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Kamila Janečková

University of Economics, Prague
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Title of the Master's Thesis:

Neuromarketing:

Conceptualization of neuromarketing usage in marketing process

Author: Bc. Kamila Janečková
Supervisor: Ing. Petr Král, Ph.D.

Declaration of Authenticity

I hereby declare that the Master's Thesis presented herein is my own work, or fully and specifically acknowledged wherever adapted from other sources. This work has not been published or submitted elsewhere for the requirement of a degree programme.

Prague, 18th December 2012

Bc. Kamila Janečková

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Abstract:

Neuroscience is a new scientific discipline studying people's nervous system and brain, and among other things discovering how they decide and what motivates them. One of the branches of this study is neuromarketing which becomes to be increasingly used as a marketing research methodology which claims to reveal what people really think not only what they declare. There are still many question marks concerning this method, and, particularly in the Czech market where there is generally little notion about it, neither clients nor advertising agencies are sure whether and how to use it throughout their marketing and communication process. This thesis sets its goal in trying to shed a light on the problematic and provide a deeper analysis of the methodology and its presence on the Czech market. Via primary and secondary research, and description of several case studies and conducted interviews, it intends to conceptualize the application of neuromarketing in marketing and thus help with a decision about when and how it may be worth to think of using it in practice.

Key words:

Neuroscience, neuromarketing, marketing research, marketing process, advertising, brain

Content

Acronyms	8
INTRODUCTION	9
Methodology	11
1. NEUROSCIENCE	13
1.1 Definition	13
1.2 Fields of interest.....	15
1.2.1 Neuroculture.....	16
1.2.2 Cognitive neuroscience	17
2. NEUROMARKETING	19
2.1 History of neuromarketing	20
2.2 Definition	21
2.3 Techniques	22
2.3.1 Electroencephalography (EEG).....	23
2.3.2 Magnetoencephalography (MEG).....	25
2.3.3 Functional magnetic resonance imaging (fMRI).....	26
2.3.4 Biometrics	27
2.3.1 Neuromarketing techniques on the Czech market.....	29
2.4 Controversy	31
2.4.1 Functioning of neuroscience techniques	32
2.4.2 Practical usage.....	32
2.4.3 Ethical questions	33
3. MARKETING PROCESS	35
3.1 Marketing mix.....	35
3.2 Theory of New product development.....	38
3.3 Models of communications	39
3.4 Marketing research.....	41
4. USAGE OF NEUROMARKETING IN THE MARKETING PROCESS	44
4.1 Cases	44
4.1.1 Communication.....	45
4.1.2 Consumer wants and needs	57
4.1.3 Convenience.....	65
4.1.4 Cost to consumer.....	67
4.2 Interviews.....	67

4.2.1	Millward Brown Czech Republic.....	68
4.2.2	CONFESS Research.....	69
4.2.3	IPSOS Tambor	71
4.2.4	PHD/ Omnicom Media Group	72
4.2.5	Ogilvy Prague.....	74
4.3	Conceptualization of neuromarketing	74
4.3.1	Neuromarketing and marketing mix	75
4.3.2	Neuromarketing framework	77
4.3.3	Neuromarketing as a type of marketing research.....	77
4.3.1	Neuromarketing and communication models	78
CONCLUSION		81
Bibliography.....		85
Annexes.....		95

Acronyms

In alphabetical appearance

ARF	Advertising Research Foundation
CCM	consumer-centric model
EEG	electroencephalography
EMG	electromyography
FMA	facial movement analysis
fMRI	functional magnetical resonance imaging
GSR	galvanic skin response
MB	Millward Brown
MEG	magnetoencephalography
NPD	new product development
PR	public relations
R&D	research and development
US	United States
UX	user experience

INTRODUCTION

During my internship in the headquarters of Danone in Barcelona, I was working in consumer insights and research department. I became fascinated by how an understanding of a deeper personal motivation and consumer insights can be used in marketing and communication, and thus a powerful and effective strategies may be created. The topic about which I barely heard before was actually a driver which started my desire to work in advertising. What particularly stroke me were new, alternative ways of how to gain these deep insights, including co-creation, neuroscience and other methods which seem to open a door to even a better understanding of consumers. Neuromarketing has been chosen as the methodology to be further elaborated on in this thesis because I was surprised by how little is known about the subject in the Czech Republic even among very experienced colleagues, researchers and academics. And no wonder, the subject matter represents a challenge due to a lack of public materials, significantly varying opinions and often distorted information provided. I felt I would like to dig deeper and shed a little bit of light on neuromarketing and its potential to be used in practice.

Since when people started talking about marketing, its mission has been to get into consumers' minds, find out what they want and desire, and use that information to sell and earn more. Sometimes marketing is presented as an evil, as something which manipulates people. Nevertheless, the role of marketing is to provide consumers with things they may want, fulfilling their obvious but also hidden needs. We may suppose it has never been as easy to discover them as it is now, with a cutting-edge technology, vast budgets and a global internet coverage, allowing consumers to interact and let companies know their opinions (and sometimes pretty loudly). And yet, there is a very high percentage of new products which fail when being launched; cases of a New Coke research failure and a Steve Jobs' s anti-marketing research approach have become weapons for marketing research opponents.

Neuromarketing builds on this reluctance and claims to solve the problem of discovering what people really want and not only what they say. It is one of the most recent marketing research techniques and it is slowly managing to gain its position as a respected source of information. Slowly, because its academic pioneers are not known for accessible books and there is still a lack of trustworthy, credible and commonly acknowledged sources of literature on a global level, not even talking about the Czech Republic. Nevertheless, we see more and more research companies embracing this tendency, acquiring neuroscience methodologies as a new offering in their marketing research methodologies portfolio. In contrast, corporations are not

likely to be that convinced due to a shortage of sufficient publicly available cases and results, controversial issues and most importantly its added value comparing to traditional marketing research. And if they do conduct a neuroscience research, rather as a rule than an exception they are not willing to provide results or even admit using it. However, the application of neuroscience in marketing is spreading fast, and this brings another issue into the game- a question of ethics. It is a disturbing topic not only for companies and scientists, but also for governments. France is among the first countries which undertook the most radical solution in the beginning of the year 2012- a ban on the usage of neuroimaging in all commercial applications. And last but not least, as for a third player on the marketing/communication field, advertising and media agencies tend to be as reluctant as corporations, having experiences with rather blurry results and hyped offerings from marketing research agencies and neuromarketing providers claiming that neuromarketing may be used for everything, every time and provides unquestionable definite answers. In other words, never has been any research methodology so controversial and as discussed as neuromarketing.

On the other hand, neuromarketing may represent a great potential in the sense of revealing information which would be otherwise impossible to find out from the traditional marketing research methodologies. Information that consumers do not consciously realize, do not want to reveal or which is simply not even asked. Moreover, it claims to avoid a distortion resulting from a nature of traditional techniques, such as self-projection of researches into asked questions, misinterpretation of answered questions and others. The fact that the methodology seems to be more scientific and reliable is particularly appealing to marketers who prefer having hard data instead of results with a deviation, and thus are more relieved from being responsible for the consequent marketing actions.

The purpose of the thesis will be in the first place to **shed light on neuroscience and neuromarketing as such**, given few literature and sources are dedicated to this topic in the Czech Republic; and to **map the neuromarketing practices on the Czech market**. Secondly, I will intend to **discover a potential of the application of this new marketing research methodology with respect to formation of a marketing and communication strategy**. Based on found information, I will try to suggest its **conceptualization throughout the marketing process**. **The hypothesis is that there are certain areas which could be more suitable for neuromarketing research than others**, as opposed to claims that it is suitable for everything. It should serve as a tool for marketers and advertisers to better understand what neuromarketing is, and in what areas of marketing and communication it can be meaningful to think about using it as a complementary to traditional marketing techniques and go ask for more details.

It is also necessary to clear what the purpose of the thesis will be not. As already said, the topic is rather controversial and with many question marks. With given

time, means and financial and other limitations, there have to be clear mission of the thesis stated in the beginning, letting the rest of the questions to be subjected to other research. The aim of the thesis will **not be to analyse technical aspects of measuring and evaluation of which of the neuroscience methodologies is the most suitable for what** (and there is still not clear one methodology, globally acknowledged as the best and most accurate), although it will be necessary to understand the basics in order to comprehend what results we could expect. **Nor will it be to evaluate the effectiveness of the neuromarketing as comparing to traditional marketing techniques**, the topic which still remains as the big question mark for both academic and professional audience, and surprisingly, there are nearly no studies elaborating on such an obvious topic. Lastly, **I will not explore controversial issues**, such as a number of respondents (which is very low, about 30 people) or ethical questions. These matters are not developed further for two main reasons; the first is a lack of the access to more detailed information and studies which would permit to derive conclusions, and the second is a limited extent of the thesis. However, in the conclusion, there will be suggested recommendations for an additional research.

Methodology

Apart from the introduction and the conclusion, the thesis is divided into four main chapters with the first three having rather a theoretical approach and the last more practical one. In the first chapter, I will have a look into neuroscience, its background and a history, tapping into its most common fields of interests and introducing the topic in general. This chapter, although not directly connected to the topic, is crucial for understanding of how and why neuromarketing was created.

Second chapter will be devoted to neuromarketing as one of the applications of neuroscience. The author will intend to objectively describe its definition, methodologies and also outline the controversial aspect of the topic. A careful attention will be paid not to be distracted by mostly American popular literature.

In the third, and the last theoretical part, the author will focus on basic marketing and marketing research concepts; describing them according to globally acknowledged marketing books.

In the fourth part, famous international as well as Czech cases of usage of neuromarketing in practice will be introduced. Furthermore, several interviews with people both from marketing research and advertising agencies will be conducted thus gathering both secondary and primary research. Both will provide the author with a linkage between theoretical findings with a practical application, and a conceptualization of neuromarketing will be derived.

There will be used both a descriptive methodology of findings from the secondary research and the conduction of primary research by interviews with several subjects. It must be kept in mind that the cases may not often include hard data of how exactly the findings from neuromarketing were implemented, nor whether these implementations brought results such as increased sales or change in brand attributes. These results are usually difficult to obtain not only for neuromarketing but for a traditional research in general; companies do not wish to share them and sometimes they do not conduct pre and post measurements to be able to compare the effectiveness brought by applied research findings. As a result, a strictly qualitative approach is being taken. For the theoretical part and in order to ensure the highest objectivity, a wide variety of sources will be examined and used. Due to quite recent and modern topic and thus shortage of acknowledged academic literature, mostly electronic sources will be used.

1. NEUROSCIENCE

1.1 Definition

Interestingly, in ancient times, a heart was considered as a main source of intelligence and knowledge. Legend says that from these times the expression “learning by heart” was invented and it is used till now. Even Aristoteles believed it as well as he believed in the fact that a brain regulated the amount of heat from a heart.¹ Hippocrates was the first of challengers who started to defend a brain as the seat of intelligence, followed by Plato who very interestingly perceived brain as the seat of rational part of the soul.²

From more recent scientists it was Descartes who is famous for his discoveries in the field of neuroscience, by that time at almost non-existent level. But not only very recently, and thanks to the invention of a microscope, significant progress has been possible and learning from neuroscience has started to be acknowledged as a valid argument across industries and interest areas. In the interview in 2009 with Dr. Eric Kandel (Nobel Laureate in Medicine and a member of the NeuroFocus Advisory Board) and Charlie Rose in the PBS Brain series, Charlie Rose commented, “*We have learned more about the brain in the past five years than during all of human history combined.*”³

But a brain is not the only thing neuroscience deals with. According to its definition by Merriam-Webster Medical Dictionary, it is:

”a branch (as neurophysiology) of science that deals with the anatomy, physiology, biochemistry, or molecular biology of nerves and nervous tissue and especially their relation to behaviour and learning”.⁴

¹ FINGER, S. *Origins of Neuroscience: A History of Explorations into Brain Function* (3rd ed.). New York: Oxford University Press, USA 2001. pp. 3–17. ISBN 0-19-514694-8.

² PLATO (360BCE). *Timaeus*.

³ ROSE, Ch. *Brain Series Episode One- The Great Mysteries of the Human Brain* [online]. 2009 [cit. 2012-09-11] Available at: <http://www.charlierose.com/view/interview/10694?sponsor_id=1>

⁴ Merriam-Webster Medical Dictionary [online]. 2012 [cit. 2012-09-11] Available at: <<http://www.merriam-webster.com/medlineplus/neuroscience>>

The name neurobiology is sometimes used instead of the term neuroscience, although the former refers particularly to the biology of the nervous system, while the latter talks about the whole science of the nervous system. Barbara O'Connell, Senior Vice President in Consumer Neuroscience Practice in Millward Brown⁵ in North America, defined neuroscience as:

*“a broad term encompassing a variety of techniques, all of which use indirect rather than direct/explicit measurement of people's response”.*⁶

Dr.A.K. Pradeep, the founder of NeuroFocus⁷ and the author of several neuroscience and neuromarketing books described neuroscience as

*“the study of the human nervous system, the brain and the biological basis of consciousness, perception, memory and learning”.*⁸

Major neuroscience blogs⁹ put simply that the neuroscience is the study of the nervous system - including the brain, the spinal cord, and networks of sensory nerve cells, or neurons, throughout the body. The nervous system consists of two main parts, the central nervous system and the peripheral nervous system. The central nervous system is made up of the brain and spinal cord. The peripheral nervous system includes the nerves that serve the neck and arms, trunk, legs, skeletal muscles and internal organs.¹⁰ Neurons are the functional units of the nervous system; human

⁵ Millward Brown is a global company, part of Kantar Group, and it is a leader in marketing research, known also for pioneering many of the industry's most innovative research methodologies

⁶ O'CONNELL, B; WALDEN, S.; POHLMANN A. Marketing and Neuroscience- What Drives Customer Decisions? A White Paper Based on the American Marketing Association's Virtual Event Marketing and Neuroscience: What Drives Customer Decisions? [online]. 2011 [cit. 2012-09-11] Available at: <http://www1.uni-hamburg.de/ami/lehre/Veranstaltungen/WS_1112/Psychophys_Methoden/AMA_Neuromarketing_2011.pdf>

⁷ Recently acquired by Nielsen company

⁸ NeuroFocus [online]. 2012 [cit. 2012-09-11] Available at: <<http://www.neurofocus.com/index.htm>>

⁹ For instance: Neuromarketing Insights at Scoop.it! [online]. 2012 [cit. 2012-09-11] Available at: <<http://www.scoop.it/t/neuromarketing-insights>>

Neuromarketing, where brainscience and marketing meet [online]. 2012 [cit. 2012-09-11] Available at: <<http://www.neurosciencemarketing.com/blog/>>

Neuroscience News.com meet [online]. 2012 [cit. 2012-09-11] Available at: <<http://neurosciencenews.com/>>

¹⁰ BrainFacts [online]. 2012 [cit. 2012-09-11] Available at: <<http://www.brainfacts.org/about-neuroscience/core-concepts/>>

bodies contain roughly 100 billion of these units. Neurons communicate with each other by sending electrical signals long distances and then releasing chemicals called neurotransmitters which cross synapses - small gaps between neurons, which number is decreasing with increasing age. The level of these chemicals determines whether and how well we remember a particular input.¹¹

1.2 Fields of interest

The definition in the previous subhead implies that the scope of neuroscience goes across a broad variety of fields, from biology to psychology. Many prestigious universities have founded its own department of neuroscience studies, such as Cambridge Neuroscience, whose groupings are used to draft the spread throughout many industries¹²:

1. Developmental Neuroscience

It is a part of developmental biology which aims to understand how cells and molecules function in the context of a developing organism; it investigates how the brain grows and changes.

2. Cellular and Molecular Neuroscience

The research of the behaviour of neurons at the cellular and molecular level which studies a diverse spectrum from molecular signalling to neuroendocrinology to sensory and motor systems; with techniques used ranging from biochemical, single-cell recording and behavioural studies to large-scale computational methods.

3. Systems and Computational Neuroscience

It represents a recent focus of development for the neuroscience community, including experimental approaches across a range of departments, such as Department of Applied Mathematics and Theoretical Physics and the Department of Engineering.

¹¹ PLESSIS, E. Jak zákazník vnímá značku. 2011. Vyd. 1. Brno: Computer Press, 2011. pp 41. ISBN 978-80-251-3529-7.

¹² Cambridge Neuroscience, University of Cambridge [online]. 2012 [cit. 2012-09-11] Available at: <<http://www.neuroscience.cam.ac.uk/research/themes/>>

4. Cognitive and Behavioural Neuroscience

This department works on the neural and neurochemical basis of cognitive and emotional behaviour in humans and other species, including studies of stress, anxiety, depression, and language. The neural systems involved in drug seeking, the reward system and reinforcement are also an important focus of research, as are the mechanisms of decision making. These areas, together with studies into the neural basis of learning, memory and perception, are the subject of techniques ranging from neuroimaging to computational modelling.

5. Clinical and Veterinary Neuroscience

Focus on neurology and neurosurgery. Research in these areas has a strong emphasis on clinical application in conditions such as Alzheimer's disease, Parkinson's disease, Huntington's disease, multiple sclerosis, stroke, brain injury, autism, schizophrenia and depression.

