Neuromarketing and Marketing Management: Contributions of Neuroscience for the traditional Marketing Mix

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ABSTRACT

The emergence of neuroeconomics, where methods and procedures developed for brain research are used for economic purposes, has been a topic for researchers and economists for more than a decade. One discipline of neuroeconomics is the so-called 'Neuromarketing' in which neuroscientific data is used to address marketing relevant topics. In the past it was difficult to gather objective consumer information from traditional research methods. Through neuromarketing, objective data collection is getting simpler. Although advantage of neuroscience for consumer research seem to be obvious the implications for marketing management have not been investigated in depth yet. In order to answer the question in how far neuromarketing is beneficial for marketing management of businesses a critical literature review is performed. The research paper investigates possible contributions of techniques used in neurology for marketing management. To come to relevant conclusions it is analysed how far neuroscientific findings support the marketing mix decisions of marketing managers. The results show how neuroscience contributes to traditional marketing mix decisions and implicates advantages of neuroscience for brand management.

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Keywords

Neuromarketing, Marketing Management, Marketing mix, Consumer Research, Brand Management

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1 INTRODUCTION

During the last decades neuroscience was mainly used for a better understanding of physical activities in the human brain, in specific to study brain based diseases and genetic defects. In recent years interest in applying neuroscientific findings and methodologies to other disciplines has been increasing (Gang et al., 2012). Nowadays methods and procedures used in brain research can be used to address economic issues. One scientific field of neuroeconomics is neuromarketing: According to Hubert (2010), "Neuromarketing is a sub area of neuroeconomics that addresses marketing relevant problems with methods and insights from brain research". The raising popularity for using neuroscientific methods as a tool for marketing management came up due to the fact of limited possibilities from classical market research. Although theoretic constructs from consumer research still add an enormous value in identifying consumer needs and wants, these methods are limited to the "black box" of the human organism (Hubert, 2010). The challenge in using traditional research mechanisms were, that researchers had to rely on subjective data, originating from consumer self-reports. As human beings have difficulties in scientifically stating their inner feelings and thoughts, those data is difficult to analyse. With the help of consumer neuroscience it is possible to get a more complete and objective understanding of consumer's desires, which may consequently assist companies to adjust their marketing strategies (Hubert, 2010).

Neuromarketing in combination with classical marketing research theories can add crucial insights in the human's decision making process as "functional brain imaging techniques allow real-time observation of the underlying brain processes during pre-purchasing, purchasing, and post purchasing stages of the consumer decision- making process in a laboratory environment" (Kenning & Plassmann, 2008). For that reason neuroscience can support businesses in decisions around product placement and contributes in optimizing the "traditional marketing-mix instruments such as product, price, communication, and distribution policies, as well as brand research" (Kenning & Linzmajer, 2011).

Although advantage of neuromarketing seem to be overwhelming, many researchers discuss the negative aspects of using neuroscience for economic purposes. In times of arising discussions about public privacy issues people become more and more afraid of emotional manipulation. Research by Kenning and Linzmajer (2011) stated that "the use of neuroscience tools for marketing purposes is, therefore, criticized by consumer protection groups who fear the discovery of that 'Buy Button', eventually turning consumers into buying robots".

As insights from neuroscience supporting marketing management are gaining more and more popularity in economics, it would be useful to further investigate how neuroscience can add value to the theoretic concept of the traditional marketing mix "as product, price, communication and distribution policies, as well as brand research because they represent predominate and essential elements of marketing theory and operational marketing management" (Hubert & Kenning, 2008). The underlying issue is analysed in the background of ethical practical issues. Therefore the **main focus of this paper is to address the question to what extend Neuroscience can support marketing management**. As stated by (Hubert & Kenning, 2008) it is possible to "show the close alliance between consumer neuroscience and established market research".

With reference to this research topic, this paper will deal with the following research questions:

***RQ1**: What is the added value of neuroscience for marketing management related to marketing mix decisions?*

***RQ2**: How does neuroscientific market research contribute to brand management?*

This research aims to outline the main implications from neuroscience for the theoretic approach of the traditional marketing mix. The topic is investigated by a critical literature review, in which the main aspects concerning neuromarketing in marketing management from previous research will be discussed and critically reviewed.

