories about customer manipulation so they are skeptic or scared of using it. Regarding the interest of companies, according to the words of professor Husić-Mehmedović, companies are interested in neuromarketing because they get valuable insights, especially in the pretesting phase. But the price of neuromarketing is something that limits companies the most and disables them to actively use it, and because of that, it did not reach its full capacities here. As she said, the academic community interested in neuromarketing is very small; she mentioned only one professor besides her in Sarajevo that is researching this field.

Since doc. dr. sc. Maja Vujičić did not cooperate with companies, she could not mention her example, but according to the facts that are currently presented on the market, many research centers with some of the neuromarketing research methods and that research agency include neuromarketing in their offer-it can be concluded that interest of the companies for neuromarketing exists (Neuromarketing Science and Business Association, 2019). Doc.dr.sc. Vujičić agreed that the lack of financial resources disables neuromarketing research, especially when it comes to the use of fMRI. She mentioned that the lack of financial resources disables the foundation of an interdisciplinary center for such researches. Furthermore, according to her words, there is a lack of connectivity and nonexistence of formal center that would connect scientists from different area and that is the reason why there is only individual academic interest in this field. In addition to that, doc.dr.sc. Maja Vujičić said, knowing from her personal experience, the execution of these interdisciplinary researches is not established in the practice. There are no administrative procedures for this kind of research (that is not standard and that connects scientists from different fields).

4.3.2 Expert opinions regarding the role of neuromarketing and its misconceptions

Both academic representatives agreed that neuromarketing is one of the market research techniques and that the role of neuromarketing in the resent researches proved to be significant. As the whole marketing process has striving to be individualized, through neuromarketing the access to respondents became individual. fMRI is considered as a gold standard of neuromarketing research, and also because of the role of fMRI the effect of neuromarketing research is huge. Researchers can get an insight into how a person reacts to different stimuli and how he/she makes decisions. According to the words of professor Husić-Mehmedović, attention and emotions are very hard to measure with traditional marketing research methods, while the EEG gives a very good insight into the attention and the intensity (but not necessarily the quality) of emotions during the stimulus.

Mr. Šumiga shared academics' opinions that the key advantage of neuromarketing is to get the information that they cannot get in the focus groups, with the surveys and based on the tools and metrics that are in everyday use.

Neuromarketing can provide insights that traditional marketing research cannot, there is a widespread skepticism that it can control the minds of people or invades the privacy; these two things are considered as two biggest problems regarding the ethics of neuromarketing-interview participants did not agree with that. Vujičić said that mind control is nonsense that does not exist, because neuromarketing is research, and as such cannot influence or change the behavior of people. Neuromarketing tools such as EEG or behavioral such as eye-tracking cannot harm research participants, and they are used to measure appearance/phenomenon, but not to influence minds or emotions. At the same time, research participants can accept or not accept to participate in the research; so nothing can be done without approval.

Professor Husić-Mehmedović said that neuromarketing is a research method that has its tools to fulfill traditional marketing researches. According to her opinion, neuromarketing methods are obviously giving better insights about the reactions of individuals, but that does not necessarily mean that consumers are going to be manipulated; actually it is not about neuromarketing whether consumers are going to be manipulated or not- companies that want to manipulate their customers will do that with or without the use of neuromarketing. It is important to get the best possible form of individuals' behavior; that should be of high importance to any individual to get to know himself/herself better; whether he/she has already made some decisions that it started to rationalize them; when person is on "autopilot" mode and when he/she is conscious about its choices and decisions; what is his/her real need and what society imposes.

All of those are general questions and with neuromarketing, they are at the forefront. As both representatives of the academic community mentioned, there is a widely known term "buy button" that is closely related to neuromarketing nowadays, more precisely, that with the use of neuromarketing companies can find the "buy button" in customer's brain-which is not true. According to them, the term "buy button" represents distortion and oversimplification of the most complex organ in the human body.

In addition to academics' opinions, Mr. Šumiga said that neuromarketing research is not dangerous and it cannot harm customers; invasive techniques are not in use and they do not manipulate with customers, but reading signals that are already in use. Regarding these claims, Mr. Šumiga emphasized the importance of education of public that human beings are primarily irrational, about the role of cognitive bias on our lives, how our brain works, why we buy products that we do not need, why we vote for politicians and afterward we are dissatisfied with our own choice. Also, with its use, they will be able to benefit as well.

Educating people will not necessarily lead to changing people, but they will get the possibility to partially control their habits, according to his words. For example: if enough people were informed about avoiding going to the grocery hungry, and buying only products from the prepared shopping list- impulsive buyers with this technique would get the possibility to use defense techniques.

4.3.3. Expert opinions regarding the ethics of neuromarketing

Most importantly, industry and academic communities mostly share opinions regarding the ethics of neuromarketing. Mr. Šumiga said that being a part of the world's biggest neuromarketing organization (NMSBA) are signers of the ethical codex. According to his opinion, since they are not manipulating with human behavior, but interpreting it- the bigger problem regarding the ethics of neuromarketing is in false presentation of results or misuse of them, false promises that neuromarketing can find miracle solutions for all business problems and with the questionable methodologies and equipment that is in use.

Doc.dr.sc. Maja Vujičić said that her attitude toward the ethics of neuromarketing is the same as for any other research area, and she agreed with Mr. Šumiga that it is important in "which hands" are information and how it is going to interpret and use it. Where they have disagreed is on which population should suggest to not do the research. Both academics agreed not to research kids because they do not have developed critical thinking and they cannot make decisions as mature people and the whole communication process should be adopted to them.

On the other hand, Mr. Šumiga pointed out that he would not say that it is up to the population, but the product for which research should not be done. He mentioned the example of a very useful didactical tool for kids and that it would be logical to analyze the game of kid to get an insight on how to make the best possible tool for the kids. That is why he thinks that it is more important for which products researches are done and here the ethical codex of neuromarketing research is very clear-to not conduct the research that would help in promotion and consumption of products that can harm human health, and those are the products which advertisements are already banned.

4.3.4. Expert opinions regarding the future of neuromarketing in the Western Balkans

According to the words of Dalibor Šumiga, the future of marketing is the fusion of human creativity with the use of amazing technology. Technology without human input is not worth much. That also leads to the conclusion that the most desirable employees will be creative analysts (Šumiga, 2019). Furthermore, according to Nikolaos Dimitriadis, the Western Balkan market has positively reacted to neuromarketing methods (Dimitriadis, 2016). Taking into consideration that neuromarketing agencies in this region have invested a lot in their equipment; Promosapiens has the most modern, mobile neuromarketing laboratory in this part of Europe, and

also TrizmaNeuro has invested a lot of money into the latest equipment and has employed excellent scientists, the market will most probably soon recognize it, actually the number of companies interested in neuromarketing research from year to year is increasing (Šumiga, 2019; Dimitriadis, 2019).

Recently, universities in this region settled the practice to cooperate with marketing agencies and talk more about this topic with students and organize conferences. Students' feedback proved to be positive, and it can be said that students in this region are very enthusiastic about this topic (Metropolitan University, 2017). Increasing reliability in the future, neuromarketing, with good equipment and experts in the field, will attract companies even more. Secondly, the application of neuroscience is expected an increase as well, and with time, the whole community will be more "positively oriented toward the brain" (Dimitriadis, 2019).

5. FINDINGS: CONSUMER ATTITUDES TOWARDS NEUROMARKETING ETHICS

Analyzing data collected from the survey, the main conclusions emerged, which will be explained in the next section. Those include:

- The majority of the survey respondents plan their purchase in advance, and know what they want to buy before they go in the store;
- Design of the products is very important for them;
- The majority of the respondents do not watch TV commercials or promotional videos on social media;
- Opinions about the influence of commercials on their purchases are almost equally divided;
- The majority of the survey respondents do not know what neuroscience, neuromarketing, EEG, fMRI, eye-tracking and GGS are, or they have not heard about it at all;
- A significant number of respondents agree that neuromarketing helps companies to meet customers' needs better and results in better products;
- The customers consider neuromarketing as one of the main components of modern marketing research;
- More than half of the survey respondents have agreed that companies should implement neuromarketing as a good practice they use.
- They would support and recommend companies that use neuromarketing;
- The respondents think that neuromarketing helps companies to know what they think;
- The consumers' opinion about the claims that with the use of neuromarketing companies invades their privacy or are able to know what they think are almost equally divided;
- The majority of the participants think that neuromarketing can make them buy the product that otherwise they would not;

- The participants do not think that neuromarketing can make them compulsive buyers;
- More participants would feel comfortable to participate in neuromarketing research than not;
- The majority of the respondents consider conducting neuromarketing research in both commercial and non-commercial (e.g. scientific research) purposes ethical;
- Almost 60% of the survey participants agreed companies should talk more about neuromarketing.

5.1 Introductory findings on consumer behavior

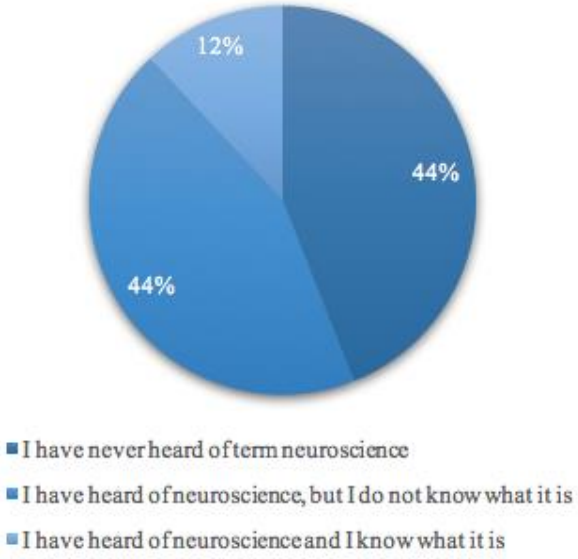
The first part of the survey aimed to investigate how conscious respondents are when they go shopping, and how much influence on their purchases has possible outcomes of neuromarketing researches, such as TV commercials, promotional videos on social media, package design, or product positioning in the stores. Almost 50% of respondents agreed that they plan to purchase in advance, while over 70% of them said that most of the time they know what they want to buy before they go in shopping. Almost 40% of the respondents said that it is not important for them how products are positioned (on what shelf), around 35% have said that product position is important for them, while 20% were indifferent, neither agreed nor disagreed.

Around 70% of respondents do not watch TV commercials and 60% do not watch promotional videos on social media, and almost the same applies to advertisements in the newspaper. Interestingly, even though the majority of the respondents said that they plan purchases and that they know what they want to buy in advance, around 50% of respondents also said that they consider themselves as impulsive buyers.