1.2.1 Neuroculture

The interest neuroscience raises over the last few years is incredible. There has been even put a label on this trend: a neuroculture; as neuroscience becomes to be so popular, neuro prefix is starting to be used for much more fields of interest. Among the most curious belong for instance:

Neuroesthetics

An area which applies neuroscience in order to understand what art is, trying to gain insights from art to learn more about the brain.¹³

Neuroeducation

A discipline that combines neuroscience, psychology and education to create improved teaching methods.¹⁴

Neurodesign

An approach that uses neuroscience to decide over what makes good customer experience and especially focuses on packaging and design.¹⁵

¹³ Neuroesthetics Institute, University College London [online]. 2012 [cit. 2012-09-11] Available at: <<http://neuroesthetics.org/institute.php>>

¹⁴ MEHTA, A. Neuroeducation Emerges as Insights into Brain Development, Learning Abilities Grow. [online]. 2009 [cit. 2012-09-11] Available at: <<http://www.dana.org/news/Brainwork/detail.aspx?id=22372>>

¹⁵ BERRY, J.D. NeuroDesign™: A Primer for Business seeking Innovation through Design [online]. 2006 [cit. 2012-09-11] Available at: <<http://www.applied-iconology.com/images/NeuroDesignWhitePaper.pdf>>

Neuroeconomics

An academic discipline that uses neuroscientific measurement techniques to look into how economic decisions are made. It combines research methods from neuroscience, experimental and behavioural economics, and cognitive and social psychology.¹⁶

Neuroethics

It tackles ethical issues rising with a recent progress of cognitive neuroscience and its practical implications.¹⁷

Although no academically acknowledged hierarchy or ranking of neuroscience areas has been developed so far, we could argue that all these new fields belong to behavioural and cognitive neuroscience and together play an important role when talking about neuromarketing. This is also the reason why it is further developed below and it is also discussed in the following chapters.

1.2.2 Cognitive neuroscience

The term "cognition" refers to the activities involved in processing information, applying knowledge, and changing preferences. Cognitive neuroscientists study functions such as perception and memory by using behavioural methods and other neuroscience techniques. Cognitive neuroscience merges the advances in these sciences and the knowledge obtained from cognitive psychology. It is a discipline that was developed at the end of the 20th century; it is acquiring a great importance in the 21st century, and it is a fundamental theoretical framework for understanding a new definition of the unconscious. It investigates the influence of neuronal processes (conscious and unconscious) in cognitive processes such as perception, attention, reasoning, decision-making, object representation, emotion, and memory.¹⁸ Decision making and motivation are particularly important for neuromarketing, as well as the proportion of rationality to emotions influencing people's behaviour.

¹⁶ LOEWENSTEIN, G.; RICK, S.; COHEN, J. Neuroeconomics. Annual Reviews [online]. 2008 [cit. 2012-09-11] Available at: <<http://www.annualreviews.org/doi/abs/10.1146/annurev.psych.59.103006.093710>>

¹⁷ LEVY, N. Neuroethics: Challenges for the 21st Century. Academic journal [online]. 2012 [cit. 2012-09-11] Available at: <<http://link.springer.com/journal/12152>>

¹⁸ BONO, C. B.; ABAD N. S. Neuroscience and advertising: Redefining the role of the unconscious. Source: WPP Atticus Awards: Merit, 2011

Neuroscience is a discipline not that recent as it might seem, having roots in ancient Egypt, however, its biggest progress has been achieved thanks to the sophisticated technology in the past five years. It goes across a wide spectrum of fields of interest and helps clarify many issues previously impossible to be tackled and which proves to be beneficially for a society. On the other hand, it must be taken into account that at the same time, there rise negative reactions to the omnipresence of neuroscience and to a neuroculture trend. Among them the strong ones are those that refer to once popular pseudoscience phrenology claiming that “the brain is the organ of the mind” which was never scientifically approved and was eventually rejected.¹⁹ Concerning the purpose of this thesis, the most important sphere of interest is cognitive and behavioural neuroscience, which provides findings that explain the intrinsic drivers of people’s behaviour and serve as a foundation for neuromarketing.

¹⁹ EYERES,H. Think outside the grey box. Financial Times [online]. 2012 [cit. 2012-09-20] Available at: <<http://www.ft.com/intl/cms/s/2/b484a1b4-c108-11e1-8179-00144feabdc0.html#axzz205qoeA7W>>

2. NEUROMARKETING

Mr. Pradeep from NeuroFocus claims: *"Neuroscience teaches us that the subconscious level of the brain is where essential perceptions are registered and decisions are made. It is at this precognitive level of the mind where initial product interest, purchase or viewing intent, and brand loyalty are formed"*.²⁰

Professor Gerald Zaltman from Harvard Business School goes even further arguing that *"everything consumers think and do is influence at unconscious levels"* and that 95 % of our purchase decision making takes place in the subconscious mind.^{21 22}

When asked what you enjoy the most about eating chips, the most probable answer would be salty (spicy/onion or whatever the taste is) taste, crunchiness, maybe even the powder would be mentioned by few. However, not many, if some at all, would answer licking the powder of the fingers. And yet, this fact has been found out thanks to neuromarketing technique. When finger-licking was used in TV copy (more about this case in chapter four), the spot was a success. This is only one example of how neuromarketing can and already is being used in practice and what are its advantages when comparing to traditional marketing research methods, uncovering what may seem as irrational, unconscious actions of consumers. Millward Brown, Martin Lindstrom, GfK, Johan Lehrer, Stanford and Harvard Universities and last but not least variety of companies from Unilever, Paypal, IBM to Campbell Soups have been using or dealing with neuromarketing.

With a rapid expansion of neuromarketing usage, many questions have been raised, especially whether it can really explain and predict consumer behaviour better than even the very experienced researcher could get out of them, or if it is rather a

²⁰ PRADEEP, A.K. "The "Aha!" Moment. Why One Letter and Three Numbers Are Critical To Marketing Success" [online]. MrWeb, 2010. [cit. 2012-09-14] Available at: <<http://www.mrweb.com/mrt/neu09sep.htm>>

²¹ Harvard Business School, Faculty and Research. [online] [cit. 2012-09-15] Available at: <<http://www.hbs.edu/faculty/Pages/profile.aspx?facId=6579>>

²² Q&A with G. Zaltman: The Subconscious Mind of the Consumer (And How To Reach It) [online] 2012 [cit. 2012-09-15] Available at: <<http://hbswk.hbs.edu/item/3246.html>>

business activity or a valid academic field of study. Furthermore, there are various controversial issues due to which several voices have been raised against its usage.

2.1 History of neuromarketing

Most probably the earliest institutional usage of neuromarketing appeared in 2002, when the first neuromarketing company was established as Atlanta advertising company, BrightHouse, announced the creation of a new business division using neuroimaging for marketing research.²³ This started to attract the attention of journalists, scientists and also venture capitalists. The announcement was followed by a lecture by Prof. Dr. Ale Smith three months later on the consumer behaviour and neuroscience and officially used the word *neuromarketing* for the first time.²⁴ Before this happened, corporations were already sponsoring a neuroscientific research for marketing topics, such as observing consumers reactions for TV commercials with EEG.²⁵

During the following years, several more or less significant articles about neuromarketing were issued. In 2003 and 2004, first important criticism started to appear both from academics and from the side of community protecting consumers' right. They were disapproving a commercial usage of neuromarketing, referring to a lack of unfounded research, and discouraging the academic sphere to further relate with it. Nevertheless, some important findings were discovered during the years 2004 - 2007; Coke vs. Pepsi challenge, described in the next chapters, and a reaction of a brain on political parties, to name the most important ones.²⁶

On August 2000, Gerald Zaltman and Stephen Kosslyn, both professors at prestigious universities, received a patent on neuroimaging, *“as a means for validating whether a stimulus such as advertisement, communication, or product evokes a certain mental response such as emotion, preference, or memory, or to*

²³ PR Web. Press release from 2002 June 22, Brighthouse Institute for Thought Sciences launches first “neuromarketing” research company. [online] [cit. 2012-09-21] Available at: <<http://www.prweb.com/releases/2002/6/prweb40936.php>>

²⁴ BERCEA, M. Neuromarketing: The first years. [online] 2012 [cit. 2012-09-21] Available at: <<http://neurorelays.wordpress.com/2012/06/04/neuromarketing-the-first-years/>>

²⁵ ROTHSCILD, M.; HYUN, Y.J. Predicting memory for components of TV commercials from EEG. J Consum Res. 1990;16:472–8

²⁶ LEVALLOIS, C. PhD, social & specialist in data visualization. [online] [cit. 2012-09-23] Available at: <<http://www.clementlevallois.net/>>

predict the consequences of the stimulus on later behaviour such as consumption or purchasing."²⁷

2.2 Definition

Neuromarketing can be defined as marketing designed on the basis of neuroscience research.²⁸

Huber and Kenning stated in their book *A current overview of consumer neuroscience* that a wider area of neuroscientific consumer research should be referred to as “*consumer neuroscience*,” and they define neuromarketing as:

*“the application of these findings within the scope of managerial practice.”*²⁹

According to a popular Czech marketing and advertising website, Mediaguru, neuromarketing is defined as:

*„a new interdisciplinary marketing field working with the latest research from neuropsychology, cognitive psychology and neuroscience.”*³⁰

What neuromarketing does in very simple words, is observing brain reacting to an impulse, for example a product, marketing campaign or a movie trailer, with a goal to understand subconscious processes ongoing in the brain which consequently helps to know and understand consumers behaviour.

It appears as if neuromarketing is, in contrast to in many other aspects similar neuroeconomics, always carried out for certain company or for particular marketing application. Generally speaking, as it was apparent from the previous chapter, many of the neuroscience fields are useful for marketing decisions, but neither of them is done particularly for this purpose.

²⁷ Google Patent Search for Patent #6099319

²⁸ FISHER, C. E.; CHIN, L.; KLITZMAN R. Defining Neuromarketing: Practices and Professional Challenges. Harv Rev Psychiatry. Author manuscript; available in PMC 2011 August 8. Published in final edited form as: Harv Rev Psychiatry. 2010 Jul-Aug; 18(4): 230–237.

²⁹ HUBERT, M; KENNING, P. A current overview of consumer neuroscience. J Consum Behav. 2008;7:272–92

³⁰ Mediaguru. [online] 2012 [cit. 2012-09-24] Available at:
<<http://www.mediaguru.cz/medialni-slovník/neuromarketing/>>

Thus as clearly as other neuroscientific fields are considered as academic disciplines with already established institutions and reputation, neuromarketing still lacks this. On top of that or maybe because of the fact that few academic papers were published and globally acknowledged, companies paying for these researches very closely watch for confidentiality and as a consequence, neuromarketing becomes very non-transparent. Interestingly enough, in some academic circles, the word neuromarketing is deliberately avoided in order to shun a commercial connotation of the word and instead, “consumer decision neuroscience” or solely “consumer neuroscience” are being used.³¹

Connection between neuromarketing and cognitive neuroscience

One of the most important findings from cognitive neuroscience says that people are not consciously aware before they act. The neuroscientists have discovered that the decision is made up in the brain up to ten seconds before the person consciously realize it.³² In other words, researches examining the brain can say how the person decides even before himself. This of course gives the huge space for those interested in the influencing of the decision making process.

The second most important discovery goes back to the quotes in the beginning of the chapter and is related to the outcome that the major thinking part of human activity (above 90-95 %), including emotions, is subconscious. There is a contradiction between what people really think, what they claim and how they eventually behave. When you ask a consumer why he bought something; very likely the answer that comes is a kind of a post-rationalization and this, apparently, has crucial consequences for any marketing research and marketing strategy.

2.3 Techniques

There are currently around 16 biometric techniques used in neuroscience. The most common are magnetic resonance, functional magnetic resonance imaging (fMRI), electroencephalograph (EEG), positron emission tomography (PET), eye-tracking, and measurement of the skin galvanic response (GSR). They can be divided into direct and indirect techniques. Direct ones measure electric activity of neurons; EEG belongs to the most used direct techniques. Indirect techniques measure brain activity

³¹ FISHER, C. E.; CHIN, L.; KLITZMAN R. Defining Neuromarketing: Practices and Professional Challenges. *Harv Rev Psychiatry*. Author manuscript; available in PMC 2011 August 8. Published in final edited form as: *Harv Rev Psychiatry*. 2010 Jul-Aug; 18(4): 230–237.

³² SOON, C. S.; BRASS, M.; HEINZE, H.-J. & HAYNES, J.-D. *Nature Neurosci*. doi: 10.1038/nn.2112 (2008)

by a different way; and fMRI can be considered as the most important indirect methodology. Second and even more frequently applied division distinguishes between brain imaging techniques, investigating brain reactions on impulses, and biometrics, studying subconscious reactions of other parts of a human body. Neuroscientists gather data from brain in “default time” or “rest time”, and then in the state of arousal, when a human body or a brain reacts to certain stimuli. Results from both states are then compared and the difference is attributed to the presence of stimuli.^{33 34}

Three well established and non-invasive methods for measuring and mapping brain activity when determining responses to marketing stimuli are:

1. Electroencephalography (EEG)
2. Magnetoencephalography (MEG)
3. Functional magnetic resonance imaging (fMRI)

The author will just briefly look into every one of these in order to understand what their pros and cons are as well as main limitations and usage.

2.3.1 Electroencephalography (EEG)

EEG is one of rather traditional technologies with the first psychological studies dating to 1979. Electroencephalograph undertook probably the biggest development from all the devices (see traditional old-fashioned EEG in Figure 1 and modern version in Figure 2), and thanks to its lower cost and mobile character it seems to be the most frequently used in future.

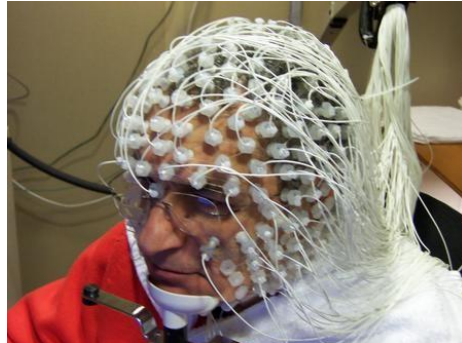
Electroencephalography investigates a neuron activity in the brain which manifests itself by generating a weak electric field caused by electric impulses. Typically, when used for a marketing research experiment, a helmet or a band is employed while electrocodes are placed on the scalp of a test subject. It works via recording of different types and patterns of brainwaves as a reaction to electrical current caused by various types of arousal. Positive or negative emotions are claimed to be distinguished and there exists also a solid presumption of recognizing how motivated people are to act or whether they want to withdraw from an experience. Usually three parameters are measured: **Attention** (Which elements are most effective at attracting

³³ LEWIS, D; BRIDGER D. Marketing researchers make increasing use of Brain Imaging. [online] 2012 [cit. 2012-09-28] Available at: <<http://www.drdavidlewis.co.uk/assets/NeuroMarket1.pdf>>

³⁴ PLESSIS, E. Jak zákazník vnímá značku. 2011. Vyd. 1. Brno: Computer Press, 2011. pp 136. ISBN 978-80-251-3529-7.

the consumer?), **Memory** (Which elements are being moved to memory for future reference?) and **Emotion** (Which elements generate an emotional response?).³⁵

Figure 1: A man connected to classical EEG



Source: Zdravotnické noviny. EEG vyhodnotí účinnost mozku [online] 2010 [cit. 2012-09-29] Available at: <<http://people.brandeis.edu/~sekuler/imgs/rwsEEG.jpg>>

Figure 2: First Wireless Full-Brain EEG Headset



Source: Neurogadget.com: NeuroFocus Reveals Mynd™ the First Wireless Full- Brain EEG Headset. [online] 2011 [cit. 2012-09-29] Available at: <<http://neurogadget.com/2011/03/21/neurofocus-reveals-mynd%E2%84%A2-the-first-wireless-full-brain-eeg-headset/1416>>

Its main limitation derives from a “default mode” of the brain, so it is difficult to claim that the brainwaves as a result of particular advertising stimuli are created completely because of these stimuli. Furthermore, this method is questioned by cognitive scientists as for understanding and predicting the effects of advertising because results are insufficient to help understand the cognitive process behind which triggers activity in the entire brain. Nevertheless, EEG is still popular technology among neuromarketing companies for its rather low cost, ability to follow neural responses to advertisements on a millisecond basis and relative easy usage (i.e. the use of electrode caps that can be placed on respondents' advertisements in normal viewing environments) rather than its accuracy. Recently,

³⁵ CALVART, G; BALANZÓ, C. B.; WATKINS, S. Opening the Black Box: An academic evaluation of the ability of EEG to predict advertising effectiveness. ESOMAR. Congress, Atlanta, Sept. 2012

there has been developed a new EEG technology which should overcome its limitation of rather superficial brain measurement.³⁶

2.3.2 Magnetoencephalography (MEG)³⁷

As well as EEG, MEG technology dates back to mid-sixties and has been getting popular because of significant improvements in the last decade. Magnetoencephalography was developed after the discovery that electrical current, created by neuronal activity, generates a very weak magnetic field. It is based on the same evidence as EEG; however, in contrast it focuses not on measuring electric field but on mapping magnetic field.

As opposed to EEG, MEG is quite expensive, however, it still remains popular, because it can recognize and record nearly real-time responses to cognitive events, and measure well the activity in areas where the activity in reaction to these events is expected to be produced. On the other hand, it is not recommended for exploratory, in advance unsure experiments and for marketing research studies looking into both higher cognitive functions and emotions. Most often it is used in combination with fMRI technology, when MEG tends to be more convenient and pleasant experience for respondents, who can sit and have scanned only their head (as seen in Figure 3). At the moment the biggest usage of MEG is devoted to medical purposes.