To investigate the underlying issue, theoretical background about the definition of neuromarketing, the implications for marketing management, the traditional marketing mix and possible issues of neuromarketing methods were collected by reading and understanding different scientific articles and books. The cited articles were published in different marketing journals but also in journals dealing with social sciences and psychology. As the application of neuroscience in marketing management is a developing topic of interest the reviewed articles and books were written between 2000 and 2014, whereas most publications were younger than eight years. Main information used were derived from the books; *Neuromarketing and Business Ethics* (Gatterer, 2012), *Neuromarketing (*Häusel, 2014), *Codes: Die geheime Sprache der Produkte* (Scheier, Linke & Schneider, 2010) and the journal articles; *a current overview of consumer neuroscience* (Hubert & Kenning, 2008) and *Consumer Neuroscience: an overview of an emerging discipline with implications for consumer policy* written by Kenning and Linzmajer (2011). Most theoretical background regarding neuromarketing was written by Peter H. Kenning, a German economist born in 1970.

After introduction and methodology, the second chapter aimed at defining the term Neuromarketing, explained main methods and procedures from Neuroscience and outlined in how far researchers investigated the topic in previous research. It is investigated how economists have been using neuromarketing in marketing management during the last years. In chapter three the traditional marketing mix is explained and implications from neuroscience will be given in order to figure out the advantages of neuromarketing for consumer research and marketing mix decisions. Afterwards a critical review on the marketing mix concept is given and the possible future of neuromarketing in marketing management stated. In the discussion part, the focus lies on the practical and ethical issues of neuromarketing before concluding statements are given.

2 NEUROMARKETING

According to Fugate, (2008) "the first attempts to understand the human mind started with Plato," as Plato understood that emotions and feelings of human beings have to be seen as two separated phenomena (Gatterer, 2012). 400 BC there was no possibility to scientifically investigate in the insides of human's brain activities but it shows that the fascination in neurologic activities is more than a few decades a topic of interest.

Therefore the usage of neuroscience to investigate in economic questions developed with emerging possibilities due to technological innovations.

Fisher, Chin, and Klitzman (2010) defined neuromarketing as "Marketing designed on the basis of Neuroscience research". This definition is quite limited. In fact neuromarketing "tries to explain the impact of a stimulus in the consumer's brain" (Gatterer, 2012) and many researchers define neuromarketing as a way to locate the "buy button" in the human brain (Lee, Broderick, & Chamberlain, 2007), which is discussed controversially. Actually neuromarketing is much more than trying to manipulate consumer behaviour to buy specific products and brands as feared by (Fisher et al., 2010) It is more about understanding consumer shopping behaviour related to price, product, distribution, communication policy and brand research (Kenning & Linzmajer, 2011). Specifically, Lee, Broderick and Chamberlain (2007) have defined neuromarketing as academic scholarship: "a valid field of study" and not simply "the application of neuroimaging techniques to sell products" (Fisher et al., 2010). Long time it was assumed that consumers act in a reasonable and conscious way in when it comes to their marketing decision. Nowadays it is known that the unconscious percentage (about 80-95%) of decision making is much bigger than the conscious part (Häusel, 2014). A concept that is similar to the myth of the conscious consumer is the theory of the rationally acting consumer. Actual brain research shows that there cannot be any decision made without the emotional part (Häusel, 2014). Häusel (2014) stated that: "The important aspects of the broader definition is the attempt to integrate all the insights of current brain research in marketing theory". Neuromarketing is not a science as could be imagined, it is more an "intelligent, focused, marketing-oriented interpretation of major scientific texts on how the brain works" (Bayle-Tourtoulou, Georges, & Badoc, 2014). Neuromarketing is knowledge about the information processing and decisions made by humans and investigates in how businesses should communicate with the brain in detail (Bayle-Tourtoulou et al., 2014).

Neuromarketing is a science in which methods and procedures from neuroscience are used for a better understanding of activities in the human brain to address marketing relevant problems. Neuromarketing is used to optimize marketing management by investigating in the neural decision making by understanding the processes taking place in the human brain during all steps of the buying process. It is about optimizing marketing strategies by understanding how all three parts of the brain (Cerebrum, brain stem and especially the limbic system, see Figure 2) process data to learn more about the needs and wants of possible customers (**Error! Reference source not found.** in attachments).

