

## NEUROMARKETING IN THE AGRI-FOOD SECTOR

Maria ROBU<sup>1</sup>, Andy Felix JITĂREANU<sup>1</sup>, Mioara MIHĂILĂ<sup>1</sup>, Elena LEONTE<sup>1</sup>

e-mail: mioara@uaiasi.ro

### Abstract

The concept of neuromarketing, one of the most current and modern, is increasingly present in practical marketing research, being used mainly in the study of consumer behavior. The concept only appeared in 1983, but in 2020 over 150 profile companies were active. Neuromarketing combines the science of the brain with the science of marketing, and manufacturers and/or retailers use neuromarketing techniques to boost sales, encourage consumption, and make a profit. The present work addresses the specifics of neuromarketing techniques in the agri-food field. It starts from the fact that these techniques differ from the classic ones, in that purchase and/or consumption decisions are not made only on rational grounds, the emotional ones predominating. The most well-known neuromarketing techniques are: electroencephalography (EEG), eye tracking, facial coding, galvanic skin response (GSR), implicit association test (TAI), etc. All these provide information on the processing of marketing stimuli and the making of purchase and consumption decisions under the influence of a complex set of emotions, feelings, perceptions or values impossible to measure with traditional quantitative methods. The aim of the paper is to create a dashboard with neuromarketing techniques applicable in the agri-food sector, based on the foray into the literature regarding the validity and functionality of these techniques for agri-food consumption. The assumption on which the approach of this paper is based is that neuromarketing techniques have an extremely significant impact on the purchase and consumption decision, and promotional actions based on such techniques, especially those that generate compulsive purchases, contribute to the increase in unbalanced consumption.

**Key words:** behavior analysis, purchase decision, consumption

Neuromarketing, a relatively new field of reference for market research, has begun to show increasing interest in both academic and practical research environments. The presence of this new concept associated with numerous application techniques is recent and apparently "mysterious", neuromarketing being in the attention of researchers for about 20 years. Conceptually, it is very little known in our country.

Neuromarketing techniques and methods are oriented towards optimizing the satisfaction of consumer needs and desires, given that this is the guaranteed way to make a profit (Pop N.A. *et al*, 2014). They are focused on consumer behavior, specifically on the nature of the purchasing and consumption decision-making process that is being monitored and desired to be influenced in order to drive sales growth. As a rule, the results of these experiments or applied techniques are used in the establishment of marketing strategies and the adaptation of production and sales to the consumer market, respectively to the profile of the current consumer.

The basis that constituted the favorable context for the development of neuromarketing

techniques is given by the limitations of traditional marketing techniques that consumers have begun to know and to which they no longer react adequately in relation to the interests of traders (e.g. psychological pricing). Moreover, new neuromarketing techniques are related to hyperconsumption. This is also motivational support for the elaboration of the paper: the observation of the increase in consumption of almost all products, goods and services provoked the scientific curiosity to find an answer to the question: what are the triggering factors of the current level of consumption?

The main aim of the paper is to highlight the fact that neuromarketing techniques are a current presence in market research, that they are no longer a surprise and have become increasingly used.

The motivation of the research is also supported by the fact that we have identified similar or even identical issues in the literature to the one we considered in this paper: the applicability of neuromarketing techniques in the agri-food field. The fact that traditional marketing techniques have advanced to neurological ones is

<sup>1</sup>Iasi University of Life Sciences, Romania

quite well known, but less is known about aspects specific of the agri-food field.

## MATERIAL AND METHOD

The work is based on a theoretical approach, based on the foray into specialized literature and the organization of information in a way that allows highlighting the novelty and relevance of the subject. We focus on presenting neuromarketing techniques and identifying the mode of action in the agri-food sector.

Methodologically, the work followed the route: problematization, documentation, selection, organization and grouping of information. The research methods used are literature incursion and analysis, selection and synthesis, interpretation.

The objectives pursued in the paper are:

- O1.** Highlighting the novelty and particularity of the subject of analysis: neuromarketing.
- O2.** Organized presentation of neuromarketing techniques used in current marketing research.
- O3.** Emphasizing the specificity of neuromarketing in the agri-food sector.