Figure 3: MEG scanner with patient



Source: The National Institute of Mental Health (NIMH), National Institutes of Health (NIH), a component of the U.S. Department of Health and Human Services [online] 2011 [cit. 2012-09-29] Available at: <http://infocenter.nimh.nih.gov/il/public_il/image_details.cfm?id=80>

³⁶ MORIN, C. Neuromarketing: The New Science of Consumer Behavior. # Springer Science+Business Media, LLC 2011

³⁷ LEE, P. L.; LIN, Y. - Y. Basic Principles of Electroencephalography & Magnetoencephalography . [online] 2009 [cit. 2012-09-29]. Available at: <http://bml.ym.edu.tw/ibs/brain/curriculum/952curriculum/file/MEG_EEG_Clinical%20applications.pdf>

2.3.3 Functional magnetic resonance imaging (fMRI)

Slightly less expensive than MEG, fMRI scanners function based on measuring the change of a blood flow in the brain, particularly a blood oxygen level, which are caused as a reaction to a brain activity. In a presence of a certain stimulus such as a commercial, areas of a subject's brain receive more oxygenated blood flow than in its default state. This is measured by employing a classical magnetic resonance tunnel (see Figure 4) which is able to create an activation brain map that specifies which parts of the brain are involved with individual mental processes. The basic of how fMRI works is a strong magnetic field, where flows of oxygenated and non oxygenated blood in the brain are depicted through radio waves. The analysis measures brain waves connected to memory, awareness and emotional engagement.³⁸

Figure 4: Neuromarketing research by fMRI in IKEM, Czech Republic



Source: ČT24 [online] 2012 [cit. 2012-09-30] Available at:

<<http://www.ceskatelevize.cz/ct24/domaci/198143-koukolik-neuromarketing-balancuje-na-hrane-etiky/>>

Limitations lay in the delay in measuring which can be up to a couple of seconds, which is also the reason why it is used in the combination with MEG as mentioned before. Apparent drawback results from the character of the scanner itself, supported by quite a strong noise, which may imply uncomfortable and unnatural situation for respondents. However, fMRI has the major advantage in imaging very deep brain structures, especially those concerning emotional responses, and can depict a place and intensity of the brain activity with extraordinary precision and almost without distortion, in contrary to more superficial results from EEG. This makes fMRI one of the most preferred technologies at the moment, particularly from scientific and academic point of view.³⁹

³⁸ COYNE, K. MRI: A Guided Tour. In: National High Magnetic Field Laboratory [online] 2010 [cit. 2012-09-29]. Available at: <<http://www.magnet.fsu.edu/education/tutorials/magnetacademy/mri/>>

³⁹ MORIN, C. Neuromarketing: The New Science of Consumer Behavior. # Springer Science+Business Media, LLC 2011

The overview of advantages and disadvantages of these three main techniques is showed in Figure 5.

Figure 5: Overview of advantages and disadvantages of different techniques

Technique	EEG	MEG	fMRI
What is measured	Electric fluctuations	Magnetic fluctuations	Changes in metabolism
Advantages/ disadvantages			
1. Potential risks for participants	++ non-invasive	++ non-invasive	++ non-invasive - claustrophobic anxiety - noise - no ferromagnetic implants
2. Temporal resolution	++ very good	++ very good	- limited
3. Spatial resolution	- limited	- limited	++ very good
4. Costs of data collection	++ very cost-efficient	- expensive	- expensive
5. Complexity of data analysis	- moderate to high complexity*	- moderate to high complexity*	- relatively high complexity

Notes: + and – indicate positive and negative features within in a row respectively; *dependant on research objective; simplified table

Source: Partly adapted from BAILLET, S.; MOSHER, J. C.; LEATHY, R. M. Electromagnetic Brain Mapping, IEEE Signal Processing Magazine, Vol.18, No 6, pp. 14-30, November 2001

2.3.4 Biometrics

Very often one of the previously mentioned methodologies is complemented with a measurement of secondary biometric variables, such as a heart rate, breathing, rate of winking or a body temperature. They measure emotional and cognitive reaction of the respondent to stimuli. These methods are not directly measuring processes inside human brain, but represent valuable tools for observing reactions and help support the hypothesis. They are included amongst neuromarketing techniques since they capture the subconscious reactions of the body which is not possible to influence by human will. However, apart from eye camera, they are rarely used as stand alone and are rather complement brain imaging methods because draw conclusions from some reaction can be quite tricky. Nevertheless, in the combination with traditional marketing research methodologies or in a connection with brain imaging techniques,

biometrics represents a very powerful tool which has a wide application. Comparing to brain imaging techniques, the usage of biometrics has a considerable advantage in its low price and easier and faster measurement and the evaluation of results. Moreover, they are more pleasant for respondents.⁴⁰

To the most used biometrics belong:

1. Eye tracking or eye camera⁴¹

Probably the most used biometrics; it measures attention, fixation and search. The output is a so called gaze map, a heat map and also the information about attention and time devoted to the stimuli. Vanessa Oshima in ESOMAR Asia Pacific conference⁴² summarized eye tracking key measures of visual equity as following:

- Attraction rate - The percentage of respondents that notice a specific element in the test scene during the viewing time.
- Speed of attraction – The percentage of respondents that saw the element within a given time frame.
- Re-examination rate – The percentage of respondents that return to the element for a second look.
- Duration of consideration – The length of time that a respondent remains involved with the element.

Particular importance was ascribed to the definition of a task and of a hypothesis before testing. The measured visual equity represents the ability of particular elements to attract attention and hold it for a period of time. These were documented as having a strong correlation to purchase intent.⁴³

2. GSR- Galvanic skin response⁴⁴

A purely auxiliary, however frequently used technique which was formerly used mainly as a lie detector. This methodology is based on the findings that skin

⁴⁰ Eye-Com Research. Top 6 biometrics in market research. [online] 2012 [cit. 2012-12-10] Available at: <<http://eyecomresearch.com/biometrics/6-top-biometrics-in-market-research/>>

⁴¹ REZLER, L.; OLCHAVOVÁ, D. Výzkum inzerce v časopisech – Oční kamera. 2010. Millward Brown. [online] [cit. 2012-12-10] Available at: <<http://www.webcasopisu.cz/priloha/4cea694cab19f/uv-inzerce-eyetracker-1210-fin-4d00c6557bd5d.pdf>>

⁴² ESOMAR is the organisation for encouraging, advancing and elevating market research worldwide

⁴³ OSHIMA, V. Are you being seen? Being visible in the cluttered marketing space of Asia. ESOMAR Issue: Asia Pacific Conference, Shanghai, March 2004. Source: Warc

⁴⁴ SUTHERLAND, M. Neuromarketing: What's it all about? from Advertising and the Mind of the Consumer [online] 2007 [cit. 2012-12-10] Available at: <http://www.sutherlandsurvey.com/Column_pages/Neuromarketing_whats_it_all_about.htm?>

conductivity changes according to the change of the emotional state of a measured person.

3. FMA- Facial movement analysis⁴⁵

It is the observation of emotional reactions based on facial movements. It measures both conscious and unconscious mimics, the intensity of the reaction and its development in the course of time.

Usually a mixture of more technologies, combining brain imaging with biometric is recommended and used in practice; for example one of the most famous neuromarketing agencies, NeuroFocus, applies the combination of EEG, eye tracking, and GSR⁴⁶. What is very important is the recommendation to subsequently conduct in-depth interviews, focus groups or questionnaires in order to confirm, compare and complement results.⁴⁷ The similar combination, called Bio/Qual, is for instance recommended by TNS (as depicted in Figure 6 on the next page).

2.3.1 Neuromarketing techniques on the Czech market

In the Czech Republic, there are five big international marketing research agencies: Ipsos Tambor, AC Nielsen, TNS Aisa, GfK Czech and Millward Brown. The majority of them use or claim to use neuromarketing pretty often. Apart from these five, there is CONFESS Research that is particularly specialized in neuromarketing and PHD that recently included so called neuroplanning among its offerings. Information stated below was gathered from official materials and websites of the companies, and should outline the techniques they are using. Information will be verified, compared and complemented in fourth chapter so that conclusion can be derived about the state of neuromarketing in the Czech Republic.

As for **Ipsos**, the official website does not provide any information on neuroscience research, thus we could suppose that its local neuromarketing activity remain rather in the workshops level only level. However, its international mother is already

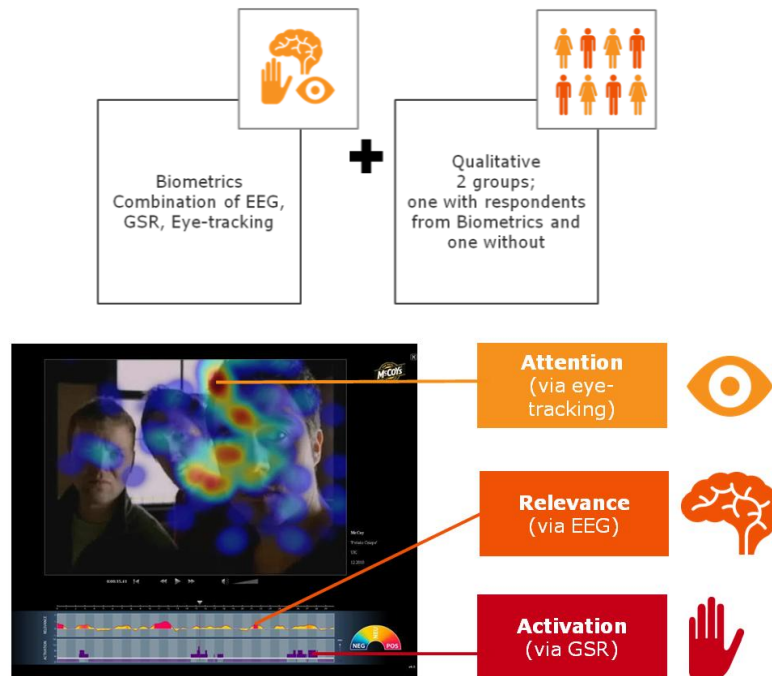
⁴⁵ MediaGuru. Co prozrazuje mimika tváře o úspěchu reklamy? [online] 2012 [cit. 2012-12-10] Available at: <<http://www.mediaguru.cz/2012/10/co-prozrazuje-mimika-tvare-o-uspechu-reklamy/#.UMxtaKzMMww>>

⁴⁶ NeuroFocus [online] 2012 [cit. 2012-09-30] Available at: <<http://www.neurofocus.com/in/neuromarketing.htm>>

⁴⁷ PAGE, G. Neuroscience: A New Perspective. Millward Brown: Point of View. [online] 2010 [cit. 2012-09-30] Available at: <<http://www.millwardbrown.com/Insights/PointsOfView/Default.aspx>>

taking further steps towards this research technique and gaining a considerable expertise.⁴⁸

Figure 6: BioQual combination recommended by TNS, illustration of what is measured by each tool



Source: BALANZÓ, C. B. Avoiding Science Fiction, Mind & Science. [online] Slideshare 2012 [cit. 2012-10-01] Available at: <http://www.slideshare.net/tnsuk/mrs-presentation-cristina-de-balanzo-bono-19-mar-2012>

TNS Aisa seems not to offer any neuromarketing techniques on the Czech market at the moment, although globally, they are building the expertise.

Nielsen does not appear to have launched any neuromarketing activities in the Czech Republic; however its parent company acquired NeuroFocus (already mentioned earlier) in 2011.

GfK Czech introduced neuromarketing in early 2011; using EEG methodology (Figure 7 from the website illustrates the band GfK uses), together with the eye camera, in-depth interviews, and a monitoring of mimics (FMA) and of body

⁴⁸ IPSOS.com. Ipsos Adds a New Mind to its Collective Brain Power [online] 2012 [cit. 2012-09-30] Available at: <http://www.ipsos-na.com/news-polls/pressrelease.aspx?id=5473>

language. They partner with US company EmSense that provide the expertise and case studies.⁴⁹

Similarly as GfK, also **Millward Brown** cooperates with EmSense Company and is using the EmBand technology, both on the global and local level, together with eye tracking and measuring of other secondary biometric variables.

Figure 7: A wireless band used for measuring brain activity



Source: GfK Neuromarketing [online] 2012 [cit. 2012-10-01] Available at: http://www.gfk.cz/public_relations/events/index.cz.html

CONFESS Research has probably the best explained and described what they are offering. Their methodology combines two methods of neuro research, **NEUROTRACE™** and **BIONavigator™**. Neurotrace™ uses GSR and EEG plus a standard questionnaire, whereas BIONavigator™ combines EEG with eye camera.

PHD is a media agency which recently conducted in the Czech market a unique experiment in collaboration with the Academy of science of Czech Republic. They used fMRI and based on the findings, a new expertise called neuroplanning was launched. Neuroplanning will be further mentioned and explained later in the thesis. Together with CONFESS Research, to the author their websites and information provided in various articles seems to be the most detailed and transparent.

2.4 Controversy

The issues with neuromarketing stand out from what has been already written. The author sees a potential division of controversial topics into three main areas:

⁴⁹ During the elaboration of the thesis, there have been revealed that EmSense went bankrupt (for instance DOOLEY, R. Neuromarketing. R.I.P. EmSense [online] 2012 [cit. 2012-10-01] Available at: <http://www.neurosciencemarketing.com/blog/articles/r-i-p-emsense.htm> >). Further information will be provided in the fourth chapter, based on findings from interviews.

- *Functioning of neuroscience techniques*
- *Practical usage*
- *Ethical questions*

2.4.1 Functioning of neuroscience techniques

Some critical aspects about neuromarketing techniques and neuroscience are still pretty much underexplored, which makes especially the academic sphere reluctant towards it. This issue also refers to the fact that not many academic papers or books are available that would be globally acknowledged. Between the most often reproached problematic belongs for instance the number of examined respondents. The usual number which on average amounts to 40 is very low according to both academics and corporations, and not even the recently released NeuroStandards, which were elaborated based on a robust research of 8 neuromarketing providers, multinational companies and scholars, provided a common agreement.⁵⁰ Other reproaches are directed to the actual usage, suitability and effectiveness of each of the methodologies, when the opinions vary across different sources of information. It seems that EEG is used and defended rather by commercial neuromarketers whereas fMRI technology is more preferred by academic neuroscientists even though also here appears to be first disagreements.⁵¹

2.4.2 Practical usage

A confidentiality of the results of neuroscience researches and mostly not publicly accessible list of references does not help neuromarketing which thus becomes very non transparent. A big issue is whether when comparing to the traditional marketing research methods, neuromarketing provides better effective and cost-efficiency solution. As for cost-efficiency, Graham Page, Millward Brown executive vice president of global solutions, said that in MB, they had been tackling whether there is enough incremental value to justify the costs for brainwave research for the past 4-5 years. In order to solve it, according to Millward Brown, there has to be yes at least to one of the following questions:

- 1. Does it provide something meaningful in its context?**
- 2. Does it tell me something I don't already know?**

⁵⁰ NeuroStandards Project White Paper. Oct. 2011 [online] 2012 [cit. 2012-10-05] Available at: <https://thearf-org-aux-assets.s3.amazonaws.com/research/NeuroStandards_WhitePaper_Oct262011_Pre-Production_Version.pdf>

⁵¹CALVART, G; BALANZÓ, C. B.; WATKINS, S. Opening the Black Box: An academic evaluation of the ability of EEG to predict advertising effectiveness. ESOMAR. Congress, Atlanta, Sept. 2012

3. Does it actually have behavioural consequences – in other words, is it a better predictor than traditional methods?⁵²

The most frequently mentioned barriers of using neuroscience methods are as follow:

- *Test environment*
 - Because of special equipment or a MRI tunnel anxiety levels can be raised and skew brain-wave responses to the stimulus subjects are viewing. Moreover, the specialized equipment and testing facilities cause companies to keep their sample sizes small.
- *Subjectivity*
 - Although neuroscience methods are deep in science, the interpretation of results can be still rather subjective. Furthermore, as mentioned before, neuroscience results can vary significantly from technique to technique, and from supplier to supplier.
- *Cost*
 - fMRI may cost thousands of dollars per subject, while EEG costs in the hundreds per subject, and both are still much more costly than traditional marketing research methods.⁵³

2.4.3 Ethical questions

And last but not least, there appear ethical questions which are asking whether by using neuromarketing, people are not being denied having their own free will. In this context, often mentioned is so called “buy button” or “magic spot” in the brain, which would manipulate consumers and make them buy what marketers desire. There are more answers to this concern; between them is first, that these worries are so far premature due to the technological impossibility to predict accurately consumer behaviour and manipulate it. In the second place, what is questioned is the nature and meaning of “free will”. The brain itself is a part of a human body and not something which stands apart, so even though the brain makes decision which is subconscious, an individual still acts based on his own decision. Furthermore, the person with his free will agrees to be monitored by neuroscience research techniques in the first place. Sometimes the issues of neuroscience research for tobacco companies, politically-related campaigns or for other non-desirable behaviour are

⁵² O'REGAN, R. How much value can Neuromarketing add to your consumer research. Marketing NPV. Vol. 5, Issue 3, 2009

⁵³ O'REGAN, R. How much value can Neuromarketing add to your consumer research. Marketing NPV. Vol. 5, Issue 3, 2009

raised up. For those reasons some of the neuromarketing companies have in their ethical guidelines explicitly prohibited to participate in this kind of research.⁵⁴

Another concern regarding neuromarketing and ethics comes down to the fact that it is still in its infancy and thus no clear, legally approved standards are available; making not only a broad public but also corporations displayed to what neuromarketing providers claim. Some countries, such as France in the beginning of the year 2012, have already taken precautions and till when there will be a more research on this topic, they banned or restricted the usage of neuroimaging techniques for commercial purposes.