5.2 Consumers' level of awareness regarding neuroscience and neuromarketing

According to the results of the survey, 44% have never heard of neuroscience, while 44% have heard of neuroscience, but do not know what it is. Twelve percent have heard of it and know what it is, and have provided their explanation of neuroscience. Most of the definitions explained neuroscience as the science of the human brain. As for neuroscience, almost the same can be sad for neuromarketing (shown in Figure 7).

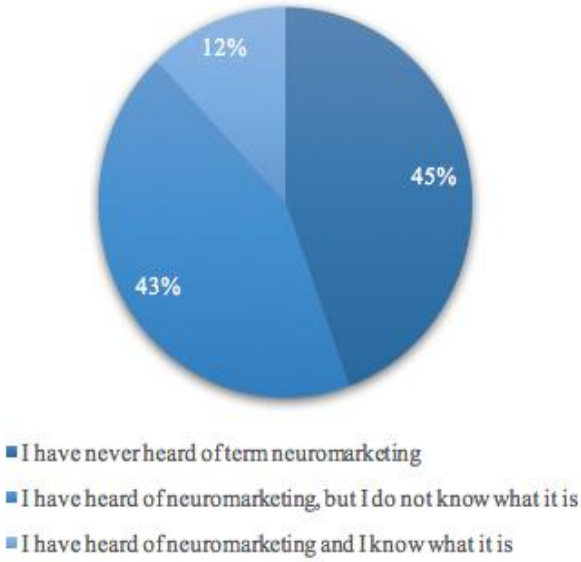
Figure 7: How familiar survey participants are with the term neuroscience



Source: Own work.

As can be seen in Figure 8, forty-four percent of survey participants have never heard of neuromarketing, 42% have heard of it, but do not know what it is, and 13% have heard of it and know what it is. The majority of the definitions explained neuromarketing as a part of marketing that is testing human reactions and behavior on marketing stimulus, intending to sell the particular product or influence subconscious behavior.

Figure 8: How familiar survey participant are with the term neuromarketing



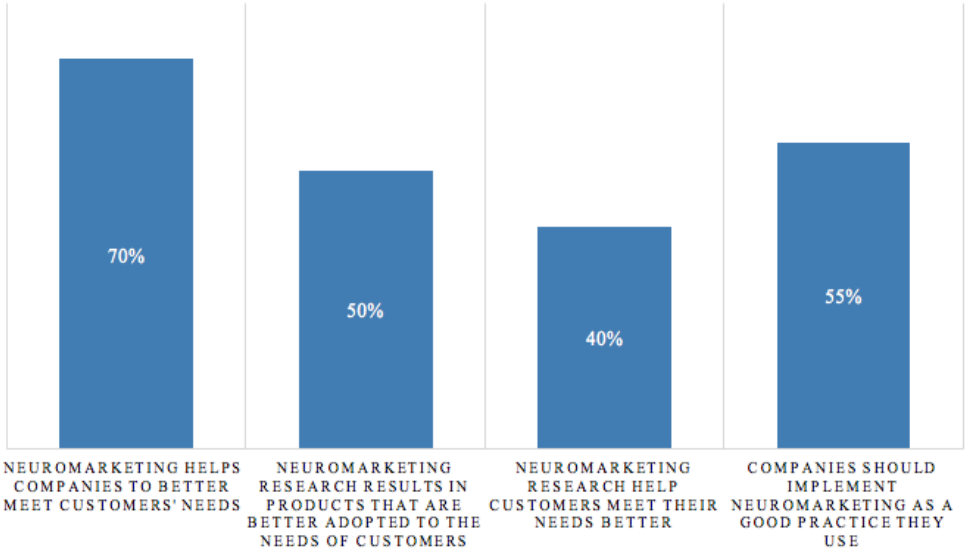
Source: Own work.

The highest number of participants have heard of neuromarketing on the internet (41%), while 25% have chosen option "Other", where they explained that they had never heard of it, or that they had heard of it in this survey, or on their workplaces. Among the survey respondents, the most known neuromarketing techniques were fMRI and eye-tracking, 48% of respondents have heard about fMRI and know what it is, while 46% have heard about eye tracking and know what it is.

5.3. Attitudes of consumers toward neuromarketing

The following part of the survey required the participants to say to what extent they agreed or disagreed with the statements, and the purpose of the statements was to investigate their attitudes and opinions about neuromarketing. As can be seen in Figure 9, around 70% of respondents agreed that neuromarketing helps companies to better understand customers' needs, 17% sad that they neither agreed nor disagreed, while 9% did not know the answer. Second statements regarding consumer attitudes toward the neuromarketing was, "Neuromarketing research results in products that are better adapted to the needs of consumers", around 55% of survey participants agreed with the statement, 24% of survey participants neither agreed or disagreed with this, and around 10% sad that they did not know the answer, or disagreed with the statement. Around 40% of survey respondents agreed that neuromarketing researches help them meet their needs better, while around 55% agreed that companies should implement neuromarketing as a good practice they use, in both cases around 30% of respondents were hesitant whether they would agree or disagree with the statements. More respondents disagreed with the statement that neuromarketing researches help meet their needs better (21%), than those who agreed that companies should implement neuromarketing as a good practice (8%).

Figure 9: Percentage of respondents who agreed with positive claims regarding neuromarketing

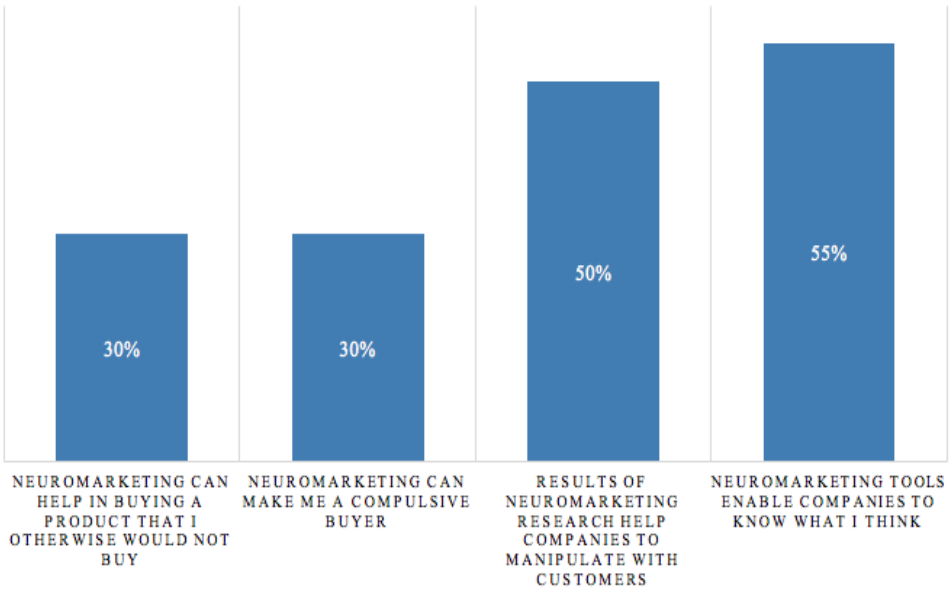


Source: Own work.

Interestingly, even though 55% of the survey respondent said that companies should implement neuromarketing as a good practice they use, and more than sixty percent said that if companies are able to use neuromarketing, they should do it, only less than 40% of the survey participants think that the use of neuromarketing by the companies is good for customers, 34% of respondents are also indifferent about this statement, around 20% disagree with it. Sixty percent of respondents said that they consider neuromarketing as one of the main components of modern marketing research, only 7% have disagreed with that, while 24% neither agree or disagree. Less than 50% of respondents said that they would support and recommend companies to use neuromarketing or their products to others, more than 35% were indifferent about it, and slightly more than 10% said that they do not agree with it. Almost the same percentage of the respondents (around 30%) agreed and disagreed with the statement "The use of neuromarketing invades my privacy", while more than 30% of respondents were undecided.

As showed in Figure 10, forty percent of the respondents said that neuromarketing tools enable companies to know what they think, 20% disagreed with that, and around 30% percent neither agreed or disagreed. Correspondingly, 50% agreed with the statement that results of neuromarketing researches help companies to manipulate with customers, later on, around 15% disagreed with the statement, while 27% said that they neither agreed nor disagreed. On the statement "Neuromarketing can influence my behavior", 28% of respondents agreed with the statement and neither agreed nor disagreed, while, 36% disagreed. Despite the fact that more than 50% said that neuromarketing can help in buying a product, they otherwise would not, only slightly more than 30% think that neuromarketing can make them compulsive buyers, other respondents are also equally distributed, almost the same percent (around 30%) is indifferent and disagreed with that. At the same time, the respondents quite equally distributed opinions about participation in neuromarketing research. Slightly more than one-third of them said that they would feel comfortable to participate in neuromarketing research, exactly 30% said that they neither agreed nor disagreed, while a bit less than 30% said that they would not feel comfortable to participate in the neuromarketing research.

Figure 10: Percentage of respondents who agreed with negative claims regarding neuromarketing

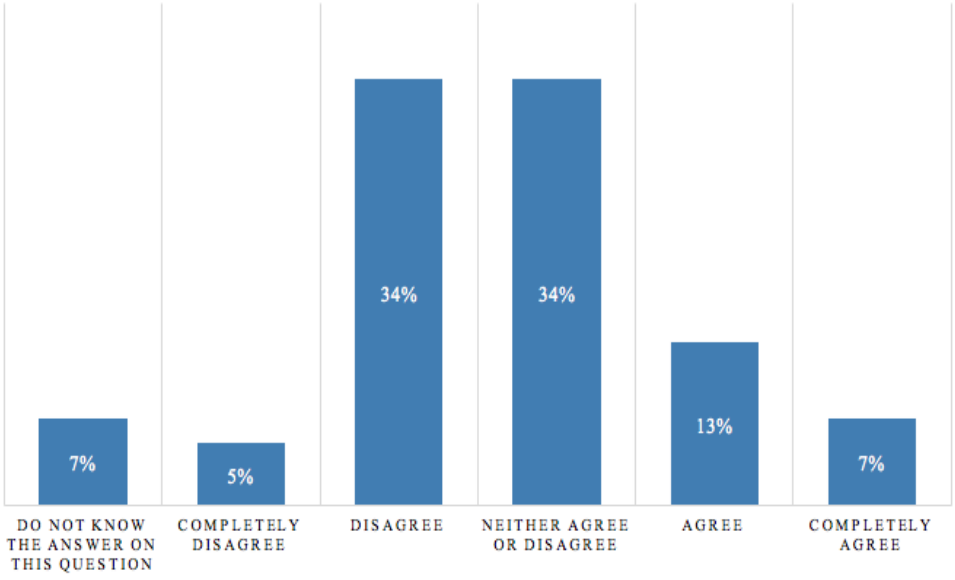


Source: Own work.