Even if the theoretical aspects predominate in the paper, the authors' contribution consists in bringing this topic to the domestic specialized literature, namely the association of two research directions: marketing techniques and market dynamics of the agri-food sector.

The research approach, focused on bringing this topic to the fore, consisted in formulating a set of questions and assumptions addressed in this paper and which we propose to develop in future research. These are: How is it possible for a consumer to find exactly the products they need on the shelf, and why do they often buy more than they need? How do manufacturers and retailers know what's on the consumer's mind? How is it possible to present the goods so organized on the shelf, so that the consumer makes minimal effort to identify them? The hypotheses issued: there is a set of alternative approaches to the human mind, with a "mysterious" tone or still unknown to the majority of the population.

From the emergence of the concept point of view in the sphere of interest of practical research, neuromarketing appeared as a result of research in neuroeconomics (Gorobeț I., 2020). Ale Smitds is the one who introduced, in 2002, the term neuromarketing in the context of describing how to apply neuroimaging techniques, from the field of neuroscience, in market research (Roebuck, 2011 cited by Pop N.A., 2014). Among the first experiments with neuromarketing techniques are Coke Cola and Pepsi.

The international literature is quite rich dealing with this subject, and the framework of definitions is vast and clarifying.

(1) "Neuromarketing is a way of describing the activity of the brain under the impact of marketing

stimuli, by using specific tools, correlated with the psychological reaction arising as a result of subjects' exposure to different advertisements." (Kotler P. & Keller K.L., 2012).

(2) "The brain is a black box that hides consumers' emotions and preferences, and neuromarketing acts as a window that reveals and provides access to these emotions." (Green S. & Holbert N., 2012)

(3) "The neuromarketing - a modern neuroscience tool which helps to see into human brains and so to open a way towards psychological decision making process - black box of the brain as said" (Dooley R., 2012).

In short, neuromarketing is the science that analyzes the unconscious responses, based on the psychological reaction of individuals to the stimuli transmitted through advertising messages. The scope of the approach is qualitative research that successfully complements quantitative research.

## RESULTS AND DISCUSSIONS

Neuromarketing techniques, which will be presented synthetically below, are used in parallel with other traditional market research methods and in a successful combination with qualitative methods taken from psychology: free mental associations (Top of Mind) or directed (Anthropomorphic test or the Chinese portrait method), projective techniques of thematic apperception, interviews, focus groups, etc. Basically, by applying neuromarketing techniques, brain waves and involuntary reactions are analyzed, with the aim of observing the brain's responses to marketing stimuli, so as to identify the thoughts or emotions of individuals regarding a product, a service, a package, an advertising message and so on (Hammou K.A. *et al*, 2013). In fact, research based on neuromarketing techniques is aimed at penetrating the minds of individuals, unconsciously, through stimulus-type interfaces: products, packaging, logos, visual, auditory, olfactory, tactile, gustatory elements, etc. with the exclusive purpose of identifying the natural and unconscious reactions of individuals (Pop N.A. *et al*, 2014).

In addition to the techniques briefly presented below in Table 1, neuromarketing practice also uses other advanced techniques from the area of neuroscience, such as: Magnetic Resonance Imaging (MRI), Transcranial Magnetic Stimulation (TMS), Steady State Topography (SST), evaluation cardiovascular parameters, etc. Most of the techniques mentioned require appropriate equipment. A grouping of these methods is (Zară I.A. & Tuță M., 2013):

1. Neurological methods: fMRI, EEG, MEG, PET, SST, TMS;

2. Biometrics and other non-neurological methods: heart rate, respiratory rate, galvanic skin

response, eye-tracking, facial, body and voice tracking.