To sum up, neuroscience techniques provide the most complete understanding when combined with traditional marketing research techniques and when used at the right time. Advertising Research Foundation confirmed its optimism for neuroscience research applied to marketing and advertising; however, it did not provide any guidelines. It agreed on a potential neuromarketing have and especially will have in future, but also admitted that no tangible sufficient results are available.⁵⁵

⁵⁴ HERINK, O. GfK: Při nákupu se chovám jako láčkovec. E15, Strategie.cz [online] 2012 [cit. 2012-10-01] Available at: <<http://strategie.e15.cz/rozhovor/ondrej-herink-gfk-pri-nakupu-se-chovam-jako-lackovec-526138>>

⁵⁵ BAROCCI, R. The ARF NeuroStandards Collaboration Project: The Beginnings of a Landmark Journey. NeuroStandards Project White Paper. October, 2011 [online] 2012 [cit. 2012-10-05] Available at: <https://thearf-org-aux-assets.s3.amazonaws.com/research/NeuroStandards_WhitePaper_Oct262011_Pre-Production_Version.pdf>

3. MARKETING PROCESS

The aim of this chapter is to introduce the main theoretical marketing concepts and models in order to understand the framework within which neuromarketing operates and also to see the implications that findings from neuroscience research mean for these models. In the beginning, marketing mix both in its classical form as well as the modern one will be reminded, followed by more profound look into a new product development. Since neuromarketing serves as one of the marketing research methodologies, closer attention will be also devoted to them. In the following chapter, based on these theoretical starting points, a conceptualization of neuromarketing can be subsequently suggested.

3.1 Marketing mix

This basic concept of marketing theory serves as a business tool to marketing professionals all around the world. The planned mix of the controllable elements of a product's marketing plan originally included 4 P's⁵⁶, each P with different attributes (see Figure 8 on the next page):

- *Product*- it is the thing which a seller wants to sell in the market. The product mix includes following items:
 - Product assortment/range
 - Packaging
 - Design
 - Brand
 - Logo
 - Services which are linked to the product

These items can be divided into 3 dimensions⁵⁷: basic characteristics of the product (physical characteristics, quality etc.), services connected to the

⁵⁶ KOTLER, P.; ARMSTRONG, G. Marketing: An Introduction. 9th ed. New Jersey: Prentice Hall. 2009, pp. 70

⁵⁷ MACHKOVÁ, H.; KRÁL, P.; LHOTÁKOVÁ, M.: International Marketing. Oeconomica 2010. 200 p. ISBN 9788024516431

product, and symbolic values (such as perception of the consumers and image).

- *Price*- the price of the product set by the seller. It is the amount of money that customers have to pay to obtain the product. There are many different strategies of how to set a price, such as penetration pricing strategy or premium pricing strategy.⁵⁸
- *Placement*- a strategy of how to deliver products to the consumers at the right time and to the right place. There are many channels of distribution which vary in character. It is the least flexible part of marketing mix.⁵⁹
- *Promotion*- means of communication by which company communicates benefits of its products and tries to persuade consumers to buy them. Promotion consists of elements such as sales promotion, advertising or PR.

Figure 8: Marketing mix and 4P's model



Source: Freely adapted from KOTLER, P.; KELLER, K.; ANG, S. H.; LEONG, S.M.; TAN, C. T. Marketing Management: An Asian Perspective (5th edition). 2009. ISBN-13 : 9789810679934

⁵⁸ KOTLER, P.; ARMSTRONG, G. Marketing: An Introduction. 9th ed. New Jersey: Prentice Hall. 2009, pp. 71

⁵⁹ MACHKOVÁ, H.; KRÁL, P.; LHOTÁKOVÁ, M.: International Marketing. Oeconomica 2010. 200 p. ISBN 9788024516431

As an enhancement to classical 4P model **7P's model** is sometimes mentioned in which to already above described 4P's are added another three P's. They are:

- *Physical evidence*
- *People*
- *Process*

Physical evidence is all about the store and visual appearance within it; People element introduces the human touch of the organization – its employees who interact with customers; Process refers to all the processes within the organization which impact marketing. However, this model is applied to services and not to products, and thus is not used that often.

Particularly for the purpose of the thesis, an alternative, **customer-centric model** as opposed to the product-centric approach needs to be also introduced. Consumer-centric approach sees marketing mix from the point of view of the customer and might help modern organisations to compete and win over their competitors. This view can be seen as challenging the traditional 4P. This approach includes **4C's model**⁶⁰:

- *Consumer wants and needs* (instead of Product) – shift the importance from the product to the consumer wishes and desires
- *Cost to the consumer* (instead of Price) – it is not limited only to the price explicitly stated on the product, but also takes into account implicit costs such as switching costs for consumer or opportunity costs
- *Convenience* (instead of Place) – also due to the increasingly used Internet coverage the place is becoming less relevant and the overall convenience is what matters, including things such as finding information beforehand etc.
- *Communication* (instead of Promotion) – as a broader version of Promotion, this approach includes all forms of communication between an organization and its customers

There exists also another version of 4C proposed by Shimizu (*Commodity, Cost, Communication, Channel*), which was later expanded into so called **7C's compass model** that on top of previously mentioned 4C's encompasses other three elements: *Corporation, Consumer, Circumstances*.⁶¹ Nevertheless, for the goal of the thesis, the classical 4P and Lauterborn 4C models will be used and therefore, it is not necessary to elaborate on other models which moreover have not reached a common academic acknowledgement. What is important is the shift of thinking from market

⁶⁰ LAUTERBORN, B. (1990) New marketing litany: four Ps passe: C-words take over. Advertising age. Vol. 61, No. 41, pp. 26

⁶¹ SOLIS, B. Engage: The Complete Guide for Brands and Businesses to Build, Cultivate, and Measure Success in the New Web. 2011. John Wiley & Sons, Inc. pp.201-202

centric point of view on marketing to consumer-centric models. This stream of scholarship has been having a great influence on the approach to strategic planning and marketing in general, and has been a starting point for the thesis since neuromarketing is based on deep understanding of consumer's behaviour and attitudes. It can be defined as:

*"...the discipline of capturing and deploying consumer insights to enhance marketing effectiveness and better serve those consumers that are brand's best prospects."*⁶²

CCM enables the manufacturers to understand what it is that consumers want; the motivations, habits, attitudes and values of consumers that creates the opinion and perception of the products they are offering. It can be viewed as a three-step process:⁶³

1. Gathering sufficient and relevant data and information about and from the individual customers
2. Usage of the information in order to keep and effectively target the current customers
3. Use the information to increase relevance for the consumers by implementing their opinion into innovation, customization and personalization

3.2 Theory of New product development

To expand probably the most important part of the marketing mix, **product**, the field of innovations or a new product development (NPD) will be introduced in this subchapter since it is especially interesting for neuromarketing. It is so for two reasons: first, because NPD can be a perilous business given around 90 % of newly introduced products fail⁶⁴, mainly because of poor design, wrong positioning, and bad timing, pricing or advertising.⁶⁵ Second and relating reason is that consumers may have a significant impact on the product development process.

⁶² MANEY, R ; FLINK, C. ; LIETZ, C. White paper on Consumer centric marketing How leading consumer packaged goods companies are transforming the way they market. [online] 2002 [cit. 2012-10-01] Available at: <<http://www.oocities.org/infobetastudio/doc/ConsumerCentric.pdf>>

⁶³ BULHALIS, D.; COSTA, C. Tourism Management Dynamics. 2006. Elsevier Ltd. ISBN: 0750663782

⁶⁴ KOTLER, P.; ARMSTRONG, G. Marketing: An Introduction. 9th ed. New Jersey: Prentice Hall. 2009, pp. 265

⁶⁵ BAKER, M.; HART, S. The Marketing Book. 2008: 2007. 6th, 5th ed. London: Butterworth-Heinemann.pp.260

In order to accommodate the neuromarketing potential throughout the NPD process, the descriptive framework needs to be chosen. For the purpose of the thesis, the NPD model by Booz, Allen and Hamilton has been selected (see Figure 9). Other considered frameworks contain similar stages; however, a number of them vary.

Figure 9: New product development model by Booz, Allen and Hamilton

Booz, Allen and Hamilton NPD Model						
Idea generation	Idea screening	Concept development & testing	Business analysis	Product development & testing	Test marketing	Launch

Source: Adapted from BAKER, M.; HART, S. The Marketing Book. 2008: 2007. 6th, 5th ed. London: Butterworth-Heinemann. pp. 261

This model begins the process of NPD with Idea generation when ideas are gathered both from within and outside the company. During the second stage, Idea screening, the purpose is to verify and get rid of ideas with insufficient potential. In the third stage, onward concepts are being further developed and tested from both the marketing and engineering point of view. Next stage, Business Analysis, assess possibilities about sales, prices, profitability and so on. In Product development & testing, customers are being introduced to prototypes and together with following stage, testing is conducted. Eventually, in the launch stage, the product is launched to the market.

It has been academically acknowledged that the customer role throughout the NPD process is significant and may impact hugely the success of the products. As stated above, one element of the 4C's model according to customer-centric approach represent **consumers' wants and needs**, and new products should respond precisely to them and represent a solution they desire. Therefore, getting consumer insights right from the beginning and implementing them during the NPD process proves to be crucial.⁶⁶

3.3 Models of communications

This subchapter looks briefly into another part of marketing mix- **communication**. In order to ensure effective communication and to help understand how it works,

⁶⁶ KOTLER, P.; KELLER, K.L. Marketing Management. 12th ed. 2006. New Jersey: Prentice Hall

communication/advertising models were developed. They should help marketers to be aware of how communication messages get through and how customers react to them. Few of the models are already quite old, for instance AIDA model dates already to 1880s, however, various organizations and researchers still base their thinking on it. Some of the most typical and quoted models are:

AIDA: *Attention, Interest, Desire, Action*

STARCH: *See, Read, Remember, Act upon*

DAGMAR: *Awareness, Comprehension, Conviction, Action*⁶⁷

AIETA: *Awareness, Interest, Evaluation, Trial, Adoption*

These models are based on three stages of buying behaviour of consumers (see Figure 10). The three stages are⁶⁸:

- **Cognitive stage**- the exposure of a product to a customer; knowledge and cognition part
- **Affective stage**- this stage deals with the emotions and attitudes
- **Behaviour stage**- stage when the consumer acts upon the communication, the actual behaviour

Figure 10: Cognitive, Affective and Behaviour stage of consumer behaviour



Source: KOTLER, P.; ARMSTRONG, G.; SAUNDERS, J., WONG, V. Principles of Marketing. Essex: Pearson. 2001

These models are based on the old paradigm that we first think then feel and eventually do. They assume that consumers are rather passive receivers and that communication moves consumers through a linear sequence of more or less conscious mental processes before they actually buy something. Nevertheless, findings from recent researches and particularly from neuroscience are proving that these assumptions are not necessarily correct and that human mind works differently, when irrational decisions are made and explained by post-rationalization. We feel, then we do and then we think if it is necessary– with emotions underpinning and integrated with our thoughts.⁶⁹

⁶⁷ Abbreviation is derived from the study called „Defining Advertising Goals for Measured Advertising Results“ proposed by Russell H. Coney in 1961

⁶⁸ KITCHEN, P. The Marketing Communications revolution. A Leviathan Unveiled? Marketing Intelligence & Planning, Vol 7, 1994. nr. 2, p. 19-25, MCB University Press Unlimited

⁶⁹ BARDEN, P. The appliance of neuromarketing. Marketing research Society Annual Conference, 2011

3.4 Marketing research

Are there enough people on the market who would like to buy our new product? What do consumers think about our brand? Is this consumer need we are addressing really bothering our consumers? These are just a few examples of the thousand question marketing professionals ask themselves every day and response to them is not possible to get from anywhere else than from marketing research.

According to Kotler (2009)⁷⁰, marketing research is:

“a function that connects consumers, customers and public with the company via information which are used for identification and definition of marketing opportunities and problems, creation, improvement and evaluation of marketing activities, monitoring of marketing performance and better understanding of marketing process.”

The origins of consumer marketing research as a field of statistical science go back to 1923 when Arthur Nielsen established the ACNielsen Company.^{71 72} Since then the methodologies undertook quite a big development but the ultimate goal of marketing research remains the same: to identify and evaluate how changing elements of marketing mix influences consumer behaviour and provide management with relevant, accurate, reliable, valid, and current information.⁷³ The majority of bigger companies carry their marketing research via specialized marketing research companies.

The number of marketing research phases differs according to individual authors, for instance according to Malhotra⁷⁴ there are six key steps in marketing research process which are relevant for all research studies:

⁷⁰ KOTLER, P.; ARMSTRONG, G. Marketing: An Introduction. 9th ed., New Jersey: Prentice Hall. 2009, pp. 406-7

⁷¹ GILLESPIE, M. Nielsen makes viewers count by watching them watch TV. Chicago Sun- Time April 9, 1989

⁷² The Nielsen Company [online] 2012 [cit. 2012-10-01] Available at: <<http://nielsen.com/us/en/about-us.html>>

⁷³ MCDONALD, M. Marketing plans. 6th ed., Oxford, England: Butterworth-Heinemann. 2007 ISBN 978-0-7506-8386-9

⁷⁴ MALHOTRA, N. Marketing Research: An Applied Orientation. 5th ed., Upper Saddle River: Prentice Hall. 2006, ISBN 0-13-222117-9

1. Problem definition and formulation of exact goals of the research

- Setting up a marketing team, definition and formulation of company problems, setting the objectives of the research and ensuring that the objective is feasible, achievable and commercially worthwhile

2. Developing an approach to the problem

- Determination of necessary resources, expertise and timing
- According to the goal determination, a type of research is chosen:
 - **Informative (explorative) research** in order to get preliminary information to suggest hypothesis
 - **Descriptive research** to better describe marketing environment, customers and their needs and suggest solution
 - **Causal research** to test hypothesis of reasons and consequences ⁷⁵
- Quantitative or qualitative approach is subsequently taken

3. Research design formulation

- Specification of what information are needed to be acquired and how to process them
- Setting up of the project of the research which should include an overview of existing data sources (secondary data), detailed explanation of the specific procedures, methodologies and tools used, sample preparation, and budget costs for implementation of the research

4. Field work

- Administration of questionnaires or of other used methodologies; decision about the responsible person and required resources

5. Data preparation and analysis

- Data are processed and analyzed, having client's needs and the goals of the research in mind
- The project implementation should be supervised closely by experienced researcher to ensure the correctness of the process

6. Report generation and presentation of the findings

- Marketing team formulates processed data into a final report which is submitted to a company management

⁷⁵ KOTLER, P.; ARMSTRONG, G. Marketing: An Introduction. 9th ed., New Jersey: Prentice Hall. 2009, pp. 406-7

Concerning used methodologies, there is a great variety ranging from the most sophisticated and expensive ones such as neuroscience techniques to the simple and practically free online questionnaires. The most often division exists between quantitative and qualitative methodologies.⁷⁶

- **Qualitative research**

- Informative research which is used to find out motivation, attitude and behaviour of consumers. It is usually used for informative purposes, with a small number of respondents and thus not possible to be generalized to the whole population. It includes for instance focus groups, in-depth interviews and projective techniques.

- **Quantitative research**

- Gathers data from a wide number of consumers so that statistical analysis may be delivered. It is typically applied to draw conclusions by testing a particular hypothesis. It includes a large number of respondents; the most common methods include surveys and questionnaires.

Kotler distinguishes also between **questionnaires** and **mechanical devices**.⁷⁷ Recently emerging methodologies such as online questionnaires and eye cameras are provoking discussions among academics, and neuroscience techniques belong definitely among the most discussed ones. Kotler ranks them among the mechanical devices used for qualitative research, nevertheless, views on this issue are fundamentally different among various authors. This topic will be further developed after the introduction of the cases and the interviews.

⁷⁶ KOTLER, P.; ARMSTRONG, G. Marketing: An Introduction. 9th ed., New Jersey: Prentice Hall. 2009, pp. 406-7

⁷⁷ KOTLER, P.; ARMSTRONG, G. Marketing: An Introduction. 9th ed., New Jersey: Prentice Hall. 2009, pp. 406-7

4. USAGE OF NEUROMARKETING IN THE MARKETING PROCESS

4.1 Cases

In this chapter, several cases of neuroscience research techniques applied across marketing process will be described. Generally, case study approach is acknowledged for its ability to provide overall picture of the studied problem.⁷⁸ A wide variety of sources of information for each case will be used in order to gather more data on a given case and thus verify provided data. Since from its definition neuromarketing tends to embrace rather profitable and corporate goals, also the majority of selected cases come from the business environment with real business impact. As a matter of fact, there are various academic and professional studies investigating theoretical possibilities of the neuroscience research application, for instance the research group of Handy and colleagues who were looking into brain processing everyday images such as advertising logos.⁷⁹ These studies will be used to complement cases from the scientific point of view given that more technical details are often omitted from the cases, but the author wants to show the practical and not only theoretical usage. Nevertheless, it has to be kept in mind that first, real business results are unfortunately rarely revealed, and second, even if they are made public, it is almost impossible to evaluate the effect from neuromarketing actions and clean the result from other influences and combined methods.

It is important here to remind the purpose of the thesis to prevent confusion of what is expected from the case studies. The cases will serve to map the practical usage of neuromarketing in order to help with the conceptualization of neuromarketing application. The interviews in the following subchapter will assess the offer of neuroscience research on the Czech market and help to build the holistic picture of neuromarketing and its possible application in the Czech Republic.