2.1 METHODS AND PROCEDURES

In traditional research it is difficult to obtain reliable data as data collected from human subjects tend to be subjective in nature. Physiological brain data instead cannot be manipulated. A famous real life example is the use of a lie detector in forensic examination; Of course the defendant can lie when the person is asked about their last night's alibi but when connected to a lie detector, a higher (unconscious) activation in the prefrontal cortex would be a sign for a wrong declaration (Dimoka et al., 2012). As neuromarketing has its origins in neuroscience, the same methods and procedures are used when investigating in processes of the human brain. Six methods are nowadays used for brain research. They can be divided in three different categories:

1. Methods in which electric cerebral activity is measured
2. Methods to measure the variance of the metabolic processes in the brain (Gatterer, 2012)
3. Methods in which psychophysiological indicators are measured (Kenning & Linzmajer, 2011).

The last method cannot directly be categorized in procedures to measure brain activity, as it analyses other physiological processes of the human body. In Figure 1, (Gatterer, 2012) and (Kenning & Linzmajer, 2011), a tabular overview of the different brain research procedures is given.

Figure 1: Methods and Procedures in Neuromarketing

Psychophysiological measurements	Electric cerebral activity	Variance of the metabolic processes
Heart rate	Electroencephalography (EEG)	Positron emission tomography (PET
Facial electromyography	Magnetoencephalography (MEG)	Functional transcranial Dopplersonogrpahy (FTCD)
Skin conductance response		Functional magnetic resonance imaging (fMMRI)

Every named method has its advantages and disadvantages in functionality. The purpose in this section is to give a short overview of the named procedures and discuss the main advantages and disadvantages for brain research.

2.1.1 PHYSIOLOGICAL MEASUREMENTS

"Measurement of psychophysiological indicators is probably the oldest and simplest technique for measuring neurophysiological states" (Camerer, Loewenstein & Prelec, 2005). Heart rate measures the change in cognitive attention whereas "Facial Electromyography (EMG) can be used to measure the emotional response by attaching sensors to different parts of the face" (Kenning & Linzmajer, 2011). It is tested, that activity in the muscle responsible for the smile in a face is connected to positive emotions (Kenning & Linzmajer, 2011). The last psychophysiological indicator to investigate in positive and negative emotions of human beings is the skin conductance response. The more aroused an individual becomes, the more he or she sweats, regardless of whether the arousal is positive or negative (Damasio, 2008)

2.1.2 ELECTROENCEPHALOGRAPHY (EEG)

The Electroencephalogram is known as the deduction and recording of electronic potentials at the brain's surface. Electrodes will therefore be placed at the surface of the skull

(Gatterer, 2012). Most times these tests are conducted in dormant phases (Gatterer, 2012). The main advantage of EEG is its high temporal resolution whereas the main disadvantage is the limited spatial resolution (Kenning & Linzmajer, 2011).

2.1.3 MAGNETO ENCEPHALOGRPAHY (MEG)

Magneto Encephalography is sensitive to changes of the magnetic fields that are induced by electrical brain activity (Kenning & Plassmann, 2008). This method allows a better spatial resolution compared to the EEG (Gatterer, 2012) and it makes it possible to visualize activities also in deeper brain regions (Kenning & Linzmajer, 2011).

2.1.4 POSITRON EMISSION TOMOGRAPHY (PET)

Positron Emission Tomography produces three dimensional pictures of activities in human bodies (Kenning & Linzmajer, 2011). It is a technique, where X-rays are placed around the head and sweep the patient's body (Gatterer, 2012). As the spatial resolution is better than with EEG or MEG, this technique can be used to analyse patterns in the human brain, which occur over longer time periods (Gatterer, 2012).

2.1.5 FUNCTIONAL TRANSCRANIAL DOPPLERSONOGRAPHY (FTCD)

FCTD works with sound, where sensors are attached to the skull above the frontal cortex. The measurement of sound properties caused by cortical activation has a limited spatial resolution but its main advantage can be seen in low costs (Gatterer, 2012).

2.1.6 FUNCTIONAL RESONANCE IMAGING (fMRI)

FMRI tracks the oxygen level in the blood flow of the brain. With a higher neurological level, the oxygen level will rise. The patient is surrounded by strong magnetic fields, whereas a computer analyses the blood structures (Gatterer, 2012). "In contrast to EEG, fMRI provides better spatial resolution, it does so, however, with a lower temporal resolution (Kenning & Linzmajer, 2011).

Sharma et al. (2010) added the Computerized Tomography Scan (CT) and the Galvanic Skin Reaction, which is not discussed in this paper.