5.4. Consumer attitudes toward the ethics of neuromarketing

Among the most important questions for this research are those that directly refer to the aim of the research- how consumers perceive ethics of neuromarketing. Around 40% of respondents said that they do not consider conduction neuromarketing research in commercial purposes as unethical, but 20% consider it unethical, while 34% are indifferent, as it is illustrated in Figure 11.

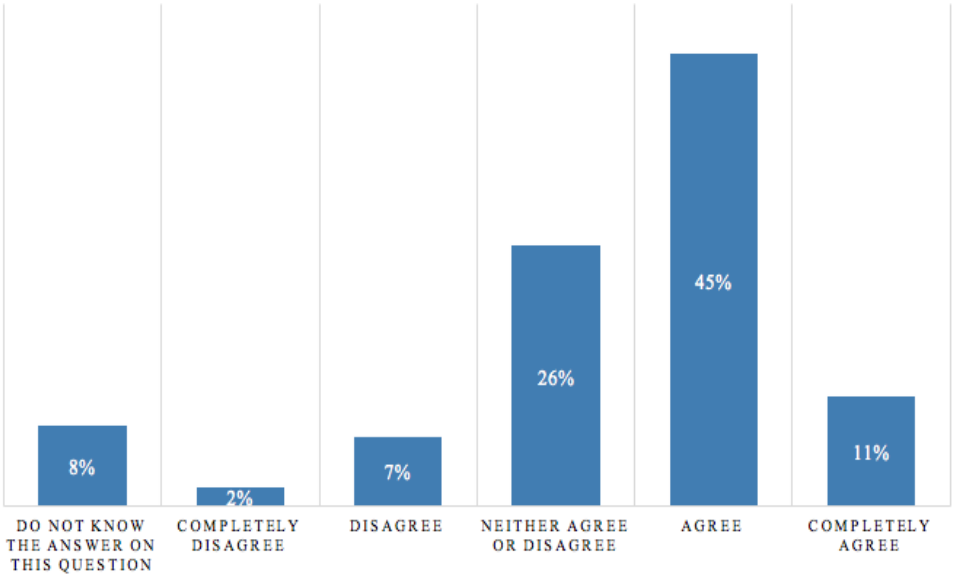
Figure 11: Attitudes of consumers toward the ethics of commercial use of neuromarketing (Claim: Conducting neuromarketing research in commercial purposes)



Source: Own work.

At the same time, as it can be seen from Figure 12 below, conducting neuromarketing research in non-commercial purposes (eg. scientific research) almost 60% of respondents consider ethical, only 9% of respondents do not agree with it, and 26% are indifferent. Almost 60% of the survey participants agreed that companies should be more open when it comes to neuromarketing, 25% neither agreed nor disagreed, while 8% did not agree with it.

Figure 12: Attitudes of consumers toward the ethics of non-commercial use of neuromarketing (Claim: Conducting neuromarketing research in non-commercial purposes (e.g. scientific research) is ethical)



Source: Own work.

5.5 Consumers' opinions about the future of neuromarketing

The last question in the survey, before demographic questions, was aiming to get the answer about consumers' opinions regarding the future of neuromarketing. More precisely, whether they are concerned that neuromarketing could have a negative influence on consumers, to provide about what they are concerned the most, likewise, if they are not concerned, why so. Among the 178 responses on this question, prevailed the opinion that consumers are not concerned about the use of neuromarketing in the future. Among the reasons, the most frequent was that they know what they want to buy and how much money they have and can spend on a particular thing. Furthermore, they are not concerned because, according to their opinion, they are already exposed to many online types of research and their habits, behavior, interest and purchase desires are monitored. Some of them consider neuromarketing as a great additional tool for the research and a better way to reach consumers. Some of them compared neuromarketing to the mobile phone; once upon a time, the mobile phone was just a predisposition, but right now it is a must-have item.

Technology is constantly evolving, and that is the normal phase of development. So neuromarketing will take its place in scientific research, but in the industry as well. Also, opinions are that neuromarketing is going deeper in the "world of consumers", not necessarily harming their health or hypnotizing them. A lot of consumers are not concerned, because they believe that with the help of neuromarketing they will enjoy better products, but on the other hand, some consumers are not concerned about neuromarketing, just because they think that is not present in their country. However, some respondents are concerned about neuromarketing and its future use. The minority of the consumers are concerned, and they are concerned because they think that neuromarketing invades their privacy, or they may feel manipulated. Some respondents said that they were concerned because they are exposed to the process of data processing, where their data can be misused.

One the other hand, some respondents are not concerned about neuromarketing, because they think that their privacy is already invaded because of social media, or they think that neuromarketing can be of significant use, but it is important to know for what purposes and measures it will be used. Respondents are also not concerned because neuromarketing is not hypnotizing them, but just going deeper, adopting products to their needs and makes shopping easier. "As medicine is evolving and any other science, the same is happening with marketing, and people should get to use it and accept it. Neuromarketing is a modern way of getting to know your customers and their needs and wishes, and according to my opinion, as such, neuromarketing has more positive sides than negative", are words of one of the respondents.

6. RECOMMENDATIONS AND LIMITATIONS

The research consisted of qualitative and quantitative research techniques; qualitative research technique aimed to collect information about neuromarketing in Western Balkans and hear the opinion of people deeply involved in this field, while quantitative research technique was designed to examine the opinions of consumers in Western Balkans and respond to main research questions. Both qualitative and quantitative research techniques have led to the same research recommendations which will be explained in detail in the following sections.

6.1 Recommendations based on the research findings

Merging of both qualitative and quantitative research techniques led to two mutual disclosures. The first one is that a small number of people are informed about neuromarketing in Western Balkans, and the second one is that due to the high costs of the neuromarketing research techniques companies are deprived of it. How faintly informed customers in Western Balkans are about neuromarketing tells the fact that slightly less than 50% of the survey respondents said that they had never heard of neuroscience or neuromarketing. At the same time, slightly more than 40% said that they had heard of neuroscience and neuromarketing, but they did not know what it was. It means that only around 10% of participants were familiar with the neuromarketing and neuroscience.

According to the opinion of doc.dr.sc. Vujičić and Husić-Mehmedović, the absence of information about this topic lead to the wrong conclusions, such as that with the use of neuromarketing companies can find "buy button", control minds and invades privacy. Bearing in mind that slightly less than a half of the respondents have bachelor and master degree, and as such are highly educated people means that formal education does not necessarily have an influence on conversance of this topic, but rather individual interest in this specific area of the research, and that around 60% of respondents have said that companies should talk more about neuromarketing.

There should be ways to make this topic closer to the general public because, on a daily bases, we are all exposed to many promotional materials and outcomes of neuromarketing researches. Informing the general public in this region about neuromarketing can be done through:

- agencies that are offering neuromarketing services;
- through companies that are using neuromarketing services;
- through consumer protections centers on the state level;

The highest percentage of the respondents have heard about neuromarketing on the internet (41%), and large number of people in this region use the internet on a daily bases (Croatia 3,787,838 population size, 90,1 % penetration; Serbia-6,325,816 internet users, 72, 4% penetration; Bosnia and Herzegovina-2,828,846 internet users, 80,8% penetration; Montenegro-439,624 internet users, 69,9% penetration;), having that in mind can be in the future place where the majority of communication with public can be conducted. (Internet Worldwide Stat, 2018).

Writing blog posts about neuromarketing, including recent marketing campaigns that were based on neuromarketing researches, as well as educating public through social media posts about neuromarketing in general, and what are possibilities of neuromarketing, but at the same time limitations, how customers can benefit from it, but what they need to pay attention to as well is something what marketing agencies that provide neuromarketing services can do. Educating customers about the benefits of neuromarketing can contribute to raising awareness of the importance of neuromarketing and ROI on neuromarketing researches and can lead to attracting new clients for neuromarketing services. A good example of this recommendation is Promosapien agency. On their website, many useful and educational blog posts can be found (Promosapiens, 2019). Positive practice of universities in this region, where neuromarketing agencies from time to time visit economic faculties and talk about neuromarketing should be continued as well, because it is one of the main ways how young people are getting in touch with the topic and getting interested in it, and research further (Metropolitan University, 2017). Companies that are using neuromarketing services after the particular campaign, in the post phase can explain through a blog post, media articles, social media posts, or short videos how they applied neuromarketing techniques, in which way it helped them and to explain shortly their impressions about it. Looking at the results of the survey, and taking into consideration that neuromarketing is still in its infancy in this region, since it is present for only about 5 years, there

is a potential that many customers can get worried if the use of neuromarketing starts to increase (around 30% of the survey respondents think that neuromarketing invades their privacy, enables companies to know what they are thinking, and making them compulsive buyers). All of these countries have their organizations for customer protection (Croatia-Croatian Association for Customer Protection; Serbia-Customer Center Serbia (CEPS); Montenegro-Customer Protection Center Montenegro; Bosnia and Herzegovina-Ombudsman Institution for Customer Protection) and they can contribute in better education of general public, it can be done by making marketing campaigns with the purpose of better education of customers. This way, as a neutral body and mediator between companies and customers, we can talk about this topic, and introduce customers better. At the same time, organizations for the protection of customers can contribute to the making of a legal framework for neuromarketing research. Doc.dr.sc. Maja Vujičić emphasized that the lack of administrative procedures for this kind of research (that is not standard and that connects scientists from different fields) has led her to a long wait for the approval of the research execution. Organizations for customer protection are able to make a legal framework for the execution of neuromarketing researches and for the protection of customers, it can be done in accordance with the NMSBA Code of Ethics since NMSBA is a world roof organization for neuromarketing, and to put it into parliamentary procedure. Even though, according to the research results, only 20% of survey respondents said that conducting neuromarketing research in commercial purposes consider as unethical, but also taking into consideration that only 10% of survey respondents knew what neuromarketing and neuroscience were before they were introduced in the survey, with the definition, and that neuromarketing research in this region is in its beginning, having clear rules for the procedure and customer protection will lead to less confusion in the future and prevention of possible ethical vagueness in the future. Lastly, referring to the point of doc.dr.sc. Maja Vujičić, where she emphasized that researchers in this field are not well connected and that there is no interdisciplinary research center for this kind of researches leads to the recommendation that there should be an organization in Western Balkans for researches in neuromarketing. Since this is not geographically a huge area and the majority of the researchers are even physically close and able to meet, organize and participate in the researchers conducted here, conferences and lectures about this topic-this seem like a logical sequence of events. This way, the interconnection and synergy between industry and academic community will most probably result in even better-informed specialists with more ideas and ways for further researches and ways how to share their knowledge with the general public. Also, having an online platform or website as a part of the organization will be useful for sharing new findings, ideas, and knowledge about neuromarketing. So, for the future use and expansion of neuromarketing in Western Balkans, informing and educating customers will be key points for their positive attitudes toward the ethics of neuromarketing. Offering educational content about this field, as well as, having developed a legal standard for customer protection will be base on the development of positive customer attitudes toward the neuromarketing.