⁷⁸ YIN, R. Case Study Research: Design and Methods. 1st, 2nd, 3rd ed. London: Sage. 2009, 2003, 1984. pp 14

⁷⁹ HANDY, T., C. ; SMILEK, D.; GEIGER, L.; LIU, C.; SCHOOLER, J., W. ERP evidence for rapid hedonic evaluation of logos. Journal of Cognitive Neuroscience, vol. 22, no. 1, 2010. pp. 124–138

4.1.1 Communication

Probably the largest part of all studies and cases about application of neuroscience to marketing is devoted to advertising and different parts of communication mix. That is also the reason why the biggest attention will be given to this part and why there is a division into individual sub-chapters.

A. ADVERTISING

Creation of superior advertising^{80 81 82}

When asked what you like and dislike about eating chips, very few people would mention the dust that remains on fingers. And those few would say it annoys them. And yet, it is the thing that people unconsciously enjoy. When NeuroFocus was asked to have a closer look on Cheetos, a famous American brand of cheese chips, they have confirmed exactly this information. It would probably never be confirmed by traditional questionnaires, simply because people do not consciously realize how important for them this sensorial experience is. Frito-Lay, the company owning Cheetos brand, used these findings as a must have in its advertising. But this was not the only role of neuromarketing in this case. When the concept of campaign was tested by traditional methods, it failed, whereas via the neuromarketing testing, marketers confirmed what people denied for various reasons to tell them in the traditional research. The campaign was a success in terms of business objective and even received the Grand Ogilvy award for advertising research.

Cheetos was always targeted partially to kids, who enjoyed a somehow mischievous funny character of the main protagonist, Chester Cheetah. But since in 2007 Pepsico/ Frito-Lay signed voluntarily the petition against promoting unhealthy snacks to kids, the company was facing a new challenge- retarget the brand to adult audience after 60 years of a successful growth of the brand which kids loved.

The research objectives were defined as:

1. Identification of an “adult” target consumer
2. Investigation of his consumption experience with Cheetos

⁸⁰ THE ARF- David Ogilvy Awards, Case study of Grand Ogilvy winner 2009. Mischievous fun with Cheetos.

⁸¹ BURKITT, L. Neuromarketing: Companies Use Neuroscience for Consumer Insights. Forbes Magazine [online] 2009 [cit. 2012-10-30] Available at: <<http://www.forbes.com/forbes/2009/1116/marketing-hyundai-neurofocus-brain-waves-battle-for-the-brain.html>>

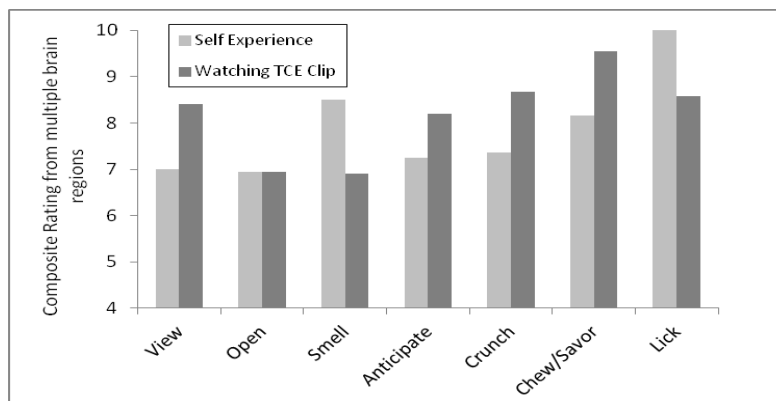
⁸² PENENBERG, A. L. NeuroFocus Uses Neuromarketing To Hack Your Brain. Fast Company [online] 2011 [cit. 2012-10-30] Available at: <<http://www.fastcompany.com/1769238/neurofocus-uses-neuromarketing-hack-your-brain>>

3. Understanding and leveraging those features overlapping between new and old target groups in order to sustain current brand equities
4. Development and evaluation of new messaging for the adult target

A variety of different marketing research techniques was used, both qualitative and quantitative approach was taken, and secondary and primary data were examined. New methodologies were also used including neuromarketing, ZMET (Zaltman Metaphor Elicitation Technique) study and cultural trends study. Neuromarketing, namely EEG in a combination with facial coding, was used in two ways, helping with research objectives number 2 and 4.

With the help of a traditional research, significant moments of the Cheetos consumption experience were identified. The tricky question was which item of consumption (such as smell, cheesy taste, fingers licking part or the crunch) should be pointed out in the advertising because even the biggest brand lovers could not answer the question. Interestingly, the experience differed based on whether a person was eating Cheetos himself (herself) or watching someone else eating it (in the spot). EEG was used to measure brain responses (results shown in Figure 11) and based on the results finger-licking was identified as a ‘must have’ in brand communications.

Figure 11: The Cheetos Total Consumption Experience (Consuming vs. Observing)



Source: Adapted from THE ARF- David Ogilvy Awards, Case study of Grand Ogilvy winner 2009. Mischievous fun with Cheetos.

The second part where neuromarketing played role was a development and the testing of new messages. Participants in the traditional focus group did not want to seem mischievous or malicious and declined the positive emotions when watching the ad, however by EEG tests researchers discovered positive emotions when a pack of these chips were put on the table and consumers actually started eating it. Derived from the research, the campaign was prepared with the main target of ‘Rejuveniles’ – the new adult target- and the Big Idea of “Bend the Rules with Mischievous Fun”.

Moreover, when the post-testing was conducted, positive responses to the ads measured by facial coding were considerably higher (86 %) than self-reported responses (78 %). Respondents simply liked the spots more but were reluctant to admit it.

The campaign brought results in terms of both brand equity and sales. Cheetos was ranked as the 41st best regarded brand among top snacks in the Research International Brand Health Tracker in 2007 and in 2008 it moved up considerable seven spots to 34th place. This was mainly achieved by improving the position within households without children- adults. According to IRI, sales doubled the expected goal of 6, 4 % and increased by 11, 3 %.

Evaluation of advertising pre and post tests

The second case comes from the Czech environment. The ability of EEG to measure brain processes on a second-by-second basis was used at the pre-testing stage to identify salient periods and the potential effectiveness of different treatments within the narrative.

For its client Amundsen, together with its advertising agency Ogilvy & Mather, CONFESS Research prepared the whole range of measures in order to identify the effectiveness of the TV spot and a gap for improvement. The so called full circle of measures that was employed is depicted in Figure 12 on the next page.

Key measures of ad effectiveness were defined as follows:

The following part has been hidden due to confidentiality reasons.

Figure 12: Biometric TV ad test of Amundsen TV commercial, research summary

The following part has been hidden due to confidentiality reasons.

Figure 13: Motion player depicting a) primary measures of Engagement (EEG) and Activation (GSR) and b) secondary measure of Fun and Genuine & Social smile (EMG)

The following part has been hidden due to confidentiality reasons.

The following part has been hidden due to confidentiality reasons.

B. PRINT

The following part has been hidden due to confidentiality reasons.

The following part has been hidden due to confidentiality reasons.

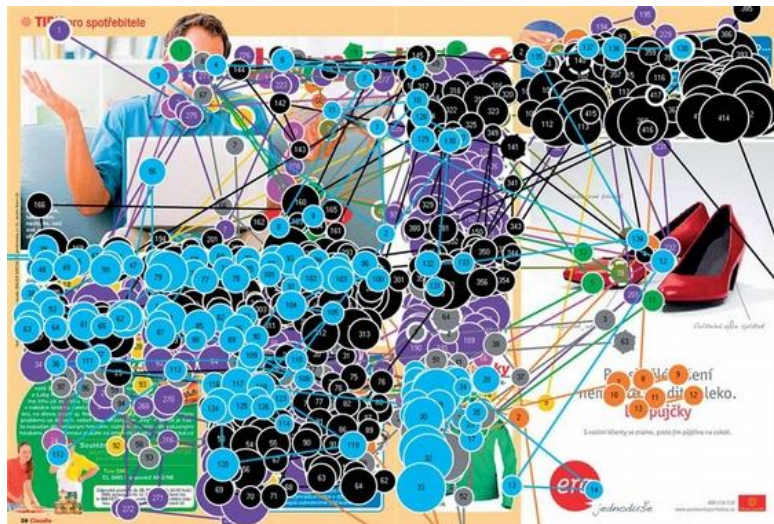
Figure 15: Released print ad



Source: Indulgy.com [online] 2012 [cit. 2012-10-30] Available at:
<<http://indulgy.com/post/8Q6FmdJUK1/nespresso-what-else>>

Millward Brown Czech Republic conducted a study about print advertising in which they with the help of eye camera identified various aspects of what makes print ads successful. In a personal interview, which can be found in the following sub chapter, they confirmed a frequent application of eye camera in order to evaluate and improve print campaigns; however, they could not share any of the cases. The potential of the secondary biometrics measures is illustrated in the Figure 16 which depicts how eye camera monitored the attention paid to the article and to the print ad in a magazine.

Figure 16: Study about print advertising and ERA case



Source: Firefly Millward Brown, CS Senior Research Executive. Časopisecká inzerce pod drobnohledem neuroscience. Strategie e15. [online] 2011 [cit. 2012-10-30] Available at:
<<http://strategie.e15.cz/special/casopisecka-inzerce-pod-drobnohledem-neuroscience-494615>>

The image, coming from the above mentioned study, describes how a very dominant symbol of the campaign for Poštovní spořitelna and its ERA products- a red woman

shoe- attracts the attention but it is not immediately linked to the category and thus does not motivate a reader to find out more about the product.⁸⁴

C. MEDIA & PR

The area of media and potentially PR is studied and developed by a new branch of neuromarketing– **neuroplanning**. Neuroplanning is a methodology of optimization of media (communication) campaigns based on findings from the latest research from neurology, psychology and marketing areas.⁸⁵ It should help clients to choose the best platforms for their advertising and theoretically, it should also recommend how to make **product placement and sponsorship** more efficient.⁸⁶

To illustrate a possible application of neuromarketing in the media practice, a case from a big cable network from US is very briefly described although without sufficient details. A&E Television Networks is one of the most successful cable networks and its show “Intervention” celebrated huge success in terms of number of viewers and fans who were adults between 18 and 54 years. They hired NeuroFocus in order to define the impact of the highly emotional show on the perception of advertising spots run during the show. EEG sensors, eye tracking and a measuring of deep subconscious responses were used to assess two key issues:

1. Determine the levels of viewers’ emotional engagement with the show and the impact of that engagement on the effectiveness of commercials run during the programme
2. Verify how well the show’s content prime this advertising for effectiveness

Commercials from various industries were tested both within the show and within a similarly popular, dramatic and highly rated show run by a competitor network to enable a comparison of viewers’s responses. Without any exact provided numbers the results were as follows:

Program Content:

- Overall Effectiveness: Intervention scored considerably higher than the competitive drama, and this score remained at this consistently high level throughout, while the competitive drama declined in the second half

⁸⁴ Firefly Millward Brown, CS Senior Research Executive. Časopisecká inzerce pod drobnohledem neuroscience. Strategie e15. [online] 2011 [cit. 2012-10-30] Available at: <<http://strategie.e15.cz/special/casopisecka-inzerce-pod-drobnohledem-neuroscience-494615>>

⁸⁵ PHD Network. [online] 2010 [cit. 2012-10-30] Available at: <<http://www.phdnetwork.cz/neuroplanning/>>

⁸⁶ NeuroFocus. [online] 2012 [cit. 2012-10-30] Available at: <<http://www.neurofocus.com/entertainment.htm>>

- Emotional Engagement: Intervention won by far in this category

Advertising:

- Overall Effectiveness: Three of six commercials scored considerably higher in Intervention than in the competitive programme. The other three scored practically the same in both shows.
- Emotional Engagement: Intervention scored highest in each of six advertising categories.

Given the priming effect of the programme content on the commercials and the fact that emotional engagement can be predictive of purchase or viewing intent, the author believes that the findings from the research would provide the A&E with powerful arguments to charge premium for advertising space within the show.⁸⁷

In the Czech Republic, the media research agencyPHD has recently conducted a unique research together with the Academy of Science of the Czech Republic when individuals were tested by fMRI while watching different types of programmes.⁸⁸ This research was outstanding in the Czech environment both for its scientific background and exceptional testing by fMRI, which is otherwise almost impossible to conduct for commercial goals, and will be described in the interview sub-chapter together with its implications for the application of neuroscience research on media planning.

D. DIRECT MAIL

Similarly as with the print advertising, also direct mail as one of the components of communication mix may be tested by neuroscience research techniques. There have been various researches using neuroscience methods for studying direct mails and paper ads in general. For instance, a study by Millward Brown for UK Royal Mail confirmed that our brains process paper-based and digital media in different ways. By fMRI testing was observed that paper advertising causes more emotional impact and that physical media in general leave deeper footprint in the brain. It is also better connected to memory because it engages with its spatial memory networks.⁸⁹

⁸⁷ NeuroFocus Case study. Neurological Testing of A&E Advertising Effectiveness [online] 2011 [cit. 2012-10-30] Available at: <http://www.neurofocus.com/pdfs/NeuroFocusCaseStudy_AnE.pdf>

⁸⁸ Pioneering Research in Czech Republic. Neuromarketing Theory and Practice journal. [online] 2011 [cit. 2012-10-30] Available at: <<http://www.phdnetwork.cz/wp-content/uploads/2012/08/Pioneering-Research.jpg>>

⁸⁹ Millward Brown Case study: Using Neuroscience to Understand the Role of Direct Mail [online] 2009 [cit. 2012-10-30] Available at: <<http://www.millwardbrown.com/Insights/CaseStudies/NeuroscienceDirectMail.aspx>>

Pohlmann in his presentation about how marketers apply neuromarketing knowledge for marketplace success⁹⁰ said that brainwave activity measurements together with eye-tracking could show consumer responses to every static image as well as each page in the direct mail material. Direct mail was claimed to be a fantastic test scenario for its immediate feedback and the allowance for testing, confirming and fine-tuning of hypotheses otherwise not always possible with other advertising media. Based on these studies and a lack of other real case studies, the author assumes that the application of neuroscience to this commercial purpose will limit itself rather to the eye camera only.

E. ONLINE

There has not been detected any usage of brain imaging methods for online advertising and websites. On the other hand, a testing of websites and online ads by a measurement of secondary biometrics and particularly by eye camera seems to be quite common on a global as well as on a local level. The testing has various purposes:

- A complete evaluation of web pages and its user friendliness and user experience
- Specific recommendation in order to increase its effectiveness
- An analysis of users' behaviour completing a given task (a search for something, ordering, registering, understanding etc.). Analysis of the duration of the task.

Sometimes so called A/B testing is conducted, when a user is presented with two variants of online advertising or a website design in order to choose more effective one.⁹¹

The following case may serve as the illustration of usage of eye camera for a website optimization. The case describes very precisely the methodology and shows the results of testing even though the results of applied changes are not explicitly stated.

⁹⁰ POHLMANN, A. The Brain Makes Behavior: How Top Marketers Are Applying Neuromarketing Knowledge for Marketplace Success in O'CONNELL, B; WALDEN, S.; POHLMANN A. Marketing and Neuroscience- What Drives Customer Decisions? A White Paper Based on the American Marketing Association's Virtual Event Marketing and Neuroscience: What Drives Customer Decisions? [online]. 2011 [cit. 2012-10-30] Available at: <http://www1.uni-hamburg.de/ami/lehre/Veranstaltungen/WS_1112/Psychophys_Methoden/AMA_Neuromarketing_2011.pdf>

⁹¹ Dobrý web. Jak funguje oční kamera. [online] 2012 [cit. 2012-10-30] Available at: <<http://www.dobryweb.cz/jak-funguje-ocni-kamera>>

From further electronic sources the usage of eye camera for this type of testing seems to be rather frequent.⁹²

Měšec.cz is a server giving advice about personal finance. In 2009, it had 20 000 visits per day. It wanted to examine the following aspects of the website:

- A graphical solution
- A visibility of present online advertising
- An understanding of a current navigation system
- User friendliness across the website

In order to do so, a website consulting agency Dobrý web⁹³ together with QuickINSIGHT consulting agency⁹⁴ providing the expertise with eye tracking were hired. Twelve testers each one being tested for 15 minutes by eye camera and then another 15 minutes wireframes⁹⁵ testing were conducted. Methodology of so called “think aloud” was employed when a respondent thinks aloud and then comments on his/her behaviour. In-depth interviews followed to help with the interpretation of the results. According to this methodology, which is called PEEP- post experience eye tracked protocol, respondents are made browse through the website via a monitor equipped with the eye camera which looks like a classical desktop computer screen, without the interference of a moderator. Subsequently, together with the moderator they interpreted their own behaviour and the results from the eye camera.⁹⁶ In Figure 17a a clear difference between a simple browsing without a determined task and fulfilling a task is visible. Moreover, the presence of the task influenced whether or not the online banner was noticed, and this finding had the implications for its placement. Concerning online banners, one of the recommendations was to remove them from the middle of one of the subpages, because users tended to ignore the lower part of the website due to the artificial border caused by them (Figure 17b).