The major advantage of all different methods and procedures for neurological investigation is the reduction of method bias from traditional research methods. Neurological procedures can be combined to overcome the practical issue of "people which are either unable, uncomfortable, or unwilling to truthfully self-report" (Dimoka et al., 2012). Neurophysiological data hat the strength of offering real time data "while a subject is executing a task or responding to a specific stimulus" (Dimoka et al., 2012). Dimoka et al. (2012) found that: "By permitting continuous real-time data collection and powerful time-series analysis", it is possible "to capture the flow of either a single construct or many constructs simultaneously".

The application of neurophysiological tools also has weaknesses: the main disadvantage can be seen in the high costs of application: (Dimoka et al., 2012) stated that "the cost of psychophysiological tools is manageable (between $10,000 and $20,000 U.S.) cost of neuroimaging tools is substantial between $100 and $600 U.S. per scanning hour:" Another weakness of brain research procedures is the experimental situation itself in which patients are probed. Often examination induce a stress situation in the human body which could cause significant failures. The high amount of imaging data which occurs from brain research is often difficult to document and analyse as it is "difficult to interpret the meaning of brain activations" (Dimoka et al., 2012). This fact makes it necessary to repeat tests for guaranteeing a high level of validity and reliability of test results.

2.2 NEUROMARKETING TODAY

One of the most famous examples how neuromarketing is applied today can be demonstrated by a business example from Coca Cola. With the use of an fMRI a research team, which was led by the brain researcher McClure (2004), found out that there can be a difference identified in brain activation between Pepsi and Coke. While drinking the two different products in a blind test, no difference was measurable, but when the consumer knows which product he consumed, there was a measurable difference in brain activation. Coca Cola activated some additional brain areas (see Figure 2) like the Hippocampus and the Dorsolateral Prefrontal Cortex, while Pepsi did not. By that study it was shown that marketing strategy of Coca Cola seems to be so successful, that the brand stimulates a cultural preference in the brain (Gatterer, 2012).

The mentioned business case is just one example of the usage of neuromarketing today. Against the belief, that neuromarketing is used for consumer manipulation, it is more about better understanding customer preferences and therefore neuroscience can be an additional tool, used in consumer research. (Solnais, et al., 2013).

Burgos-Campero and Vergas-Hernandez (2013) stated that "the collaboration between neuroscience and marketing to expand the knowledge in important areas, from the expected questions such as the relationship between the consumer and the product, the influence of advertising stimuli, the formation of a brand, unmet needs and business opportunities, to the interaction".

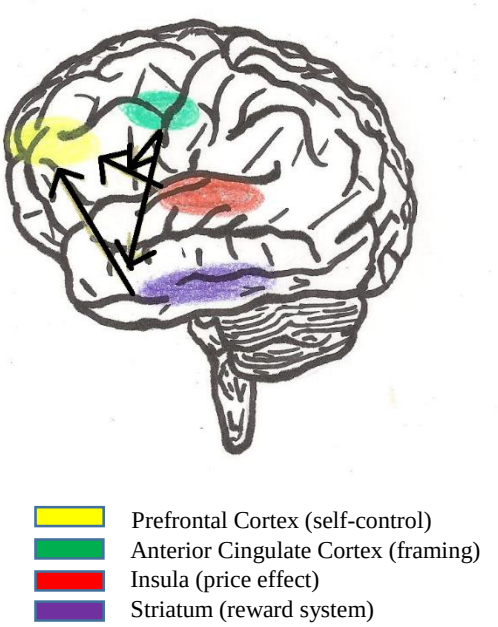
As stated by Professor Dr Kenning in Häusel, (2014): There can be three different subjects identified, in which neuroscience nowadays is used in combination with marketing purposes. *The first one is brand research:* It is known that the decision for a specific brand also known as first-choice-brand (Deppe et al., 2005) is a highly emotional process and activates other brain regions than substitute products from other brands. But it is still unclear how a brand image can be built in our brain. So how does the brain learn to act loyal towards a specific brand? What is known, is the fact that decisions are made based on the principle of reward and punishment. It can be assumed that brand loyalty arises through positive experience with a specific brand resulting in an activation of the parts in the human brain, which are responsible for the reward system (Häusel, 2014).