Table 1

**Provides a summary of the main neuromarketing techniques currently in use**

<b>Galvanometry (GSR)</b>	It measures nervous system activation-induced variations in skin conductance. It is a very good predictor of market performance compared to declarative methods and indicates the intensity of emotional reactions.	<b>Eye Tracking (ET)</b>	It measures eye fixations by recording the reflections of the cornea determined by infrared radiation. It is considered that mental attention is directed towards the object subject to visual attention (Kalliny, 2010).
<b>Functional magnetic resonance imaging (fMRI)</b>	Used in medicine and physics, it uses regular, stationary MRI equipment and enables a non-invasive process to record human biological brain activity at the neural level in real time (Houser and McKabe, 2014).	<b>Electroencephalography (EEG)</b>	It records the cerebral activity of the neurons located in the brain. Alpha and beta rhythms are being measured. The principle underlying EEG investigations derives from the Theory of Frontal Asymmetry. (Davidson, 2004)
<b>Functional nuclear magnetic resonance (RMNf)</b>	It allows the study of neural structures located deep inside the cerebral hemispheres. The principle of action consists in recording the changes that appear in the magnetic field adjacent to the blood vessels that irrigate the neurons. (Huettel et al., 2009).	<b>Magneto Electroencephalography (MEG)</b>	It records the magnetic field generated by the activity of synchronized neurons (Roulet & Droulers, 2010). It favors the analysis of brain processes in near real time (milliseconds).
<b>Functional near-infrared spectroscopy (fNIRS)</b>	A method for functional imaging, which is increasingly used in neuromarketing. By this method it is possible to measure the blood flow of the cerebrum and the change in blood flow in a specific brain region during neuronal activity (Kirilina, 2012).	<b>Blood oxygen level dependent (BOLD)</b>	The neurological activity can't be seen directly, but the hemodynamic response of the brain, yes. This phenomenon, called BOLD signal, is often used as a dependent variable in neuromarketing research (Royo-Vela & Varga, 2022)
<b>Positron emission tomography (PET)</b>	It requires the injection of tracers, during the experiment, if the radioactive subject is tested, sending radiation to active areas of the brain. It relies on a scanner that is capable of detecting glucose and oxygen. When the injection of a dose of radioactivity exceeds the medically acceptable threshold, it prohibits repeating the experiment.	<b>Face recognition</b>	It allows the identification of human facial movements and is a system developed by an anatomist Carl-Herman Hjortsjö. The visual system is able to extract a lot of information from the human face: social categories, personality, emotion. The brain works predictably, constantly anticipating sensory information based on past experiences.

Source: authors' processing and synthesis in accordance with specialized literature

From the point of view of the purpose for which these research techniques are used more and more frequently, they are considered primarily because they allow the identification of the emotions generated by the marketing message or the carrier product, as well as the establishment of correlations between those emotions and the specific elements of the message or product characteristics that generated those emotions (Butler, 2008).

Another important aspect in the application of these techniques is that of ethics. "Neuroethics appears as a discipline of many importance" (Izaguirre-Torres D. *et al*, 2020), and one of the sensitive aspects in the use of neuromarketing techniques is that that the subjects are exposed to sets of analyzes for which they do not always give their consent or in which they do not even know that they are participating.

As for the applicability of these techniques in different areas of interest, it is noted that there is

no exception for the agro-food sector. Moreover, the results obtained by applying these techniques stimulate agri-food consumption, changing nutritional behavior or attitude towards agri-food goods. A preliminary explanation is that these goods satisfy instinctual, basic needs. The literature supports this claim, by the following: "The number of studies on agro-economic issues using neuroscientific methods opens up a wide range of future-oriented options", respectively "In the category advertising and marketing, the effects of marketing measures in the field of agricultural marketing are examined in more detail. The focus is on visual simulation, for example in the form of product design, and the resulting neural activations and actual actions." (Schukat S. *et al*, 2021). A specific behavior that is analyzed through neuromarketing techniques is nutritional behavior which, in our opinion, complements and correlates, especially in recent years, with that of over- or hyper-consumption of agri-food, respectively with

the concept of food-waste. Varshney (2016) mentioned the presence of a “buy button” or “magic spot” in the brain. And, pursuing this matter, the statement is supported by the literature: “There is enough evidence to state that neuromarketing is used as a marketing strategy by multinationals, encouraging the consumption of fast food, high intake of sugar, salt and fat, which causes diseases such as obesity, heart attacks, cancer, high blood pressure or diabetes.” (Izaguirre-Torres D. *et al.*, 2020). Even if in 2022, Russo *et. al.* Stated that “To the best of our knowledge, no study has ever assessed the effectiveness of certified agri-food product communication using neuromarketing techniques and no study has ever investigated the role of the emotional sequence in the communication of certified agri-food products”, we believe that the interest in studying the agri-food sector is increasing.