⁹² CONSTAT Research Youtube account. For instance cases of: ČSOB credit account testing, LG website testing, Proton website testing. [online] 2012 [cit. 2012-10-30] Available at: <<http://www.youtube.com/user/ConstatResearch?feature=watch>>

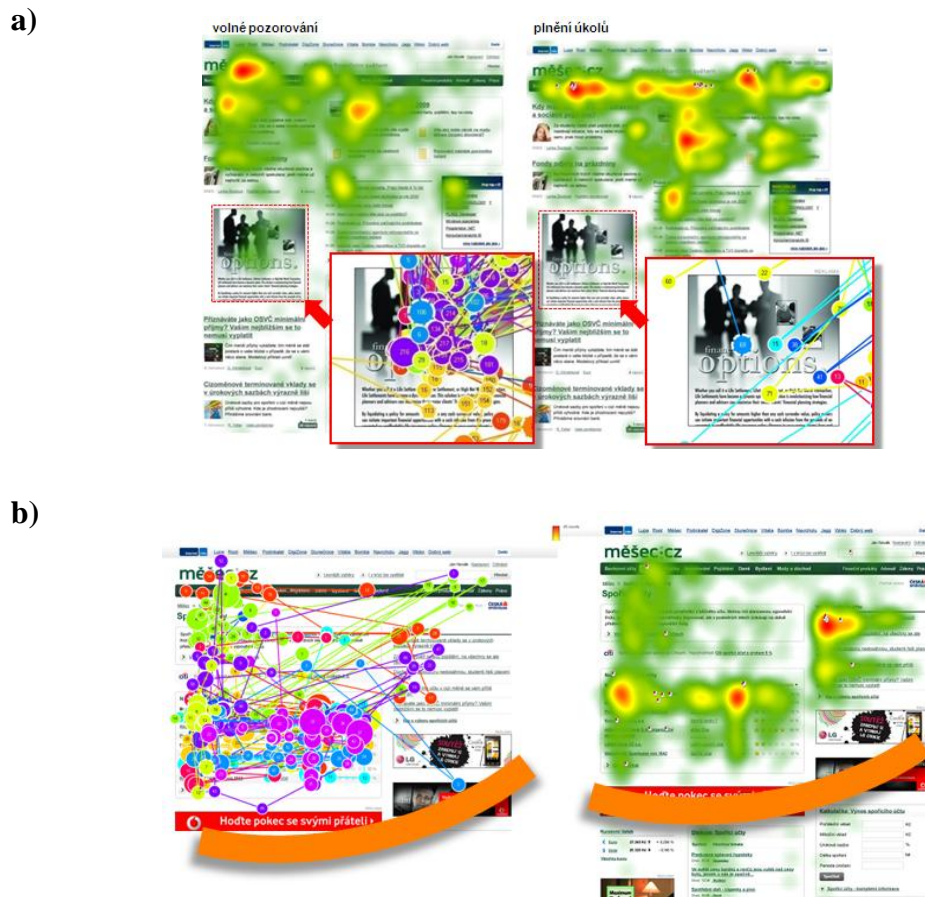
⁹³ Dobrý web. [online] 2012 [cit. 2012-10-30] Available at: <<http://www.dobryweb.cz>>

⁹⁴ QuickINSIGHT. [online] 2008-2011 [cit. 2012-10-30] Available at: <<http://www.eyetracker.cz>>

⁹⁵ Wireframe is a visual scheme which represents a skeletal framework of a website

⁹⁶ BLAHA, T.; FENDRYCH, A. World Usability Day (WUD) 2009: Co prozradí oční kamera a jak testovat wireframy webu [online] Slideshare 2012 [cit. 2012-10-30] Available at: <<http://www.slideshare.net/dobryweb/wud-2009-co-prozrad-on-kamera-a-jak-testovat-wireframy-webu-2492788>>

Figure 17: Heat map – a map of attention with and without a task on the homepage of Měšec.cz and artificial border created by a presence of the banners



Source: BLAHA, T.; FENDRYCH, A. World Usability Day (WUD) 2009: Co prozradí oční kamera a jak testovat wireframy webu [online] Slideshare 2012 [cit. 2012-10-30] Available at: <<http://www.slideshare.net/dobryweb/wud-2009-co-prozrad-on-kamera-a-jak-testovat-wireframy-webu-2492788>>

4.1.2 Consumer wants and needs

This part involves many areas potentially interesting for neuromarketing testing. The author came across several more or less detailed case studies embracing all three product dimensions mentioned in the theoretical part. The most common tested areas seem to be a brand building and positioning, which includes the first and among the experts probably the most quoted case study called “Pepsi Challenge”, a new product development, and a packaging.

A. BRAND

Branding effect^{97 98}

One of the first experiments with neuroscience techniques and brands, which although not conducted for commercial reasons had a big impact on its next development, was carried out in 2004 when a young researcher, Samuel McClure, conducted a study on the differences of preference between Coke and Pepsi. He tried to explain the paradox when in many previously conducted blind tests respondents clearly preferred Pepsi, nevertheless when brand names were revealed, Coke was favoured.

First, 67 respondents were asked to declare their preference of either Coke or Pepsi. Afterwards their brain reactions during the tasting were observed by fMRI. Initially, respondents were served unlabelled samples of both drinks, both inside and outside the scanner. The frequency of preference measured by both ways was almost identical, meaning that when a respondent did not know which brand he was tasting his preference was nearly the same (Figure 18a).

However, when at least one of the samples was branded, there was a change in preferences. Respondents were being repeatedly given two samples (this time only in fMRI scanner); which were always of the same brand one branded and other unbranded, and they were told that the unlabelled drink can be of both brands. One round of testing included two samples of Pepsi (while respondents thought it can be Pepsi and either Pepsi or Coke) and vice versa, in the second round of testing, there were two samples of Coke (and respondents assumed there is Coca Cola and either Coca Cola or Pepsi).

In this case the results varied. Taste preference for Coca Cola was much higher both in the case of branded and unbranded sample, even though the process of tasting was conducted exactly the same (Figure 18b). When Coca Cola was being tasted, different brain centres were activated than during Pepsi tasting. In the case of Pepsi, only the centres responsible for taste perception were activated similarly as when the brand was not revealed at all. Nevertheless, in the case of Coca Cola, there was a difference in activated brain centres when the brand was and was not revealed. The

⁹⁷ MCCLURE, M. S. et al. Neural Correlates of Behavioral Preference for Culturally Familiar Drinks *Neuron*, Vol. 44, 379–387, October 14, 2004, Copyright 2004 by Cell Press. [online] [cit. 2012-10-30] Available at:

<http://www.librimedia.com/website/content/research/papers/neural_correlates_of_behavioral_preference_for_culturally_familiar_drinks.pdf>

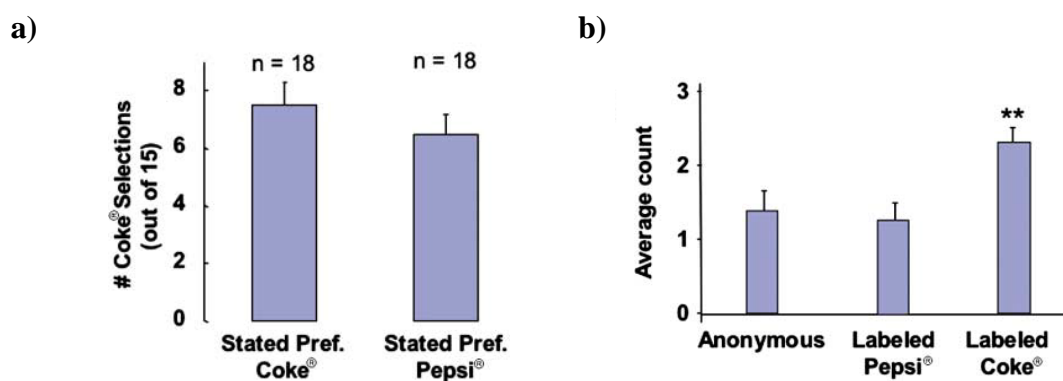
⁹⁸ BERCEA, M. Neuromarketing: The first years. [online] [cit. 2012-10-30] Available at:

<<http://neuorelays.wordpress.com/2012/06/04/neuromarketing-the-first-years/>>

part of brain responsible for higher thinking and cognition was activated as well which signals that respondents were actively associating the brand with their memories and emotions which consequently had an impact on their taste perception.

McClure thus revealed that branding effects can be observed in the neural activity of respondents consuming the drinks. His findings may imply that a higher brand familiarity thanks to for instance advertising has an impact on emotional memory structures that are connected with the brand and establish a brand preference. This study has been quoted many times since then and it is known as Pepsi vs. Coke Challenge.

Figure 18: Results of different testing rounds in Pepsi vs. Coke Challenge



Source: MCCLURE, M. S. et al. Neural Correlates of Behavioral Preference for Culturally Familiar Drinks. *Neuron*, Vol. 44, 379–387, October 14, 2004, Copyright 2004 by Cell Press. [online] [cit. 2012-10-30] Available at: http://www.librimedia.com/website/content/research/papers/neural_correlates_of_behavioral_preference_for_culturally_familiar_drinks.pdf

Brand positioning

Quite a few companies have already decided to use a neuroscience technology for the positioning of their product or for building their brand, between them for instance P&G, Motorola or Home Depot⁹⁹, but details and results were not made public. The

⁹⁹ PENENBERG, A. L. NeuroFocus Uses Neuromarketing To Hack Your Brain. *Fast Company* [online] 2011 [cit. 2012-10-30] Available at: <http://www.fastcompany.com/1769238/neurofocus-uses-neuromarketing-hack-your-brain>

case of Ebay has been chosen to be described since it was one of the most detailed.¹⁰⁰
101

Ebay needed a new corporate identity for one of its core services – PayPal which positioning by that time was rather weak. The main words attributed to the brand and its services were “safe, simple and wow”. This was not satisfactory since it did not distinguished PayPal enough from its competitors. Neuromarketing provider was invited to conduct marketing research which would help build a new global identity and persuade more e-shoppers to use this online payment service.

By EEG, GSR and eye tracking, seven brand attributes can be measured as they elicited subconscious responses:

- form
- function
- benefits
- feelings (the emotional connection a brand elicits from consumers)
- values (what it represents)
- metaphors (aspirations, challenges, lessons or life events that seem connected to the product)
- extensions (the unexpected and perhaps illogical feelings it inspires)

Based on brainstorming between the client and neuromarketing provider, three brand attributes were selected: function, feelings and benefits. Afterwards, three brand characteristics were assigned to each of these three attributes. For function, "convenient," "fast," and "secure" were tested; for feelings, "confident," "hassle-free," and "in the know"; and for benefits, "new opportunity," "on my side," and "empowering." A panel of 21 people, 11 men and 10 women, was established segmented according to a gender and usage (light and regular users, and non users) and were tested on these characteristics which were embedded in full sentences.

The attribute of “fast” ranked the highest and obtained extremely positive feelings shown by the heat map, particularly amongst current users. In the feelings category, “in the know” and “on my side” were the ones best ranked. Attributes were tested also by a traditional market testing, namely by conventional online survey, however

¹⁰⁰ PENENBERG, A. L. NeuroFocus Uses Neuromarketing To Hack Your Brain. Fast Company [online] 2011 [cit. 2012-10-30] Available at: <<http://www.fastcompany.com/1769238/neurofocus-uses-neuromarketing-hack-your-brain>>

¹⁰¹ BURKITT, L. Neuromarketing: Companies Use Neuroscience for Consumer Insights. Forbes Magazine [online] 2009 [cit. 2012-10-30] Available at: <<http://www.forbes.com/forbes/2009/1116/marketing-hyundai-neurofocus-brain-waves-battle-for-the-brain.html>>

they differed considerably. “Fast” was still evaluated high but “on my side” was by far outnumbered by “confident”, which in contrary ranked very low in neuroscience research. The company decided to rely on the neuroscience method and found its global image, both visual and verbal, based on its results. The new positioning emphasized the outcomes it delivers, especially the speed, more than security and safety depicting in previous campaigns. The strategy appeared to be successful, at least according to then global chief marketing officer, Mr. Herstein, who claimed having click-through rate and response rate on their company emailing and web pages increased three to four times.

Another important finding from the brain scanners is that behavioural change generally precedes attitudinal change, not vice versa, which could mean that further sophistication in neuromarketing techniques would greatly assist companies in affecting this behavioural change. The scanners can already measure "branded empathy", opening the door to the possibility that individual business metrics – awareness, brand equity and so on – will be trackable in real-time by neuroscientists in future.¹⁰²

B. NPD

Dan Ariely in his study about hope and hype of neuroimaging in business¹⁰³ suggests that neuromarketing can be valuable when designing the product and before it is launched. As the main advantage of neuroimaging is the opportunity to gain valuable insights about the product experience before the significant amount of money are spent on a new product launch and its marketing. Also the advertising corporations expressed their encouragement towards the usage of neuroscience research for NPD. In his presentation, the founder of WCRS creative agency¹⁰⁴ Robin Wight offered a defence of neuroscience-based research which according to him can help companies reduce the failure rate of new products, because it reveals and may provide hints how to overcome stubborn and conservative minds of consumers.¹⁰⁵

¹⁰² CLIFT, J. Measuring Advertising Performance 2012 day one: Effectiveness metrics, global creativity and new breakthroughs in marketing research. Event Reports: Warc MAP, March 2012

¹⁰³ ARIELY, D.; BERNIS, S. Neuromarketing: the hope and hype of neuroimaging in business. *Nat Rev Neurosci*. Author manuscript; available in PMC 2011 April 1. Published in final edited form as: *Nat Rev Neurosci*. 2010 April; 11(4): 284–292. [online] 2010 [cit. 2012-10-30] Available at: < <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2875927/> >

¹⁰⁴ Integrated Marketing and Advertising Agency in London

¹⁰⁵ CLIFT, J. Measuring Advertising Performance 2012 day one: Effectiveness metrics, global creativity and new breakthroughs in marketing research. Event Reports: Warc MAP, March 2012

Ariely further proposes four main areas where neuroimaging can prove to be especially useful for NPD, and those are food, entertainment (particularly movies), architecture and political candidates. The author believes that from the commercial point of view, probably the most likely to be used frequently is the neuroscience research into food. Since food tasting and the perception of flavour are multisensory processes and holistic experience of taste, odour, texture, sound, appearance and other factors, they provide various opportunities for neuroscience research to reveal what respondents would be otherwise incapable of articulate themselves, and the previously described cases of Pepsi vs. Coke Challenge and Cheetos already confirmed this fact. The impact of the above written dimensions of tasting experience on different brain centers have been already examined by several researchers.¹⁰⁶ The potential for commercial use lie in the fact that corporations having business in food industry can use neuroscience research to design more tasteful and appealing products. Ariely also mentions the ethical threat that could follow such a usage. There could be a possibility of a creation of such an appealing food that would be so tempting and delicious that would be simply irresistible. On the other hand, the research could be also used for “public good” and help make a nutritious food more likeable.

Apart from the following two cases which are insufficient in the provided information, the author had not found any more evidence on the already existing commercial cases. However, she attributes this lack of cases to the fact that companies are even more careful about the leakage of information about this particular area of research because they do not want to be accused of the ethical threat of consumers’ rights and free will, rather than to the fact that such cases would not exist.

The automobile company, Hyundai Motor America, admitted using neuroscience techniques to track the activity in respondents’ brains while letting them study a model of their new car before its launch in order to confirm whether it is appealing for them as for the potential customers or not. 15 men and 15 women¹⁰⁷ were examined by EEG electrode-studded caps while observing a sporty silver test model of a 2011 Hyundai. They were asked to focus on particular parts of the vehicle such as the bumper, the tires and the windshield. Information from each person’s brain activity was recorded and was supposed to measure preferences potentially leading to purchase decisions. The manager of the company claimed that by employing EEG

¹⁰⁶ For instance ROLLS, E. Brain mechanisms underlying flavor and appetite. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* 2006;361:1123–1136

¹⁰⁷ A sample of 30 people is a standard in neuromarketing studies, this controversial fact is mentioned in the previous chapter about neuromarketing and it is also further discussed in interviews

they wanted to reveal what consumers think about the features of the model and thus be able to tweak them before starting producing the cars in masses.¹⁰⁸

The second case comes from the mobile phone company. Neuroscience was employed here in order to define differences in product designs that would impact buyer's purchase decisions so that it could refine their product development accordingly. The research employing a combination of EEG, GSR and eye tracking was built to distinguish the overall dimensions of five different models of mobile phones. It revealed differences between mobile phone purchasers who favour features and those who prefer external design, between genders and age groups. The findings from the research were said to be incorporated into the product design, the manufacturing and marketing. Moreover, according to the case study, based upon the value brought by this research and its applicability to many of the company's other consumer product divisions, the corporation commissioned an on-premises, full-time basis NeuroLab.¹⁰⁹

C. PACKAGING & DESIGN

Packaging may be very important in generating emotions¹¹⁰ and seems to be the second biggest area where neuroscience research has been used right after the advertising. When Campbell's soup decided to repackage its iconic cans of soup, it was a bold move. The decision was made based on low sales which did not reflect what consumers were saying in focus groups about their positive feelings towards the product. To find out not only what people consciously claimed but their unconscious emotions, the company decided to collaborate with three different companies which then spent two years on an extensive research to help Campbell's soup packaging to be redesigned globally.