6.2 Limitations of the research

When analyzing limitations of quantitative research, increasing the research sample in size would result most probably in more comprehensive results, in addition, a higher level of sample heterogeneity, in form of a wider span of age, country of residence, and education could be useful as well. At the same time, it would be better if more respondents were introduced with neuromarketing, so they could have an attitude based on their knowledge and experience. Regarding the qualitative part of the research, an increase in the sample size, as well as, a higher level of heterogeneity in the sense of the scientific background of interview participants would deliver more detailed insights. For example, if neurologists, sociologists, and psychologists were interviewed in order to share their opinions about the possibilities of neuromarketing research, influence on customers and ethics of neuromarketing, it would round off the research and give a more detailed insight. If there were no resource constraints, this research could include additional research objectives, more narrowly formulated, allowing the discussion more depth and scope. Furthermore, diversifying data collection techniques, as well as analysis methods would be implemented to achieve a wider range of results and ideas.

6.3 Further research recommendations

So far, in the Western Balkan region this is the first research that aimed to investigate consumers' attitudes toward the ethics of neuromarketing. Like the first one, an aggravating circumstance for it was the lack of data and information about this topic in Western Balkans, but with the use of both qualitative and quantitative research techniques, it delivered a lot of new information that will open new questions. This research has opened two interesting areas that could be further explored: the education of customers about neuromarketing and a strategy for advancing neuromarketing through better awareness.

According to the opinions of interview participants, it can be concluded that neuromarketing should not be considered as an ethically questionable field, not more than any other research method. At the same time, the community interested in neuromarketing in Western Balkans is not well connected, and in order to build more positive attitudes of consumers toward the ethics of neuromarketing-customers should be better educated toward this topic.

Quantitative research led to the conclusion that, first of all, customers are not well informed about what is neuromarketing, but after they have been explained what it is, the majority of respondents had positive attitudes about the ethics of neuromarketing and its use in both commercial and non-commercial purposes.

As neuromarketing is the research field in its infancy in this region, but with a promising future, there is still a lot of space for the changes in the attitudes of consumers. An ongoing debate about whether neuromarketing is ethical or not will be one of the very interesting topics in the future.

CONCLUSION

Neuromarketing in the Western Balkans has been present for about 5 to 10 years, both in academic and industry research. In these four countries with around 16 million inhabitants, there are people deeply involved in the neuromarketing research, and recognizable in the world because of their contribution. This is confirmed by the fact that two companies from this region are members of NMSBA as the world umbrella organization for neuromarketing, and that Western Balkans' neuromarketing researchers were consultants for numerous international companies and lecturers on many conferences.

This thesis had the purpose to examine neuromarketing from an ethical point of view and to understand the attitudes of consumers in the Western Balkans towards it. The goals of the research were to comprehensively review the ethical issues related to neuromarketing, to determine the opinions of consumers about the ethics of neuromarketing in the Western Balkans and to develop recommendations and best practices concerning how consumers can be protected from potential invasion of privacy or abuse by neuromarketing.

The research consisted of qualitative and quantitative research techniques; qualitative research technique aimed to collect information about neuromarketing in Western Balkans and hear the opinion of people deeply involved in this field, while quantitative research technique was designed to examine the opinions of consumers in Western Balkans and respond to main research questions.
Merging of both qualitative and quantitative research techniques led to two mutual disclosures. The first one is that a small number of people are informed about neuromarketing in Western Balkans, and the second one is that due to the high costs of the neuromarketing research techniques companies are deprived of it. How faintly informed customers in Western Balkans are about neuromarketing tells the fact that slightly less than 50% of the survey respondents said that they had never heard of neuroscience or neuromarketing. At the same time, slightly more than 40% said that they had heard of neuroscience and neuromarketing, but they did not know what it was. It means that only around 10% of participants were familiar with the neuromarketing and neuroscience.

Most importantly, the majority of respondents have a positive attitude toward the ethics of neuromarketing; they consider conducting neuromarketing research in both commercial and non-commercial purposes as ethical. Based on the finding from interviews and surveys, it can be concluded that neuromarketing in Western Balkans is in its infancy, but according to the current situation on the market, with a promising future. Increasing its reliability in the future, with the good equipment and experts in this field will attract companies even more to neuromarketing. At the same time, the education of customers and high awareness about neuromarketing is one of the most important segments for the understanding of neuromarketing and building the attitude towards the ethics of it.

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APPENDIXES

APPENDIX 1: Abstract in Slovenian language

Na zahodnem Balkanu je nevrotrženje še vedno v povojih in o njem ni bilo veliko napisanega. Zlasti ne o etiki nevrotrženja, kije ena izmed treh najpomembnejših stvari. V skladu s tem socilji raziskave celovit pregled etičnih vprašanj povezanih z nevrotrženjem, določitev mnenj potrošnikov o etiki nevrotrženjana zahodnem Balkanu ter oblikovanje priporočil in najboljših praks o tem, kako lahko potrošnike zaščitimo pred morebitnim vdorom v zasebnost ali zlorabe s strani nevrotrženja.

Hkrati je namen raziskave odgovoriti na raziskovalna vprašanja; kakšna je stopnja ozaveščenosti o etiki nevrotrženja med potrošniki na zahodnem Balkanu, kakšno je mnenje potrošnikov na zahodnem Balkanu glede etike nevrotrženja in kateri so najboljši načini za zagotovitev zaščite potrošnikov pred morebitnim vdorom v zasebnost ali zlorabo nevromarketinga.

Prvi del raziskave je podal teoretični uvod in razlago nevrotrženja, njegove tvorbe, namena in rabe. Temu je sledila ena najpomembnejših in najbolj zanimivih tem, ko gre za nevrotrženje - etiko. Etika je razložena v ločenem poglavju, dotakne se razlogov, zakaj raziskovalci menijo, da je nevrotrženje neetično, in zakaj ga ne bi smeli obravnavati kot neetičnega. Nevromarketing na zahodnem Balkanu je razložen v ločenem poglavju, ki temelji predvsem na informacijah pridobljenih na podlagi intervjujev z ljudmi, ki delajo na tem področju zahodnega Balkana.

Zaradi pomanjkanja informacij o nevrotrženju v tej regiji so bile uporabljene tako kvalitativne kot kvantitativne raziskovalne tehnike. Kvalitativna raziskovalna tehnika je pomagala zbrati več neposrednih informacij o nevromarketingu na zahodnem Balkanu z vidika predstavnikov akademske skupnosti in industrije, informacije so bile uporabljene v teoretičnem delu naloge. Da bi odgovorili na glavna raziskovalna vprašanja, so bile izvedene kvantitativne raziskave s potrošniki na zahodnem Balkanu. Sodelovalo je več kot 300 ljudi iz Bosne in Hercegovine, Srbije, Hrvaške in Črne gore. Največ udeležencev je bilo iz Bosne in Hercegovine (132), sledijo jim Srbija (73), Hrvaška (51) in Črna gora (49). Večina anketirancev je bila visoko izobraženih posameznikov z univerzitetno ali magistrsko izobrazbo, s povprečno starostjo 30 let.

Rezultati raziskav so pokazali, da imajo potrošniki z zahodnega Balkana malo znanja o nevrotrženju, natančneje, le približno 10% jih je vedelo, kaj je nevrotrženje. Poleg tega so vprašani, ko so med raziskavo že bili seznanjeni z nevrotrženjem, večinoma pokazali pozitiven odnos do nevrotrženja in njegovih raziskav, hkrati pa so pokazali tudi nekaj strahu v zvezi z njegovo uporabo. Največ udeležencev raziskave je slišalo za nevrotrženjepreko interneta (41%), 70% anketirancev se je strinjalo, da nevrotrženje pomaga podjetjem, da bolje razumejo potrebe potrošnikov, 50% pa se jih je strinjalo, da bodo podjetja z uporabo nevrotrženja izdelke prilagodila njihovim potrebam. Šestdeset odstotkov vprašanih je menilo, da je nevrotrženje eden glavnih sestavnih delov sodobnih trženjskih raziskav. Po drugi strani pa je 40% anketirancev mnenja, da orodja za nevrotrženjepodjetjem omogočajo, da vedo, kaj mislijo, 50% pa se je strinjalo z izjavo, da rezultati raziskav nevrotrženja pomagajo podjetjem pozneje manipulirati s potrošniki. Najpomembneje je, da ima večina vprašanih pozitiven odnos do etike nevrotrženja, kadar se uporablja tako v komercialne kot tudi v nekomercialne namene. Približno 40% anketirancev je dejalo, da izvajanje nevrotrženjskih raziskav v komercialne namene ne obravnavajo kot neetične, kjer pa za izvajanje raziskave nevrotrženja v nekomercialne namene (npr. znanstvene raziskave) skoraj 60% vprašanih meni, da so etične. Na podlagi

ugotovitev je raziskavapodala priporočila glede boljšega izobraževanja potrošnikov o nevrotrženju, organizaciji regijskega centra in zaščiti potrošnikov prek lokalnih centrov za zaščito potrošnikov.

APPENDIX 2: Interview with Dalibor Šumiga (Promosapiens, Croatia)

1. How long does your agency exist and what services does it provide?

4 years.

Behavioral Marketing (Digital Marketing with Intensive Use of Consumer Psychology), Neuromarketing, Lectures, Business Counseling on Consumer Psychology.

2. Since when have you been offering your clients neuromarketing researches services and why?
Since its inception, but the initial services were in a smaller volume, they grew up as we increased the equipment for neuromarketing researches.

3. Are clients interested in neuromarketing services and what are their most common requirements?
They are.

The requirements are the same as with classic marketing or market research projects - we want to better understand what customer needs, better analyze their own creative solutions and their efficiency and feedback on how to create a more effective marketing and sales campaign

4. What do you consider as a key reason or advantage of neuromarketing that makes your clients deciding for neuromarketing services?

Ability to find the information they cannot get from their customers in focus groups, explicit surveys, or based on tools and metrics that they use daily.

5. What are the reasons clients do not use neuromarketing services in our area, in your opinion?
One of the reasons is that they do not know that the service exists, because they think it's terribly expensive and intended only for the biggest brands and because somebody told them about fairy tales about magic manipulation to customers and they are sceptical or frightened.

6. What is the average number of clients on an annual level looking for neuromarketing service and whether this number is increasing?