## CONCLUSIONS

Neuromarketing involves the study of the nervous system, through qualitative methods. It is different from psychological studies or studies of cognitive functionality, being based on the functionality of neural systems. By capitalizing on the results of the application of these techniques, it is possible to better understand consumer behavior and influence purchasing and consumption behavior.

The recognized benefits of using neuromarketing techniques are: stimulating customers through the five senses to make the most appropriate purchase decision, with prevalence to be convinced to buy and/or consume; optimizing the buyers' experience through a personalized approach; intensification of the brand name in the minds of consumers, to remain fixed in the memory and to repeat the purchase; the perception of the product through the sensitive memory that sensitizes consumption; more adequate satisfaction of refined needs and consumer expectations, thus satisfying more special needs (attention, convenience, individuality).

The results of applying these techniques allow the creation of much more targeted marketing strategies and advertising messages. Certainly the subject is topical, challenging and opening the way for new research directions.

## REFERENCES

- Berčík J., Horská E., Wang W.Y., Ying-Chun C., 2015** - *How can food retailing benefit from neuromarketing research: a case of various parameters of store illumination and consumer response*. Open Access Agricultural & Applied Economics, Digital Library - AgEcon Research, DOI: 10.22004/ag.econ.202714.
- Dolley R., 2012** - *Brainfluence: 100ways to persuade and convince consumers with neuromarketing*. Canada: John Wiley and Sons.
- Fortunato V.C.R., Giraldo J.D.M.E., De Oliveira J.H.C., 2014** - *A Review of Studies on Neuromarketing: Practical Results, Techniques, Contributions and Limitations*. Journal of Management Research, 6(2), 201. doi:10.5296/jmrv6i2.5446
- Gorobeț I., 2020** - *Neuroeconomia între behaviorism economic și știință*, Conferința Științifică Internațională "Competitivitate și inovare în economia cunoașterii", 25 - 26.IX.2020, Chișinău.
- Green S., Holbert N., 2012** - *Gifts of the neuro-magi: science and speculation in the age of neuromarketing*, Marketing Research, 24(1):10-14.
- Hammou K. A, Galib H., Melloul J., 2013** - *The contributions of neuromarketing in marketing research*, Journal of Management Research, 2013, 5(4):20-23.
- Izaguirre-Torres D., Málaga-Juárez J., Chuqui-Diestra S.R., Velásquez-Ccosi P.F., Siche R. 2020** - *La neurociencia en la publicidad de productos agroalimenticios: ¿Una herramienta beneficiosa o un peligro para salud pública?* Scientia Agropecuaria 11(3):629-639.
- Kotler P., Keller K.L., 2012** – *Marketing Management*, 14<sup>th</sup> Global Edition, Boston.
- Pop N.A., Dabija D.C., Iorga A.M., 2014** - *Responsabilitatea etică a companiilor de neuromarketing în valorificarea cercetărilor de piață - o abordare exploratorie la nivel global*. Amfiteatru Economic, Vol. 16, nr. 35, pp. 13-28.
- Russo V., Bilucaglia M., Circi R., Bellati M., Valesi R., Laureanti R., Licitra G., Zito M., 2022** - *The Role of the Emotional Sequence in the Communication of the Territorial Cheeses: A Neuromarketing Approach*. Foods 2022, 11, 2349. <https://doi.org/10.3390/foods11152349>.
- Schukat S., Diekmann M., Heise H., 2021** - *What links neuroscience to agricultural economics? A review of neuroscientific methods literature in agricultural economic research and marketing*. International Food and Agribusiness Management Review, 24(6), DOI: 10.22434/IFAMR2020.0141
- Varshney N.K., 2016** - *Exploring neuromarketing dynamics*. International Journal of Advanced Technology in Engineering and Science, 4(1).
- Zară I.A., Tuță M., 2013** - *Neuromarketing Research - A Classification and Literature Review*. Research Journal of Recent Sciences, 2(8):95-102.
- Royo-Vela M., Varga Á., 2022** - *Unveiling neuromarketing and its research methodology*. Encyclopedia, 2:729–751. <https://doi.org/10.3390/encyclopedia2020051>.