These three companies were Innerscope Research, Olson Zaltman Associates and Merchant Mechanics. For two years they were investigating microscopic changes in skin moisture, heart rate and other biometrics both in-store and at home, to see how

¹⁰⁸ BURKITT, L. Neuromarketing: Companies Use Neuroscience for Consumer Insights. Forbes Magazine [online] 2009 [cit. 2012-10-30] Available at: <<http://www.forbes.com/forbes/2009/1116/marketing-hyundai-neurofocus-brain-waves-battle-for-the-brain.html>>

¹⁰⁹ NeuroFocus Case study. Product Design and Packaging: Mobile Phone Study [online] 2011 [cit. 2012-10-30] Available at: <http://www.neurofocus.com/pdfs/NeuroFocusCaseStudy_ProductDesign.pdf>

¹¹⁰ YOUNG, S. Neuroscience explains the emotional buy. Brand Packaging, July 2011. [online] [cit. 2012-10-30] Available at: <<http://www.brandpackaging.com/articles/82861-neuroscience-explains-the-emotional-buy>>

consumers react to everything from pictures of bowls of soup to logo design. In the end 1500 respondents were involved, and the combination of biometrics with traditional research methodologies such as different types of deep interviews was used.

The changes in packaging came as a surprise to many. They are illustrated in the Figure 19 and included changes in the company's logo which was recommended to be smaller and to be moved lower so it is not that outstanding, in the steam which was advised to rise from larger, more vivid soup images in more modern white bowls, and in the picture of a spoon which was evaluated as unemotional and thus recommended to be abandoned.^{111 112 113}

Figure 19: Improved packaging based on findings from neuromarketing



Source: WILLIAMS, J. Campbell's Soup Neuromarketing Redux: There's Chunks of Real Science in That Recipe. Fast Company [online] 2010[cit. 2012-10-30] Available at: <<http://www.fastcompany.com/1558477/campbells-soup-neuromarketing-redux-theres-chunks-real-science-recipe>>

¹¹¹ BRAT,I. The Emotional Quotient of Soup Shopping. The Wall Street Journal, Media & Marketing. [online] 2010[cit. 2012-10-30] Available at: <http://innerscoperesearch.com/news/WSJ_Campbells_2010_02.pdf>

¹¹² VAZQUEZ, P.M. Campbell Soup's Labels Redesigned Using Neuromarketing. PSFK. [online] 2010 [cit. 2012-10-30] Available at: <<http://www.psfk.com/2010/02/campbell-soups-labels-redesigned-by-neuromarketing.html>>

¹¹³ WILLIAMS, J. Campbell's Soup Neuromarketing Redux: There's Chunks of Real Science in That Recipe. Fast Company [online] 2010[cit. 2012-10-30] Available at: <<http://www.fastcompany.com/1558477/campbells-soup-neuromarketing-redux-theres-chunks-real-science-recipe>>

There are two issues with this case that need to be mentioned. First, it seems like the researches did not use any of the brain imaging techniques, although due to lack of more detail information it cannot be excluded, and relied solely on secondary biometrics such as heart rate, respiration and eye tracking. Second, although it was already two years ago, there are no publicly available results of the effects of the new label designs which would indicate whether money and time invested in such a robust neuromarketing research were actually worth it.

Young¹¹⁴ points out that neuroscience can be useful in more areas than only in the identification of design elements that are causing negative reactions. It can reveal and help understand underlying factors why a design is actually not working. He also highlighted the fact that neuroscience outcomes are more valuable if they are gathered early in the design process rather than at the end when there is already no space for making bigger adjustments.

Neurodesign and UX experience

As referred to in the previous chapter, this discipline of neuromarketing dedicated to design and packaging improvements is sometimes called neurodesign. Apart from a packaging, it deals with the whole area of user experience including also already mentioned digital experience.

4.1.3 Convenience

If we agree with Barden that shoppers often shop on autopilot¹¹⁵, then companies may have a problem with understanding their customers via a traditional marketing research because they do not realize their subconscious purchasing behaviour themselves. In the previously mentioned cases, especially as far as the packaging was concerned, a monitoring of customers in the store with eye camera was frequently included in the research. On their website, NeuroFocus also mentions the usage of neuromarketing for aisle design and virtual 3D stores testing.¹¹⁶ For its client, an international snack food company, they conducted a range of neuroscience testing to improve the in-store experience relevant to their brands and to enhance the brands' impact in every step of the shopper journey. Twenty respondents were selected based on the client's specifications. A variety of gondolas' and displays' current as well as

¹¹⁴ YOUNG, S. Neuroscience explains the emotional buy. Brand Packaging, July 2011. [online] [cit. 2012-10-30] Available at: <<http://www.brandpackaging.com/articles/82861-neuroscience-explains-the-emotional-buy>>

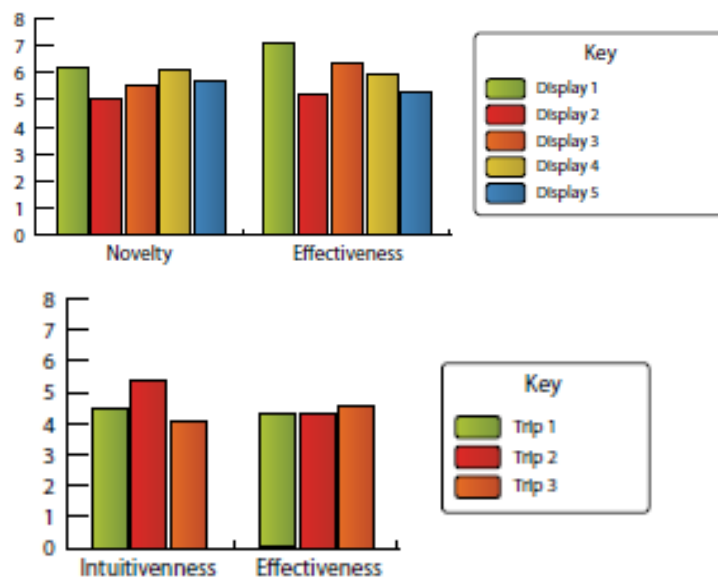
¹¹⁵ BARDEN, P. The appliance of neuromarketing. Marketing research Society Annual Conference, 2011

¹¹⁶ NeuroFocus [online]. 2012 [cit. 2012-10-30] Available at: <<http://www.neurofocus.com/instore.htm>>

new designs were tested directly in the client's retail store laboratory by eye camera and portable EEG.¹¹⁷

In the Figure 20, there is an illustration of the neurological measurement of individual attributes within various displays. Based on the recommendations driven from research findings, the effectiveness of the store aisle design as well as of the shelf and specific elements of merchandising of the client's product was said to be improved, but no precise data were provided.

Figure 20: Stand-alone display effectiveness and differences between shopping trips



Source: NeuroFocus Case study. Results of Neurological Testing of Shoppers' In-Store Experience [online] 2011 [cit. 2012-10-30] Available at: http://www.neurofocus.com/pdfs/NeuroFocusCaseStudy_InStoreSnackFood.pdf

Plassmann et al. conducted a study¹¹⁸ using fMRI to investigate the neural foundation of a brand loyalty, and let both loyal and less loyal customers of a department store be scanned while deciding amongst two out of four department stores where they would purchase different types of clothing. The findings demonstrated that loyal customers in comparison to the disloyal ones have built affective relationship to the

¹¹⁷ NeuroFocus Case study. Results of Neurological Testing of Shoppers' In-Store Experience [online] 2011 [cit. 2012-10-30] Available at: http://www.neurofocus.com/pdfs/NeuroFocusCaseStudy_InStoreSnackFood.pdf

¹¹⁸ PLASSMANN, H.; AMBLER, T.; BRAEUTIGAM, S.; KENNING, P. What can advertisers learn from neuroscience. International Journal of Advertising Vol. 26, No. 2, 2007

store. This was suggested as probably the most important underlying factor of their repurchases because the greater activation of emotional and self-referencing memory as well as rewarding activation pattern was identified.

4.1.4 Cost to consumer

The author did not come across any commercial case study which would suggest the usage of neuroscience for price and price setting. There are academic studies that mention price elasticity being tested by facial coding and willingness to pay by fMRI¹¹⁹ but they do not stand alone for assessing price to quality ratios for the companies. The study of Plassmann from 2008¹²⁰ looked into the drivers of the famous effect when the price of a wine influences the rating of its taste by consumers. The study shows where and how this happens in the brain, namely how the part of brain that combines basic sensory information with higher cognitive processes becomes more active for more expensive wines.

4.2 Interviews

There have been conducted four qualitative one-to-one (one-to-two) interview sessions in various market and media research agencies in the Czech Republic: Millward Brown, CONFESS Research, IPSOS Tambor and PHD/ Omnicom Media Group, plus one qualitative interview with two planners and a creative director from Ogilvy Prague. Prepared set of questions can be found in the Annex C, however, it is not a complete list of questions, since the interviews evolved spontaneously and also due to the presence of more people, they had often a character of a focus group.

¹¹⁹ ARIELY, D.; BERNIS, S. Neuromarketing: the hope and hype of neuroimaging in business. *Nat Rev Neurosci*. Author manuscript; available in PMC 2011 April 1. Published in final edited form as: *Nat Rev Neurosci*. 2010 April; 11(4): 284–292. [online] 2010 [cit. 2012-10-30] Available at: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2875927/>>

¹²⁰ PLASSMANN, H.; O'DOHERTY, J.; SHIV, B.; RANGEL, A. Marketing actions can modulate neural representations of experienced pleasantness. Edited by Leslie G. Ungerleider, National Institutes of Health, Bethesda, MD, and approved December 3, 2007. [online] [cit. 2012-10-30] Available at: <<http://www.pnas.org/content/105/3/1050.full>>

4.2.1 Millward Brown Czech Republic

P. Průšová, Licencee Director Europe and Managing Director of Millward Brown Czech Republic

The following part has been hidden due to confidentiality reasons.

The following part has been hidden due to confidentiality reasons.

The following part has been hidden due to confidentiality reasons.

The following part has been hidden due to confidentiality reasons.

4.2.3 IPSOS Tambor

Eva Veisová – Executive Director Ipsos UU

Tomáš Macků - Research & Communication Director CR, SR

The following part has been hidden due to confidentiality reasons.

The following part has been hidden due to confidentiality reasons.

4.2.4 PHD/ Omnicom Media Group

*Petr Miláček, Strategy planning director, PHD / Research Director
Omnicom Media Group*

The following part has been hidden due to confidentiality reasons.

¹²³ BAROCCI, R. The ARF NeuroStandards Collaboration Project: The Beginnings of a Landmark Journey. NeuroStandards Project White Paper. October, 2011 [online] 2012 [cit. 2012-10-05]
Available at: <https://thearf-org-aux-assets.s3.amazonaws.com/research/NeuroStandards_WhitePaper_Oct262011_Pre-Production_Version.pdf>

The following part has been hidden due to confidentiality reasons.

4.2.5 Ogilvy Prague

Jakub Kočí, Strategic planner Ogilvy & Mather

Tomáš Bártil, Strategic planner OgilvyAction

Will Rust, Executive Creative director Ogilvy Prague

The following part has been hidden due to confidentiality reasons.

4.3 Conceptualization of neuromarketing

Heading to the final stage of the thesis, the overview of findings, as well as implications and contributions of this study on both practical and theoretical level can be now introduced.

The application of neuroscience to marketing is a relatively new field of interest and therefore, much information about effectiveness is missing, and not all concepts are validated properly. Nevertheless, based on the explored case studies, accompanied by the reviewed academic research and the interviews with Czech research agencies that provided the additional insights, some conclusions can be derived about the possible usage of neuromarketing throughout the marketing process.

¹²⁴ Neither of them cooperated on the Amundsen case

4.3.1 Neuromarketing and marketing mix

A spectrum of neuromarketing applications was demonstrated mainly in three parts of 4P model, whereas in the case of price, the sufficient evidence about the commercial applicability of neuroscience has not been provided. The author tried to draw some conclusions from these cases and to illustrate it visually; the model of marketing mix and 4P from the theoretical part was used. Neuromarketing was accommodated in the model as suitable for the three mentioned parts: product/consumer wants and needs, promotion/communication and place/convenience. Moreover, the suggestion of using neuroscience for particular elements of each P (C) was derived (Figure 21). Since it has been indicated that neuromarketing is based mainly on the customer-centric approach to marketing, 4C's are being used in parallel with 4P's and are interchangeable in this context and for the purpose of the thesis. In the following text, each part is being summarized.

Figure 21: Possible application of neuromarketing to different parts of marketing mix



Source: Author

Promotion/ Communication

Neuroscience seem to be able to be helpful in several areas in both creation and post-testing of TV, print advertising and direct mails, in the creation of superior online advertising and strategy, and in better quality media planning. The ability to measure respondents' unconscious second-by-second reactions plus to exclude distortions such as self-projection and self-denial of respondents (particularly in cases when the topic is sensitive for instance sex, personal finances, health issues and others) or their dishonesty such as in case of Cheetos make neuromarketing particularly useful. At the concept testing stage, it helps to explain positive and negative reactions to advertising and indicates what changes should be made, which provides the

opportunity to develop considerable understanding of the main features to see what may be the crucial ones to extend to other channels. This relates to Vecchiato's conclusion that neuromarketing can predict the most remembered scenes.¹²⁵ EEG and less frequently also fMRI were the most mentioned neuroimaging methodologies, which were as a rule always combined with both measurement of secondary biometrics, such as GSR, and traditional marketing research methodologies, such as deep interviews.

Product/ Consumer wants and needs

Neuromarketing plays its role when consumers cannot articulate what they want from products and services or they do not realize they would prefer something else, like in the case of Campbell's Soup. Neuroscience tools can measure consumers' responses throughout their whole consumption experience and derive recommendation for adjustments and improvements in all three product dimensions. They can analyze the brain responses to physical characteristics and quality, such as packaging and design elements, as well as to services connected to the product similarly as in the case of PayPal. Symbolic values such as brand and brand positioning lends itself very well to neuroscience research due to their abstract and nebulous character.

The findings correspond to Zaltman's claims that insights offered by neuroscience tools can be applicable at all stages of the product life cycle.¹²⁶ In terms of **new product development**, relating to Booze model stated before, it can provide precious insights before big investments into the product launch will be made in product & development testing stage as in the case of Hyundai. Moreover, neuromarketing can also supply R&D departments with inspirations for new product opportunities in idea generation stage and help develop concepts further in concept development & testing stage. Regarding a mature product, modifications based on recommendations from neuroscience research can extend the life of this product and boost additional sales. Both EEG and fMRI were spotted to be used in these cases, while fMRI played bigger role than in case of promotion, because of its potential to reveal and scan deeper parts of human brain and because measurement of quick changes is not an issue here.

¹²⁵ VECCHIATO, G. et al. On the Use of EEG or MEG Brain Imaging Tools in Neuromarketing Research. Hindawi Publishing Corporation, Computational Intelligence and Neuroscience. Volume 2011, Article ID 643489, p 12. Accepted 28 June 2011

¹²⁶ Q&A with G. Zaltman: The Subconscious Mind of the Consumer (And How To Reach It) [online] 2012 [cit. 2012-11-20] Available at: <<http://hbswk.hbs.edu/item/3246.html>>

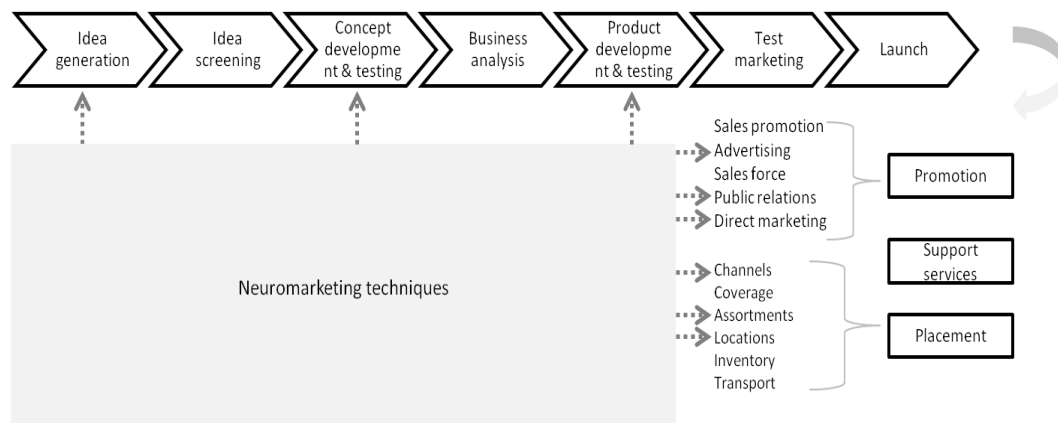
Place/ Convenience

Place is often the first moment of truth for a brand and a customer. Particularly by mobile EEG, eye camera and 3D virtual stores the whole shopper journey can be monitored in live store setting in order to ensure that the brand enhances its presence in this touch point to the maximum. The application of neuroscience may be valuable both for retailers as well as for brands.

4.3.2 Neuromarketing framework

The exploratory research has resulted into the formation of neuromarketing framework (Figure 22) which can serve as a comprehensive and holistic outline of the neuromarketing trend and thus represents major and to some extent even exclusive theoretical input. The further research investigating the effectiveness of neuromarketing applied for each one of the elements of the framework is suggested in order to validate this input, and could be potentially based on it and use it as a starting point.

Figure 22: Neuromarketing framework



Source: Author

4.3.3 Neuromarketing as a type of marketing research

The research has shown that neuromarketing can be used as all the three types of marketing research according to Kotler¹²⁷: informative, descriptive as well as causal, but descriptive and causal role is more frequent. Although and as stated before, Kotler ranks it among qualitative research, this statement has not resulted clear and

¹²⁷ KOTLER, P.; ARMSTRONG, G. Marketing: An Introduction. 9th ed. New Jersey: Prentice Hall. 2009, pp. 406-7

there are ongoing discussions whether neuromarketing should really be considered as a qualitative or quantitative research methodology (e.g. The ARF NeuroStandards¹²⁸). Additionally, it has been confirmed that the use of neuromarketing requires demanding interpretation and translation of scientific findings into effective practice in the marketplace, in order to generate helpful new products and services, more informative and effective communications and more rewarding in- store experiences. The implications resulting from the research also suggest that the combination of neuromarketing with traditional marketing research tactics is necessary to obtain the complete picture.