I do not have that information because we do not share the questions about the neuromarketing method and others. Our way of working is to solve the client's problem, sometimes neuromarketing methods and tools are needed, and sometimes they are not. If the client says he

wants neuromarketing research, and we estimate that there is a more efficient way/methodology to solve the problem, we will try to offer a better solution to the client and not sell any neuromarketing at all costs. Our great advantage is that we have our own equipment that we have financed by ourselves, no investor or loan, and we do not have to sell it at all costs.
In any case, the number of queries and the number of realized projects are increasing significantly, and further growth will only depend on educating the public about the benefits of this marketing branch and we will intensively work this year.

7. Are your clients interested in neuromarketing services, whether they are mostly domestic companies or parties operating in the Balkans?

Both. Because we operate our business outside the Balkan and Europe.

8. Which tools do you use the most during your research? (fMRI, EEG, eye-tracking, galvanic skin response, etc.)?

All but the slightest advantage has implicit testing because they can work online, EEG and eye tracking because they are applicable to the largest range of research. Thereafter GSR and facial coding + UX testing and architecture of choices (application of behavioral economy in marketing and sales processes) come.

9. What are the most important advantages of neuromarketing in your opinion, and what are the limitations?

Benefits: an insight that is not easy (or impossible) to get through other marketing and sales tools.
Limitations: the price of the equipment (for us, this item is irrelevant for the client, is there are no significant restrictions for the client).

10. Do you consider neuromarketing researches are dangerous to customers?

Absolutely NO. We do not use any invasive techniques, we do not manipulate the human brain but just read the signals that are already present.

11. What is your attitude towards the ethics of neuromarketing?

As members of the world's largest neuromarketing organization, we are automatically signatories to the Code of Ethics. Aboveboard, given that we are not manipulating human behaviour, we are already interpreting it, seeing the greater issue of ethics in the false presentation of results, the false promises that neuromarketing is a marvellous solution to all business problems and questionable methodologies and equipment that is being used.

12. Given that there are various fears about neuromarketing and that the invasion of privacy and

potential control of thought is considered to be the two biggest problems of neuromarketing ethics, would you agree with this and whether it is possible to protect the respondents from the abovementioned possibilities?

I repeat - we do not control human behaviour, we interpret it. We need to educate the public about being a man, primarily irrational, about the role of cognitive bias on our lives, how our brains work, why we buy products that do not need us, why we vote for politicians, and we are later dissatisfied with our choice, etc. If we educate the public, we will not be able to change people, but we will give them the ability to at least partially control their habits. Eg.If enough people tell you not to go shopping hungry and to buy them exclusively on a pre-arranged shopping list, you will give those who consider it will impulsively spend money to use this defence technique. Limitations in human behavior have nothing to do with neuromarketing, but with human brain and man as a brain-driven emotion. Even before the arrival of neuromarketing, we knew a lot about human behavior and our limitations when making decisions.

13. On which populations would you suggest not to do researches?

I would not say that the question of the population is because if you develop a useful didactic toy for a child, then you would logically analyze the child's play and provide insight to help make the best possible toy.

I think the more important issue for which research products are being conducted is that the ethics code of neuromarketing experts is very clear, that is, that research that is used in the promotion and consumption of products that are extremely harmful to human health are not being produced, is not allowed.

It raises the question of what is really harmful or who will assess what is harmful and what is not, and that is already a special debate.

APPENDIX 3: Interview with professor Melika Husić-Mehmedović (the University of Sarajevo, School of Economics and Business)

1. When did you start to be interested in neuromarketing, how long and intensively have you been exploring the area?

I heard about Neuromarketing in 2009 during a US tour at George Washington University. Since it was a new and extremely interesting area for me, I have been following with interest since then. In 2014 I learned from my friends in the research agencies that they are starting to engage in these researches, and since then I write and work intensively in this area. I would say that this is currently one of my primary interests in research.

2. How do you evaluate the role and effect of neuromarketing in researches?

The role of neuromarketing in recent researches is significant. As the entire marketing process is individualized, the respondents are also evaluated individually through neuromarketing's methods. However, it must be very realistic what NM is offering and what is the scope of such research. It is not a holy grail and will not give answers to where the "buy button" is in the human brain, but will successfully complement the existing research methods and give a complete picture of the observed problem. Specifically, attention or emotion is very difficult to measure through traditional re-call methods eg. EEG provides the perfect information about what attention is to and what is the intensity (not necessarily of quality) of the emotions of the respondent in some stimulations.

3. Do you know how many companies are interested in neuromarketing services and how much is the academic community in the Western Balkans interested in research in this area?

Companies are interested because they get good usable data if they use NM in the pre-test phase of the promotional ad (or packs, or spots, or designs ...). For posttesting, the NM is not over-useful. Nevertheless, the price of NM is extremely high, which prevents companies from actively using this tool, so that it has not yet adequately recovered, and especially exploited its potential. The academic community that deals with this topic practically does not exist. I joined a colleague from Ljubljana, prof.Tomaž Kolar, I know about a professor from East Sarajevo who has written a book about NM, and that's how I know about NM.

4. According to some, invasion of privacy and potential control of thought are considered to be the two biggest problems of neuromarketing ethics, do you agree with this and whether it is possible to protect the respondents from the abovementioned possibilities?

"Control of thoughts" is a nonsense that does not exist, just like a "buy button". These are researches, not influencing or changing behavior in any way. Respondents accept or disapprove of being respondents, so nothing can be done without their consent. Some methods are invasive, but respondents need to be acquainted before they give their consent. Eg. MRI can be functional and structured, although functional uses much more in neuromarketing and there are some indications that it can cause harm to the respondent in excessive use and the structure is detrimental to some of the basics (which we do not understand best in marketing). However, classical neuro methods such as EEG or behavioural methods such as the eye-tracker do not cause any harm to the respondent, and we are used to measure a phenomenon rather than affect one's thoughts or emotions.

5. What is your attitude towards the ethics of neuromarketing?

I recommend looking at work: Stanton, S.J., Sinnott-Armstrong, W., & Huettel, S. A. (2017). Neuromarketing: Ethical implications of its use and potential abuse. Journal of Business Ethics, 144 (4), 799-811. - I sign everything that these authors have concluded.

6. What are the most important advantages of neuromarketing in your opinion, and what are the limitations?

The advantages of neuromarketing are reflected in its individualization, they certainly reduce the error in the responses and give us a more realistic picture of the tested occurrence. Its shortcomings are not a lack of neuromarketing, but researchers who set unrealistic expectations, seek elements that do not exist, try to find something that is impossible and the like. That is why most of the work in this area has been published in very bad publications, and very few good, quality papers in good magazines. Therefore, it is necessary to set realistic expectations on neuromarketing, to use a combination of nerve and behavioral methods (I personally prefer EEG), to pre-test advertising messages, packaging, shelves, and others, and to have neurologists who can interpret the results that the marketer will later explain in their context. I also suggest looking at the text: Lee, N., Chamberlain, L., & Brandes, L. (2018). Welcome to the jungle! The neuromarketing literature through the eyes of a newcomer. European Journal of Marketing, 52 (1/2), 4-38.

7. Do you consider neuromarketing researches are dangerous to customers?

Answer 4.

8. On which populations would you suggest not to do researches?

Children 100%! As a parent, and as a marketing expert, I would be happy to appeal to the research industry that no (or even with the consent of parents) any neuroscience on children is done. Other populations are mature enough to be able to make a decision on their own and (not) allow exploration on their own.

APPENDIX 4: Interview with doc. dr. sc. Maja Vujičić (University of Rijeka, Faculty of Economics and Business)

1. When did you start to be interested in neuromarketing, how long and intensively explore the area?

I was interested in neuromarketing in the end of my undergraduate study, and more intensively I began to study about this area during my postgraduate doctoral studies. So I can say I have been following this area for the past ten years. I have always been interesting in the field of psychology and medical science, and neuromarketing is an area that unites the economy / marketing with the above mentioned. In addition, this is an area that in social sciences provides the first insight into the results of research. In social sciences, researchers always face the possibility that respondents do not give the exact answer to the questions asked. Eg. they do not want to answer or give a false answer, they may give a socially desirable answer, or they are not aware of some of their motives themselves. Therefore, this is an area where truly an insight into the reactions of individuals to certain stimuli is gained. The most intensive period of my research and dedication to neuromarketing as a research method was the period during which I conducted a research through Functional Magnetic Resonance (fMRI) in 2013, in collaboration with Polyclinic Medico from Rijeka.

2.How do you evaluate the role and effect of neuromarketing in researches?

Neuromarketing is one of the market researches methods. As the neuroscientist Gemma Calvert (2012) once mentioned, fMRI is considered to be a standard standard neuromarketing research, and that is the part that I focused most on. Based on such research methods, insights can be drawn that no other method can be obtained in social research, which is why I believe that the role and impact of such research is great. They get a clearer understanding of how an individual responds to certain stimuli and makes decisions.

One of the researches that goes into the aforementioned and which was personally very intriguing to me, the research carried out by Plassman et al. (2008). The results the researchers came to suggest that the expected wine enjoyment is more intense (stronger activation of the median orbital frontal cortex) if the price of wine is higher. In other words, although respondents in the experiment consumed the same wine when they had the information to drink, supposedly, more expensive wine - their reaction was as if they were convinced that they needed more wine in that wine.

Therefore, I believe that this research opens up many new and not just marketing questions, but questions about individual perception and even placebo effect.

3. Do you know how many companies are interested in neuromarketing services and how much is the academic community in the Western Balkans interested in research in this area?

Since I am part of the academic community, I can talk about my own first-hand experience. Unfortunately, for this kind of research (eg fMR) there is a lot of financial resources missing and we are now far from being an interdisciplinary research centre. Also, there is a lack of connectivity and the existence of a formalized centre that would connect scientists from multiple areas and is all about the individual interest of the researcher and his involvement in the topic of neuromarketing.

In addition to this, the implementation of such interdisciplinary research has not been implemented in practice. Namely, I was personally waiting for 5 months of approval for the implementation of fMR research. I went to more ethics commissions at the University of Rijeka, but not because the research was ethically questionable, but because there are simply no administrative procedures in place in the implementation of such interdisciplinary research that is moving away from standards and linking experts from many areas.
Since, as far as neuromarketing is concerned, I did not cooperate with companies, I can not say a personal example. However, due to the fact that there are numerous centers for research on some of the neuromarketine methods (Neuromarketing Science and Business Association, 2019), and that research agencies include neuromarketing in their offer (Nielsen Consumer Neuroscience), the interest of the company no doubt exists.

4. According to some fears about neuromarketing and that the invasion of privacy and potential control of thought is considered to be the two biggest problems of neuromarketing ethics, do agree with this and whether it is possible to protect the respondents from the abovementioned possibilities?

Neuromarketing is a research method that has its own "tools" and which complements traditional research methods. In public, his perception is quite distorted. I believe that today, under the term "neuromarketing", many unprofessional and superficial interpretations arise and I see a big problem here. Surfing the Internet, I often come across the terms "buy button". I believe it is distortion and simplification (and degradation) of something as complex as the human brain. It is true that the methods used by neuromarketing gain clearer insights into individual reactions, but one who has the intention to manipulate will manipulate - regardless of the existence of neuromarketing.

I think it is important to try to get a clearer insight into the patterns of individual behavior. This should at the same time be important to each individual - that, ultimately, he knows better. Has any of the decisions already made and "only" knowingly rationalizes them? When is the "autopilot", and when it wakes up its decisions and elections? What is his real need, and what is society doing? These are general issues, and neuromarketing has led them more into the foreground.

5. What is your attitude towards ethics of neuromarketing?

My attitude is the same as the ethics of any other area of research. Everything can be used in a positive and negative context and depends on what is in the hands of knowledge and resources. As I wrote before, non-marketing tools are "just" tools. It all depends on what purpose existing knowledge is used.

I believe that knowledge should be served to consumers. The essence of marketing should be to overcome market failures, to understand consumers and offer the products they need, to mutual satisfaction. If non-marathon research contributes to a better understanding of the consumer, then they should be used to adjust the offer to the consumer.
This is a very small area, from the existing guidelines in the research, they can include ESOMAR's market-oriented guidelines, which include the methods used in neuroscience and the NMSB's Code of Ethics.

It should also be emphasized that any non-neuromarketic studies that would endanger the health of the examinees are considered unethical. Investigations must be harmless for experimental participants.

6. What are the most important advantages of neuromarketing in your opinion, and what are the limitations?

As the most important advantage of neuromarketing, I consider the fact that accurate insights are gained in respondents' reactions based on, for example, insights into brain responses to specific stimuli.

I see constraints in the complexity and price of research, especially in fMR research. There is still a lack of adequate administrative logistics for such research, and there is also a lack of linkage between researchers who are interested in this area.

7. Do you consider neuromarketing researches ade dangerous to customers?

The most dangerous for buyers I consider to be deceptive advertising as well as giving false product information. Some products/services are available to buyers, and there is a big question as to how many buyers are informed about them (eg bank loans) or whether they are products that customers are "buzzed" (eg bookmakers). Here I see a problem. If the findings are used to deceive customers, this is a problem. But this is a general problem and is not directly related to neuromarketing research.

It is enough to forget about social marketing aimed at the benefit of community members (not profits, as with classical companies). In other words, the knowledge gained in the research should also be used in this context: helping individuals, for example, better choices for their health or abandoning harmful habits. The more knowledge we have about ourselves - the better. I think knowledge must be available, and non-marital research methods contribute to knowing more about ourselves.

8. On which populations would you suggest not to do researches?

On the children. Children do not have developed critical awareness and can not think as adults, mature people, at all, the whole communication with them must be measured

APPENDIX 5: Survey questioner

ANALYSIS - Summary

Q1	Za sljedeće tvrdnje, molim Vas označite do koje mjere se slažete odnosno ne slažete									
	Subquestion	**Answers**							**Valid**	**Units**
		Ne znam odgovor ili nemam mišljenje	U potpunosti se ne slažem	Ne slažem se	Niti se slažem, niti ne slažem	Slažem se	U potpunosti se slažem	Valid		
Q1a	Kupovinu jasno planiram unaprijed	5 (1%)	16 (3%)	77 (16%)	148 (31%)	181 (39%)	43 (9%)	470 (100%)	470	471
Q1b	Prilikom odlaska u kupovinu većinom unaprijed znam šta mi treba	1 (0%)	12 (3%)	31 (7%)	80 (17%)	271 (58%)	75 (16%)	470 (100%)	470	471
Q1c	Prilikom kupovine jako mi je bitno na kojoj polici u prodavnici se nalaze proizvodi	23 (5%)	48 (10%)	135 (29%)	92 (20%)	128 (27%)	42 (9%)	468 (100%)	468	471
Q1d	Prilikom kupovine bitan mi je dizajn proizvoda ili pakovanja	4 (1%)	23 (5%)	68 (14%)	121 (26%)	206 (44%)	47 (10%)	469 (100%)	469	471
Q1e	Često gledam TV reklame	8 (2%)	120 (26%)	197 (42%)	85 (18%)	50 (11%)	9 (2%)	469 (100%)	469	471
Q1f	Često gledam promotivne video materijale koji mi iskoče na društvenim mrežama (YouTube, Facebook, Instagram, itd.)	5 (1%)	137 (29%)	147 (31%)	90 (19%)	79 (17%)	11 (2%)	469 (100%)	469	471
Q1g	Često gledam reklame u časopisima	9 (2%)	139 (30%)	154 (33%)	80 (17%)	83 (18%)	5 (1%)	470 (100%)	470	471
Q1h	Reklame imaju uticaj na moju kupovinu	5 (1%)	59 (13%)	136 (29%)	144 (31%)	114 (24%)	12 (3%)	470 (100%)	470	471
Q1i	Sebe smatram impulsivnim potrošačem (često kupim svari koje nisam planirao/la unaprijed	3 (1%)	33 (7%)	115 (24%)	91 (19%)	173 (37%)	55 (12%)	470 (100%)	470	471

Q2	Da li ste upoznati s pojmom neuronauka?				
	Answers	**Frequency**	**Percent**	**Valid**	**Cumulative**
	1 (Nikad nisam čuo/la za neuronauku)	205	44%	44%	44%
	2 (Čuo/la sam za neuronauku, ali ne znam šta je)	207	44%	44%	88%
	3 (Čuo/la sam za neuronauku i znam šta je)	58	12%	12%	100%
Valid	Valid	470	100%	100%	

Q3	Kako biste Vi objasnili šta je neuronauka?				
	Answers	**Frequency**	**Percent**	**Valid**	**Cumulative**
	istrazivanje mozga, uma te nacina na koji percepiramo okoliku i podsticaje iz iste	1	0%	2%	2%
	nauka koja se bavi neurološkim reakcijama na razne vrste stimulansa, uključujući i psihološke.	1	0%	2%	4%
	nauka o nacinu odlucivanja i uticaju impulsivnog	1	0%	2%	6%
	obladt koja se bavi studijom nervnog sistema	1	0%	2%	8%
	neuronauka se bazira na istraživanju ljudskog mozga, njegovih kognitivnih sposobnosti i uticaja endogenih i egzogenih faktora na njegove performanse.	1	0%	2%	10%
	uticaj podsvjesnih reakcija na naše aktivnosti i ponašanja	1	0%	2%	12%
	neuronauka je oblast koja ima za cilj da objasni kako stimulansi uticu na mozdane i somatske reakcije coveka	1	0%	2%	13%
	ukoliko mislite na neuroscience, onda je to nauka koja se bavi proučavanjem morfologije i funkcija zdravog živčanog sustava s naglaskom na mehanizmima kojima se ostvaruje njegova uloga glavnog kontrolnog i upravljačkog sustava organizma.	1	0%	2%	15%
	neuronauka, kako jo i sam govori, bavi se istrazivanjem nervnog sistema, odnosno istrazivanja koja se u opsegu krecu izmedju mozga i uma.	1	0%	2%	17%
	saznanja koja se formiraju u cns	1	0%	2%	19%
	nauka koja proucava ponasanje nervnog sistema i nacine na koji mozak dovodi do odluka u svakodnevnom zivotu.	1	0%	2%	21%
	grana koja obuhvata medicinske nauke i it tehnologiju. moze se koristiti u razlicite svrhe, od ispitivanja licnosti, profesionalne selekcije, vrsenja uticaja na mnjenje, do olaksanja zivota oboljelih.	1	0%	2%	23%
	istraživanje psihologije ljudi	1	0%	2%	25%
	nauka koja se bavi proucavanjem nervnog sistema, mozga	1	0%	2%	27%
	nauka o nervnom sistemu	2	0%	4%	31%
	najkraće, istraživanje mozga i uma	1	0%	2%	33%
	znanstvena nauka o nervnom sistemu. ukljucuje kako anatomiju i biologiju tako i psihologiju i matematiku. sve u ciju boljeg	1	0%	2%	35%

	razumijevanja fukncionisanja nervnih celija.				
	nauka o funkcionisanju mozga i nerava	1	0%	2%	37%
	kako nervi sistem utice na nase ponasanje	1	0%	2%	38%
	nauka/iztrazivanje nervnog sistema. sirok pojam.	1	0%	2%	40%
	znanstvena disciplina, u psihologiji/medicini, proucava rad neuroloskog sistema i kako oblikuje nase ponasanje	1	0%	2%	42%
	oblast koja se bavi naucnom studijom nervnog sistema	1	0%	2%	44%
	znanost proucavanja zivcanog sustava.	1	0%	2%	46%
	nauka koja se bavi proučavanjem funkcionisanja nervnog sistema	1	0%	2%	48%
	nauka o neuronalnim procesima bilo u fizioloskom ili psiholoskom smislu	1	0%	2%	50%
	nauka koja se babi uticajem na psihicko stanje ljudi, samim tim i na potrosace prilikom odabira	1	0%	2%	52%
	sve oblasti koje se tiču istraživanja fizioloških procesa u mozgu i na koji način oni utječu na našu psihu, svijest ili podsvijest po različitim pitanjima.	1	0%	2%	54%
	nauka o strukturi i radu mozga	2	0%	4%	58%
	neuronauka je oblast koja se bavi dubokim i detaljnim istrazivanjem nervnog sustava, ukljucujuci nerve, te i kroz razne nauke kako ljudski mozak funkcionise.	1	0%	2%	60%
	nauka koja proučava ljudski mozak i uticaj mozga i razuma na odredjene postupke.	1	0%	2%	62%
Valid	Valid	52	11%	100%	

Q4	**Da li ste upoznati šta je neuromarketing?**				
	Answers	**Frequency**	**Percent**	**Valid**	**Cumulative**
	1 (Nikad nisam čuo/la za neuromarketing)	207	44%	44%	44%
	2 (Čuo/la sam za neuromarketing, ali ne znam šta je)	200	42%	43%	87%
	3 (Čuo/la sam za neuromarketing i znam šta je)	59	13%	13%	100%
Valid	Valid	466	99%	100%	