In order to improve neuroscience research, the Advertising Research Foundation together with both corporations and neuromarketing providers collaborated on a robust project which gave light to first NeuroStandards. Several suggestions of important questions which need to be considered before conducting the research (Figure 23 on the next page) were put forward.

4.3.1 Neuromarketing and communication models

Finally, the findings from the theoretical background and the practical cases helped to support the argument that the information- procession models of communication in all brand touch points are outdated. Neuroscience has proved that a brain reacts to incoming data by attempting to match it to a pattern and assess whether the pattern is positive or negative or whether there is a reward. Consequently, it will drive an action (behaviour), and all this is happening very quickly and moreover subconsciously. This implies for AIDA that the brain first reaches for D- desire and then decide whether or not to pay attention –A. In other words, people first act and then think- post-rationalize their behaviour.^{129 130}

¹²⁸ BAROCCI, R. The ARF NeuroStandards Collaboration Project: The Beginnings of a Landmark Journey. NeuroStandards Project White Paper. Oct. 2011 [online] 2012 [cit. 2012-10-05] Available at: <https://thearf-org-aux-assets.s3.amazonaws.com/research/NeuroStandards_WhitePaper_Oct262011_Pre-Production_Version.pdf>

¹²⁹ BARDEN, P. The appliance of neuromarketing. Marketing research Society Annual Conference, 2011

¹³⁰ ARIELY, D.; BERNIS, S. Neuromarketing: the hope and hype of neuroimaging in business. Nat Rev Neurosci. Author manuscript; available in PMC 2011 April 1. Published in final edited form as: Nat Rev Neurosci. 2010 April; 11(4): 284–292. [online] 2010 [cit. 2012-10-30] Available at: <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2875927/>>

Figure 23: Summary of Issues for Discussions between Vendors and Data Users

<u>Issues</u>	<u>Key Questions</u>
Sample	Which number of respondents is adequate for the research purpose? What is the best way to draw the sample? Are there limitations/ biases regarding sample composition?
Design	What is the best design given the specific purpose of the research? Are experimental features incorporated into the design? Should the research be base on only one measure or use a multi-measurement approach?
Data Collection	Who is supervising and conducting the research and measurement? How are the researchers (or coders) trained? What equipment/software is being used and is information on quality, maintenance, and reliability available?
Documentation	Is information on data collection procedures provided or is the measurement a "black box"?
Validation	Exactly how are the constructs (i.e. "attention", "memory", or "subconscious") defined? Is the research and are the constructs validated through neuroscience or through marketing studies? Are reliability studies being conducted?
Statistical Significance	Which statistical significance tests are performed? Is it clear which findings are significant, which are directional, and which are neither?
Reporting of findings	Which aspects of the findings are directly derived from neuroscience research and which are interpretations and hypotheses? Who interprets the data?

Source: NeuroStandards Project White Paper. Oct. 2011 [online] 2012 [cit. 2012-10-05] Available at: https://thearf-org-aux-assets.s3.amazonaws.com/research/NeuroStandards_WhitePaper_Oct262011_Pre-Production_Version.pdf

Neuromarketing in the Czech Republic

From the interviews and Czech case studies a couple of conclusions can be derived. First, what is claimed by the companies is not always the most accurate and the most updated information. It seems that neuromarketing in the Czech Republic is even in the more infant stage than on the global level. Many marketing research agencies use the word neuromarketing and neuroscience to describe their offers on their promotional materials and on the websites but in the vast majority of cases restrict themselves to eye camera and secondary biometrics measurement only. They admit not having sufficient knowledge about the topic and thus exhibit lower or bigger reluctance towards it. The small size of the market and financial and time constraints were also mentioned as the reasons behind slower acceptance of neuroscience

techniques in the Czech Republic in comparison to foreign markets. On the other hand, there are few companies that show a deeper interest and expertise. Thanks to their belonging to global networks they have an access to global knowledge and benchmarks. Interestingly, rather those research companies which are not the biggest players on the market demonstrated the biggest know-how. Last but not least, the combination of traditional and new methodologies was highlighted even as absolutely necessary in order to understand holistic picture.

CONCLUSION

*“When we look back from the future, I think the very term ‘neuromarketing’ will become an anachronism,” predicts Pradeep. “I think the future is about neurodesign. By better understanding the human brain, we can move up the chain beyond marketing, to truly designing for the consumer products and offers that will genuinely be of greater service and relevance.”*¹³¹

The first goal of this thesis was to shed light on neuroscience and neuromarketing because only few academic and globally acknowledged literature and sources are dedicated to the topic in the Czech Republic, with the special focus on the mapping of the neuromarketing offer on the Czech market. The second goal was to outline a potential of the application of neuromarketing as a complementary or stand-alone marketing research technique throughout the marketing process. The hypothesis was proposed that not all the elements of marketing and communication mix are suitable for this type of research as opposed to what is being claimed by neuromarketing providers. The ultimate goal of the thesis was to serve as a guide for especially Czech marketers and advertisers that might help them understand the basics of neuroscience research, facilitate them navigation in the local neuromarketing offer and enable them a better assessment of the potential of neuromarketing as an alternative to their traditional marketing research methodologies.

In the first chapter, neuroscience as an academic discipline was introduced and defined. Its fields of interest were described without getting into too much detail, with the exception of cognitive and behavioural neuroscience which was evaluated as the foundation for neuromarketing and as such was described more in detail. The trend of neuroculture was briefly mentioned in the end.

The second chapter focused on neuromarketing as a new type of marketing research which merges biomedical and socio-cultural fields. The main techniques, both brain imaging and biometrics ones, were concisely explained in order to understand their advantages and limitations. Furthermore, the Czech neuromarketing offer was outlined to be further expanded in the fourth chapter. Eventually, the most

¹³¹ SANDGREN, J. Into The Wonderland of Neurodesign. Brand Tech News.com. [online] 2011 [cit. 2012-11-20] Available at: <<http://brandtechnews.net/tag/neuroscience/>>

controversial issues regarding neuromarketing, including the objections towards the research process and techniques as well as the ethical concerns, were classified and summarized.

The third part of the thesis outlined the basic theoretical concepts and models which represent the fundamental framework for the neuroscience research. The particular focus was devoted to the customer centric approach to marketing. This stream of scholarship, which has a great influence on the approach to strategic planning and marketing in general, was the starting point for the thesis since neuromarketing as the marketing research methodology is based on deep understanding of consumer's behaviour and attitudes. These three chapters were developed based on gathered and reviewed data from secondary research; information was drawn primarily from recognized academic literature, professional marketing articles and validated Internet resources.

In the practical, fourth chapter, primary as well as secondary research were conducted. In order to describe the commercial application of neuroscience research and its findings, the case study approach was chosen. The cases were classified according to the parts of marketing mix which they were designed to examine. In the second part of the chapter, major neuromarketing providers and research agencies in the Czech Republic were interviewed which provided the author with a better picture about the application of neuroscience research in practice, and enabled her to map the current Czech neuromarketing offer.

Thanks to the rapid technological development in the recent years, neuroscience has progressed immensely and it is now covering many different fields of interest ranging from psychology via design to evolutionary biology. Neuromarketing was defined as the application of neuroscience tools in marketing practice. Both because of its commercial character and many unresolved issues, it provoked and is provoking many discussions among the academic community as well as among broad public. Some call it a hype, others a hope and some even an ethical threat. Many neuromarketers exaggerate their offers and claim that neuromarketing can be applied to everything and the results it provides are undisputable, which together with limited publicly available cases and a lack of transparency cause significant reluctance towards it.

On the other hand, neuroscience studies already proved that large amounts of information are processed below conscious awareness and that it is nearly impossible for participants in marketing research to accurately self report their non-conscious emotional experiences. The old paradigm Think, Do, Feel had to take a back seat and new paradigm Feel, Do, Think has opened the door to neuroscience marketing research.

Thanks to the conducted interviews, reviewed articles and studied cases, I saw that neuroscience tools are not suitable for every part of marketing process, but are used particularly for those projects where emotions connected to the subject of the research are needed to be analysed into detail and when there exists an assumption that traditional methods could not reveal these hidden emotions. The ultimate thesis goal was accomplished by suggesting the areas of marketing mix and stages of a new process development where the application of neuroscience research might bring a value and otherwise unobtainable insights. However, before investing into this kind of rather costly research, I would recommend marketers not being afraid to ask neuromarketing providers for further information and proofs from real cases which are normally not shared to be able to assess a real potential for their particular problem and business. There were also proposed exact questions they should be asking before hiring a provider and conducting the research. In every case, results presented in this paper highlight that neuromarketing should never stand alone but should be combined with traditional research techniques.

A drawback and a challenge for the thesis consisted in the fact that there is not yet an agreed experimental paradigm between neuromarketing practitioners and academic sphere. Furthermore, and as already mentioned couple of times before, there is a lack of academic literature on the topic and the existing one tends to be to a certain extent outdated due to a constant progress and new findings on the topic. There were many sources with contradictory outcomes, and thus I had to conduct a deeper analysis by using a wide range of more or less acknowledged sources in order to ensure the highest validity of the findings. And last but not least, results from conducted commercial neuromarketing research are very often kept private and not shared publicly, which makes it more difficult to set up standards and best practice. I would recommend neuromarketing researchers and companies sharing their knowledge and findings more openly so that better application of neuroscience tools can be ensured together with better results interpretation. I believe this would consequently lead to bigger effectiveness and pave the way to future research as well as to the bigger acceptance within broad public and academics. Among the things that need to be studied further belongs especially a research into the effectiveness of neuromarketing comparing to traditional marketing research methodologies. This study would need to carry out cost-benefit and added value analysis, in other words, to compare potential gains from gathering valuable insights and extensive costs, which does not seem to decrease significantly in near future.

Several conclusions were drawn when comparing the Czech Republic to other countries. I discovered that there is still a huge gap as far as the acceptance of neuroscience tools as a regular and acknowledged marketing research offer is concerned. The marketers and corporations as well as advertising agencies and those marketing research agencies that do not have neuromarketing in their portfolio seemed to be rather reluctant. This may be caused by the size and financial

restrictions of local clients but also by a lack of knowledge and benchmarks in the Czech environment. Moreover, the hype about neuromarketing that was brought by some Czech companies which rather misused it to get into highlights reinforced the mistrust. In spite of the reluctance, there are providers and clients that are already actively using neuroscience research in their marketing process. The number of possible applications is however limited which originates primarily in the size of corporations and a limited dissolution of the neuromarketing costs in their revenues.

Personally, I think that neuromarketing, despite its immense progress in the recent years, is still in its beginnings and its true potential will only develop in future, supported by bigger transparency, more conducted studies and further technological development. The results from the thesis will serve me in my advertising career as guidance, and I do believe that I will use neuroscience sooner or later in my profession to create better and more effective marketing and advertising.

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List of figures

Figure 1: A man connected to classical EEG.....	24
Figure 2: First Wireless Full-Brain EEG Headset.....	24
Figure 3: MEG scanner with patient	25
Figure 4: Neuromarketing research by fMRI in IKEM, Czech Republic	26
Figure 5: Overview of advantages and disadvantages of different techniques	27
Figure 6: BioQual combination recommended by TNS, illustration of what is measured by each tool	30
Figure 7: A wireless band used for measuring brain activity.....	31
Figure 8: Marketing mix and 4P's model	36
Figure 9: New product development model by Booz, Allen and Hamilton.....	39
Figure 10: Cognitive, Affective and Behaviour stage of consumer behaviour	40
Figure 11: The Cheetos Total Consumption Experience (Consuming vs. Observing)	46
Figure 12: Biometric TV ad test of Amundsen TV commercial, research summary	48
Figure 13: Motion player depicting a) primary measures of Engagement (EEG) and Activation (GSR) and b) secondary measure of Fun and Genuine & Social smile (EMG) ...	49
Figure 14: Usage of neuromarketing for print ads testing and its findings	51
Figure 15: Released print ad	52
Figure 16: Study about print advertising and ERA case	52
Figure 17: Heat map – a map of attention with and without a task on the homepage of Měšec.cz and artificial border created by a presence of the banners	57
Figure 18: Results of different testing rounds in Pepsi vs. Coke Challenge	59
Figure 19: Improved packaging based on findings from neuromarketing	64
Figure 20: Stand-alone display effectiveness and differences between shopping trips	66
Figure 21: Possible application of neuromarketing to different parts of marketing mix	75
Figure 22: Neuromarketing framework	77
Figure 23: Summary of Issues for Discussions between Vendors and Data Users	79

Annexes

Annex A: Adapted from Simar- How is marketing research doing in the Czech Republic

obrat v mil.Kč	2011
300-320	IPSOS Tambor
240-260	A.C.NIELSEN
200-220	GfK Czech
180-200	TNS AISA
120-140	Millward Brown
100-120	MEDIARESEARCH, STEM/MARK
80-100	Factum Invenio
60-80	INCOMA GfK
40-60	MEDIAN, Network Media Service
20-40	Market Vision, Simply5, Opinion Window, FOCUS CZ, Data Collect
10-20	CONFESS Research , Mareco, Psyma, Kleffmann a partner
5-10	STEM, Ultex, MindBridge

Source: SIMAR.cz. Jak si vede výzkum trhu.[online] 2012 [cit. 2012-10-30] Available at:
< <http://simar.cz/clanky/jak-si-vede-vyzkum-trhu.html>>

Annex B: Marketing&Media- Comparison of prices of neurotests in the Czech Republic

Comparison of prices for neurotests on TV spot average n°of respondents 40)			
Name of the agency	CONFESS Research	GfK Czech	Ipsos Tambor
What does test contain	EEG, GSR, reaction times, recall questionnaire	EEG, GSR, eye camera, FMA	EEG, GSR, eye camera, validation interviews
Price for testing of 1 TV spot	275 000 (when testing 2 spots price for one is 222 500 CZK)	315 000 CZK	260 000 CZK
Omnibus*	150 000 CZK incl. eye camera	Not offering	160 000 CZK
<p>Millward Brown – Uses EEG, FMA, eye camera, implicit methods with reaction times, in various combinations as a part of qualitative and quantitative research. It is not offered as an individual package</p> <p>*TV spots testing for more clients on the same sample of population</p> <p>Prices are VAT excl. Source: individual marketing research agencies</p>			

Source: Marketing&Media. Zájem o neuromarketing se zvyšuje.[online] 2012 [cit. 2012-10-30]
 Available at: < [http://mam.ihned.cz/?p=100000_d&article\[id\]=54610530](http://mam.ihned.cz/?p=100000_d&article[id]=54610530) 4/2/2012>

Annex C: Set of prepared questions for interviews

Ipsos

1. I have not come across any information if IPSOS in the Czech Republic currently offers any neuroscience marketing research or techniques, does it?
2. If yes, what do you offer and how does it work?
3. How much does it cost?
4. Do you evaluate the results here?
5. How many clients have already let something having tested by neuroscience techniques?
6. Why and when would you recommend neuromarketing in comparing to traditional marketing research methodologies?
7. If you do not currently offer it, what are the reasons of why not and would you consider in future changing your mind?

MB

1. With what kind of neuroscience techniques do you have experience and which ones are you currently offering in the Czech Republic?
2. What are their advantages and disadvantages, and for what cases have you used them?
3. What advantage or disadvantage in comparing to traditional marketing research techniques do you perceive?
4. What are you using for brain imaging now that EmSense whose EmBand that you were using in the past went bankrupt?
5. Do you see any difference between secondary and primary biometrics research?
6. What is your learning for the future concerning neuromarketing?

CONFESS Research

1. With what kind of neuroscience techniques do you have experience and which ones are you currently offering in the Czech Republic?
2. What are their advantages and disadvantages, and for what cases have you used them?
3. What advantage or disadvantage in comparing to traditional marketing research techniques do you perceive?
4. What about using fMRI, isn't it more precise and can get more data?
5. How much does it cost and for what reason is the cost that high?
6. Do you evaluate the results here?
7. How many clients have already let something having tested by neuroscience techniques?

8. Are those rather clients or advertising agencies who demand neuromarketing research from you?

Ogilvy Prague

1. Have you ever used and recommended neuro research for your campaigns?
2. Do you know what is neuromarketing about, which techniques are being used?
3. For what purpose would you use neuromarketing?
4. What do you see as potential drawbacks of it?
5. Would you like to see more neuromarketing techniques being applied if there were no budget limitations?

PHD/Omnicom Media Group

1. What were your drivers why you decided to conduct such a unique research, using fMRI?
2. Why did you choose television as a tested medium?
3. Based on what criteria did you choose respondents?
4. Were ethical issues the problem throughout the testing?
5. Isn't the number of respondents used in this testing too low to provide valid representative sample for the whole republic?
6. What exactly did you measure?
7. Did you combine the testing with other, more traditional marketing research techniques?
8. What exactly was the outcome of the testing and how is it now used in practice?
9. Do clients in the Czech Republic take advantage of the results and does it have a real impact on their sales?
10. Comparing fMRI to other neuroscience techniques and marketing research methods, what are its advantages and disadvantages?
11. How do you think fMRI can be used for marketing purposes apart from your research?
12. What would you do differently if you had another chance to conduct similar kind of research?