Q5	**Kako biste Vi definisali neuromarketing?**				
	Answers	**Frequency**	**Percent**	**Valid**	**Cumulative**
	oblast marketinga koja istražuje ponašanje potrošača te se služi psihologijom istog kako bi se povećala prodaja.	1	0%	2%	2%

	plasiranje reklamnog sadrzaja pojedincima iz ciljnih grupa, koji se targetiraju na osnovu javnih izjava, postupaka, ponasanja na društvenim mrežama.	1	0%	2%	4%
	neuromarketing je kako potrosaci reaguju na reklame, prucavanje kako potrosace privuci da nesto kupe, sta utice na njihovo misljenje-mozak	1	0%	2%	5%
	u kontekstu marketinga bi to bilo izucavanje procesa donosenja kupovnih odluka na osnovu neuronauke	1	0%	2%	7%
	proucavanje potrosackih odluka, koriscenjem tehnologije koja proucava mozak i porosacevo ponasanje u kupovini.	1	0%	2%	9%
	uticaj različitih kampanja na percepciju i podsticanje potrošača	1	0%	2%	11%
	neuromarketing pokusaca da otkrije sta se desava u svesti potrosaca prilikom odluke o kuoovini	1	0%	2%	13%
	uticaj na konzumente	1	0%	2%	14%
	metoda koja obuhvata načine na koji reklame, etikete, dizajn, visina police ili npr. muzika u supermarketima ili drugim prodajnim mjestima, videima, reklamama (i online) utječe na našu psihu, podsvijest, izbore prilikom kupovine i načine potrošnje novca...	1	0%	2%	16%
	reakcije mozga na stimulanse	2	0%	4%	20%
	neuromarketing je ispitivanje kako mozak reaguje na odredjene reklame.	1	0%	2%	21%
	marketing ciji je target ljudska psihologija i proucavanje uticaja odnosno rezultata odredjenih marketinskih stimulansa koji se ciljano usmjeravaju ka publici. odredjena vrsta manipulacije nasom psihom.	1	0%	2%	23%
	manipulacija ljudskog uma, građanstva, putem svjesnih ili nesvjesnih detalja u marketing reklamama	1	0%	2%	25%
	istrazivaci koriste za merenje reakcije potrosaca na reklame	1	0%	2%	27%
	kako nasa podsvest (nervi sistem) utice na nase odluke pri kupovini ili odluci	1	0%	2%	29%
	nauka koja proučava ljudski mozak i promjene koje se desavaju u njemu usljed izloženosti reklamama, ili prilikom kupovine, kao i načinu na koji mozak reaguje i utiče na donošenje odluka kada je kupovina upitanju.	1	0%	2%	30%
	kao jedno veliko polje za istraživanje ponašanja potrošača /između ostalog	1	0%	2%	32%
	marketing koji se služi neurološkim tendencijama konzumatora da podstiče na konzumaciju odnosno kupovinu nekog proizvoda.	1	0%	2%	34%
	neuromarketing je jedna od najmladjih disciplina nauke, koja se bavi proucavanjem mozga potrosaca prilikom percepcije i izbora proizvoda/usluga u kupovini.	1	0%	2%	36%
	marketing koji koristi neuropsihologiju u marketing istrazivanju	1	0%	2%	38%
	oblast marketinga koja se primenjuje kako bi se ispitala mentalna reakcija potrosaca na proizvod.	1	0%	2%	39%
	dio pisholigije koji prouvaca ponasanje potencijalnih kupaca	1	0%	2%	41%
	efwf	1	0%	2%	43%

	neuromarketing se koristi za poticanje kupovnih navika potrošača na podsvjesnoj razini.	1	0%	2%	45%
	marketing targetiran po principu navika i psihe potrosaca	1	0%	2%	46%
	neuromarkering je bransa marketinga koja proucava ljudski mozak te njegove zelje i reakcije kroz medicinska istrazivanja i tehnologija putem kojih se saznaju i uce svjesne i podsvjesne odluke potrosaca.	1	0%	2%	48%
	posmatranje potrošača u zadatim situacijama, njihove mimike, prepoznavanje emocije i sl.	1	0%	2%	50%
	uticaj marketinga na svijest potrosaca	1	0%	2%	52%
	istrazivanje o ljudskim odlukama vezanim za efekte marketinga	1	0%	2%	54%
	yx	1	0%	2%	55%
Valid	Valid	56	12%	100%	

Q6	**Gdje ste čuli za neuromarketing?**				
	Answers	**Frequency**	**Percent**	**Valid**	**Cumulative**
	1 (Na internetu)	194	41%	41%	41%
	2 (Na TV-u)	24	5%	5%	46%
	3 (U časopisima)	10	2%	2%	48%
	4 (Na fakultetu)	50	11%	11%	59%
	5 (Od prijatelja)	77	16%	16%	75%
	6 (Drugo)	116	25%	25%	100%
Valid	Valid	471	100%	100%	

Q6_6_text	**Q6 (Drugo)**				
	Answers	**Frequency**	**Percent**	**Valid**	**Cumulative**
	nisam nigdje cula za to.	1	0%	1%	1%
	nisam	14	3%	12%	13%
	nisam cuo	6	1%	5%	18%
	nigdje	9	2%	8%	26%
	sada u anketi	1	0%	1%	27%
	n/a	1	0%	1%	28%
	nisam čuo	5	1%	4%	32%
	nisam nigdje cula	1	0%	1%	33%

	nikad nisam cula	1	0%	1%	34%
	kao pojam mi je nepoznat	1	0%	1%	34%
	drzim obuke iz te oblasti, prosla sam veci broj edukacija na tu temu	1	0%	1%	35%
	ne znam kako bi marketing mogao biti povezan sa neuroznanošću.	1	0%	1%	36%
	nisam čula za ovaj pojam	1	0%	1%	37%
	nisam cula	32	7%	28%	65%
	nisam čula za neuromarketing..	1	0%	1%	66%
	nigde	2	0%	2%	67%
	nikad cula	2	0%	2%	69%
	nisam cula ta taj pojam	1	0%	1%	70%
	članak u online stranici.	1	0%	1%	71%
	gg	1	0%	1%	72%
	nisam još čula	1	0%	1%	72%
	nisam čula	6	1%	5%	78%
	od roditelja	1	0%	1%	78%
	нисам чуо	1	0%	1%	79%
	pa ako nisam čuo/la kako je ovo pitanje obavezno	1	0%	1%	80%
	nisam čula.	2	0%	2%	82%
	u ovoj anketi	2	0%	2%	84%
	fadvg	1	0%	1%	84%
	poslu	1	0%	1%	85%
	neformalno obrazovanje	1	0%	1%	86%
	‘m	1	0%	1%	87%
	na poslu.	1	0%	1%	88%
	sad. ovo pitanje ne treba biti obavezno, ako je vec odgovor ne na prethodno pitanje.	1	0%	1%	89%
	sve navedeno	1	0%	1%	90%
	nlp	1	0%	1%	91%
	linkedin	3	1%	3%	93%
	-	1	0%	1%	94%
	.	3	1%	3%	97%
	ne znam	1	0%	1%	97%
	/	1	0%	1%	98%

	posao	1	0%	1%	99%
	evo sada	1	0%	1%	100%
Valid	Valid	116	25%	100%	

Q7	**Od navedenih pojmova, označite za koje ste čuli.**										
	Subquestion	**Answers**						**Valid**	**Units**	**Average**	**Std. deviation**
		Nikada nisam čuo/la	Čuo/la sam, ali ne znam šta je	Čuo/la sam i znam šta je	4	5	Valid				
Q7a	EEG (elektroencefalografija)	265 (57%)	64 (14%)	136 (29%)	2 (0%)	2 (0%)	469 (100%)	469	471	1.7	0.9
Q7b	fMRI (funkcionalna magnetna rezonanca)	114 (24%)	130 (28%)	225 (48%)	0 (0%)	1 (0%)	470 (100%)	470	471	2.2	0.8
Q7c	Eye-tracking	118 (25%)	130 (28%)	216 (46%)	2 (0%)	1 (0%)	467 (100%)	467	471	2.2	0.8
Q7d	GGS (galvanska reakcija kože)	281 (60%)	100 (21%)	85 (18%)	2 (0%)	1 (0%)	469 (100%)	469	471	1.6	0.8

Q15	**Za sljedeće tvrdnje, označite u kojoj mjeri se slažete, odnosno ne slažete**										
	Subquestion	**Answers**						**Valid**	**Units**	**Average**	**Std. deviation**
		Ne znam odgovor ili nemam mišljenje	U potpunosti se ne slažem	Ne slažem se	Niti se slažem, niti ne slažem	Slažem se	U potpunosti se slažem	Valid			
Q15a	Neuromarketing pomaže kompanijama da bolje upoznaju želje i potrebe svojih kupaca	29 (9%)	8 (3%)	11 (3%)	53 (17%)	176 (56%)	38 (12%)	315 (100%)	315	471	4.4	1.3
Q15b	Neuromarketinška istraživanja rezultiraju proizvodima bolje prilagođenim potrebama kupaca	30 (10%)	10 (3%)	25 (8%)	75 (24%)	149 (47%)	26 (8%)	315 (100%)	315	471	4.2	1.4
Q15c	Neuromarketinška istraživanja pomažu da i ja bolje upoznam svoje potrebe	32 (10%)	15 (5%)	52 (17%)	90 (29%)	105 (33%)	21 (7%)	315 (100%)	315	471	3.9	1.4
Q15d	Kompanije bi trebale usvojiti neuromarketing kao dobru praksu koju koriste	27 (9%)	9 (3%)	16 (5%)	93 (30%)	132 (42%)	38 (12%)	315 (100%)	315	471	4.3	1.3
Q15e	Korištenje neuromarketinga od strane kompanija je dobro za kupce/korisnike	28 (9%)	14 (4%)	43 (14%)	107 (34%)	106 (34%)	17 (5%)	315 (100%)	315	471	4.0	1.3
Q15f	Ako su kompanije u mogućnosti da	30 (10%)	8 (3%)	13 (4%)	68 (22%)	159	36 (11%)	314	314	471	4.4	1.4

	koriste neuromarketing, trebale bi ga koristiti					(51%)		(100%)				
Q15g	Smatram neuromarketing kao jednu od glavnih komponenti modernih marketinških istraživanja	28 (9%)	6 (2%)	16 (5%)	75 (24%)	151 (48%)	39 (12%)	315 (100%)	315	471	4.4	1.3
Q15h	Ja bih podržao/la kompanije koje koriste neuromarketing	28 (9%)	11 (3%)	19 (6%)	103 (33%)	128 (41%)	26 (8%)	315 (100%)	315	471	4.2	1.3
Q15i	Ja bih preporučila kompanije koje koriste neuromarketing drugima	29 (9%)	11 (3%)	33 (10%)	113 (36%)	106 (34%)	23 (7%)	315 (100%)	315	471	4.0	1.3
Q15j	Ja bih preporučio/la kupovina proizvoda kompanija koje koriste neuromarketing	33 (10%)	13 (4%)	39 (12%)	117 (37%)	89 (28%)	24 (8%)	315 (100%)	315	471	3.9	1.3
Q15k	Korištenje neuromarketinga ugrožava moju privatnost	33 (11%)	9 (3%)	82 (26%)	100 (32%)	70 (22%)	20 (6%)	314 (100%)	314	471	3.7	1.3
Q15l	Neuromarketinški alati omogućavaju kompanijama da znaju o ćemu razmišljam	32 (10%)	10 (3%)	57 (18%)	90 (29%)	106 (34%)	20 (6%)	315 (100%)	315	471	3.9	1.3
Q15m	Rezultati neuromarketinških istraživanja pomažu kompanijama da kasnije manipulišu kupcima	28 (9%)	9 (3%)	36 (11%)	84 (27%)	111 (35%)	46 (15%)	314 (100%)	314	471	4.2	1.4
Q15n	Neuromarketing može da utječe na moje ponašanje	23 (7%)	21 (7%)	92 (29%)	89 (28%)	72 (23%)	17 (5%)	314 (100%)	314	471	3.7	1.3
Q15o	Neuromarketing može pomoći da kupim proizvode koje inače ne bih kupio	30 (10%)	9 (3%)	38 (12%)	77 (25%)	127 (40%)	33 (11%)	314 (100%)	314	471	4.1	1.4
Q15p	Neuromarketing me može učiniti kompulsivnim kupcem	23 (7%)	18 (6%)	67 (21%)	104 (33%)	81 (26%)	21 (7%)	314 (100%)	314	471	3.8	1.3
Q15q	Ne bih se osjećala prijatno da treba da participiram u takvom istraživanju	26 (8%)	15 (5%)	88 (28%)	95 (30%)	66 (21%)	24 (8%)	314 (100%)	314	471	3.7	1.3
Q15r	Sprovođenje ovih istraživačkih metoda u komercijalne svrhe smatram neetičnim	21 (7%)	15 (5%)	107 (34%)	108 (34%)	41 (13%)	22 (7%)	314 (100%)	314	471	3.6	1.2
Q15s	Sprovođenje ovih istraživačkih metoda u nekomercijalne (recimo, za nauku..) svrhe smatram etičnim	26 (8%)	7 (2%)	22 (7%)	83 (26%)	142 (45%)	35 (11%)	315 (100%)	315	471	4.3	1.3
Q15t	Kompanije bi trebale biti otvorenije kada	28 (9%)	7 (2%)	20 (6%)	77 (25%)	151 (48%)	31 (10%)	314 (100%)	314	471	4.3	1.3

	je u pitanju neuromarketing											

Q16	Ako vas brine da bi u budućnosti neuromarketing mogao imati negativan uticaj po kupce, molim Vas da napišete šta Vas najviše brine? Također, ako vas ne brine, zašto Vas ne brine?				
	Answers	**Frequency**	**Percent**	**Valid**	**Cumulative**
	немам коментар.	1	0%	1%	1%
	n/a	1	0%	1%	1%
	s obzirom da je konzumerizam već postao stil i cilj života širokih narodnih masa, ne odobravam ništa što bi ga dodatno podstaklo	1	0%	1%	2%
	neuromarketing moze uticati na povecanje konzumerizma i zavisti od kupovine cesto i nepotrebnih stvari	1	0%	1%	2%
	cesto se susrecemo sa situacijom gdje pored nase neuroloske potrebe da kupimo odredeni proizvod sami sebe mozemo ubjediti da taj proizvod nam zapravo ne treba jer ga imamo previse ili dovoljno. u ovom slucaju neuromarketing bi djelovao negativno na kupca samim tim sto bi mogao uticati da se taj proizvod “mora kupiti”	1	0%	1%	3%
	ne brine me sve dok se neuromarketing koristi u svrhu reklamiranja opsteprihvacenih zdravih navika npr. promovisanje zdrave ishrane i zdravog zivota ili predstavljanje cigareta kao nesto vrlo stetno. takodjer mislim da neuromarketing moze pomoci i brendu da unaprijedi svoj proizvod, kupcu da dobije ono sto zeli a sve bez nekog forsiranja jer na kraju kupci donose zadnju odluku. brinulo bi samo zloupotrebaljavanje ljudske podsvijesti za negativne stvaria posebno ukoliko je ciljana grupa mladja populacija koja djeluje impulsivnije u kupovini.	1	0%	1%	3%
	ne bi mogao imati negativan uticaj na kupce, jer samo uzima u obzir percepciju kupca prema određenim proizvodima kako svjesno tako i podsvjesno.	1	0%	1%	4%
	mislim da bi u bliskoj budućnosti velike kompanije mogle kreirati svjesno ili nesvjesno neke oblike opasnosti u cilju potencijalne manipulacije potrošača. ako generalno posmatramo, danas čak i najnapredniji pristupi ne daju mogućnost čitanja misli, tako da sam zabrinuti da bi u budućnosti neuromarketing mogao iskoristiti ljudske slabosti. možda postoji mogućnost da detektori unutar trgovačkih lanaca jednog dana analiziraju naše želje i plasiraju proizvode kojima smo skloni u tom trenutku....	1	0%	1%	4%
	kompanije trebaju da se udalje od klasicnih metoda i pocnu korsititi nove metode te da idu u korak s vremenom. kroz razne oblike reklama, kolacice ja browserima ljudi su svakako izlozeni skeniranju ukusa i ponasanja te smatram da ovo nije neka mnogo drugacija metoda.	1	0%	1%	5%
	komoanije trebaju transparentno napisati kako koriste neuromarketing kako bi kupci bili upoznati s njegovim rezultatima.	1	0%	1%	6%
	to je za mene nova tema o kojoj nesto posebno ni ne razmisljam, samim tim me i ne brine.	1	0%	1%	6%
	ne brine me jer imam kontrolu nad potrošnjom	1	0%	1%	7%
	prevelika manipulacija	1	0%	1%	7%
	to bi bilo samo jos jedno procesuiranje, pored svih ostalih putem interneta, dm itd	1	0%	1%	8%

	mogucnost impulsivne kupovine i toliko dobro istrazenih ljudskih reakcija da bi nam se plasirali proizvodi koje cemo kupovati iako nam ne trebaju	1	0%	1%	8%
	narusavanje provatnosti i mogucnost primoravnja kupovine odredjenih proozvoda.	1	0%	1%	9%
	ne brine me jer ne mislim da bi takav marketing mogao imati negativan utjecaj na potrošače u smislu nekakve vrste hipnotiziranja njihove svijeti, već samo dublje zadire u svijest kupca, bez nužne štetnosti za potrošačevo zdravlje ili prosudbu.	1	0%	1%	10%
	brine me, jer privatnost može da mi bude ugrozena	1	0%	1%	10%
	не брине ме, у мо¼им годинама таква врста маркетинга не утиче на мо¼е мождане жели¼е.	1	0%	1%	11%
	manipulacija kupaca kao i iskorištavanje privatnih podataka u druge svrhe.	1	0%	1%	11%
	ne brine, jer mislim da se to vec u velikoj mjeri i sprovodi, svakako ostaviti covjeku na volju da izabere kako on zeli pristupiti problemu.	1	0%	1%	12%
	brinem se ali zahtijeva kompleksan,opsiran odgovor za koji sad nemam vremena	1	0%	1%	12%
	ne brine me	5	1%	3%	15%
	svako poboljšanje skretanja pažnje na kupovinu potrebnih, odnosno nepotrebnih i beskorisnih proizdvoda koji koštaju samo zato što su brend bi moglo biti jedino korisno	1	0%	1%	16%
	ugrozavanje privatnosti vidim kao jedini problem.	1	0%	1%	16%
	na djecu siromašnih roditelja.	1	0%	1%	17%
	ne brine me jer su to nove tehnologije kojima će se dio tržišta sigurno prilagoditi, jer u svemu tome neuromarketing ima svoju pozitivnu stranu.	1	0%	1%	17%
	smatram da moze imati negativan uticaj samo jer kupci mogu da se osete kao da ce biti izmanipulisani	1	0%	1%	18%
	ljudi ili jesu podlozni uticajima ili nisu. na koga uticu porodica, prijatelji, modni trendovi, ne pravi razliku da li ce se ukljuciti i kompanije koje koriste neuromarketing	1	0%	1%	19%
	ne mislim da neuromarketing moze da bukvalno manipulise nasim mislilma i da vidi tacno sta mi zelimo, ali moze da prati reakcije naseg mozga na odredjene proizvode. tako da za mene ima dobrih strana u smislu sto mozda tako neke zelje potrosaca mogu biti zadovoljene a negativno sto na neki nacin jeste privatno. bilo bi dobro istovremeno da odredjene kompanije koje to koriste, kako prate nase reakcije na proizvode koje nide, da tako ubace i cene za te proizvode i prate reakcije ljudi na cene.	1	0%	1%	19%
Valid	Valid	178	38%	100%	

XSEX	**Spol**				
	Answers	**Frequency**	**Percent**	**Valid**	**Cumulative**
	1 (Muški)	72	15%	24%	24%
	2 (Ženski)	234	50%	76%	100%

Valid	Valid	306	65%	100%	

Q17	Koliko imate godina?					
	Valid	Units	Average	Std. deviation	Minimum	Maximum
	304	471	30.4	10.44	18	100

Q19	Zemlja prebivališta?				
	Answers	Frequency	Percent	Valid	Cumulative
	1 (Srbija)	73	15%	24%	24%
	2 (Crna Gora)	49	10%	16%	40%
	3 (Hrvatska)	51	11%	17%	57%
	4 (Bosna i Hercegovina)	132	28%	43%	100%
Valid	Valid	305	65%	100%	

Q20	Veličina grada u kojem živite (po broju stanovnika)?				
	Answers	Frequency	Percent	Valid	Cumulative
	1 (< 50.000)	99	21%	33%	33%
	2 (50.000-150.000)	69	15%	23%	55%
	3 (150.000-300.000)	42	9%	14%	69%
	4 (300.000-500.000)	32	7%	11%	80%
	5 (> 500.000)	62	13%	20%	100%
Valid	Valid	304	65%	100%	

Q21	Visina mjesečnih neto prihoda (cca)?				
	Answers	Frequency	Percent	Valid	Cumulative
	1 (< 800 BAM / 410 EUR / 48,000 RSD)	66	14%	22%	22%
	2 (900 BAM - 1700 BAM / 460 EUR - 870 EUR / 54,000 RSD - 100, 000 RSD)	104	22%	34%	56%
	3 (1800 BAM - 2600 BAM / 920 EUR - 1350 EUR / 107, 000 RSD - 160, 000 RSD)	61	13%	20%	76%
	4 (2,700 BAM - 3,500 BAM / 1,400 EUR - 1,800 EUR / 165,000 RSD - 210, 000 RSD)	32	7%	11%	87%
	5 (> 3,500 BAM / < 1,800 EUR / < 210, 000)	39	8%	13%	100%

Valid	Valid	302	64%	100%	