The second subject in which neuromarketing plays an important role, is the impact of advertising. Especially advertising is only successful when addressing the emotions of possible consumers. Different parts in the brain are activated through different emotions, as for example fear and happiness (from P. Kenning) in Häusel (2014). But we still do not know which specific attributes in an advertisement are responsible for the transport of emotions. We know that an advertisement, which is assessed as attractive activates the rewarding system of the brain but also advertisements which are judged as negative will be well recognized.

The third subject in which neuroscience can contribute to prior research results is the one of buying decision. As stated before, Weber et al. (2007) refutes the hypothesis that neuromarketing

can be used to locate a "buy button" in the human brain. Neuroscience is rather used to find solutions to marketing relevant problems by investigating in the different decision processes which are responsible for a buy decision. These can be quite complex as known today. As an additional role for the other to marketing subjects mentioned, emotions have a conscious and unconscious influence of the buying decision of a human being (Deppe et al., 2005). Knutson et al. (2007) developed a model in which it is shown, that buying decisions are a result of competing impulse handling and is generated in the insula and the Nucleus acumens in the prefectural cortex. Deppe et al. (2005) executed that four impulses are responsible for the buying decision.

Figure 2: Brain Areas



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The functionality of brain areas is described as below:

1. The reward which is conducted by a different brand of a product will be encoded in the **Striatum**.
2. The effect of a price can be located in the activation of the **Insula**.
3. Decisions on the integration of both impulses and self-control can be positioned in the **Prefrontal Cortex** of the brain
4. And the factors which can be named as frames (the reference price for example). These are processed in the **Anterior Cingular Cortex**.

(Häusel, 2014)

Unclear until know is; if the results known from neuroscience are a better method than traditional research procedures to forecast and explain the buying behaviour (Häusel, 2014).

3 NEUROMARKETING IN MARKETING MANAGAMENT

As the definition of the term "Neuromarketing" is given and explained in how far economists and scientists investigated in neuroscience for economic purposes in the next section the application of neuromarketing for marketing management is analysed. The next section is meant to explain the traditional marketing management tool called the marketing mix and in how far neuroscience can add value to the theory of the marketing mix.

3.1 THE TRADITIONAL MARKETING MIX

The principal pf the marketing mix was first mentioned around 1940. At this time the marketing mix persisted out of 12 different categories (Hyman, 2004). McCarthy, (1960) than reduced the original 12 categories to come to a total of four categories, which seem to make sense without the remaining instruments, he comes to the following categories (Zollondz, 2012):

- Product
- Price
- Place
- Promotion

Following the definition of Zollondz, (2012) the marketing mix is about the combination and coordination of marketing instruments, which are used to achieve the marketing goals of businesses for a specific target market. Every instrument has to be adjusted to the adoption of the other categories.

After the appearance of Web 2.0 applications, marketing environment changed and additional marketing channels became important, which nowadays influence strategic marketing decision. The McKinsey consultant Christian Malorny was one of the first who developed an understanding of the additional marketing instruments needed. He introduced us how important employees and process based organisations are for nowadays marketing decisions (Zollondz, 2001). Based on those discovery, the additional three P's were added:

- Personnel
- Process
- Physical Facilities

With those additional three P's the requirements were set, which are necessary to follow a Customer-Relationship-Marketing approach (Zollondz, 2012). Based on the definition of Bruhn (2011) a definition of Consumer-Relationship-Marketing is given: Consumer-Relationship-Marketing is a customer based orientation of a marketing focused corporate management in which all business processes are aligned to the needs and wants of consumers. In **Error! Reference source not found.** (see attachment) a graph was constructed, which shorty explained the seven P's of the marketing mix.

3.2 IMPLICATIONS FROM NEUROSCIENCE FOR THE MARKETING MIX

By the introduction of the Consumer-Relationship-Marketing approach and the additional three P's of the marketing mix the next section is introduced: the evolution of a more customer based business orientation can be seen as the corner stone for the use of neuroscience for marketing management. The alteration of business strategies to become more focused on the needs and wants of consumers originate the question on how to supply the shopping needs of human beings. Methods of problem resolution can be found in neuroscience. In the following section it is explained in how far neuroscience contributes to the marketing mix approach.

Although seven elements of the marketing mix are presented, not all seven are relevant for neuromarketing purposes. As neuromarketing is mainly used to get new information about consumer preferences regarding products and services, the marketing mix is shortened to the original four elements:

1. Product
2. Price
3. Place
4. Promotion

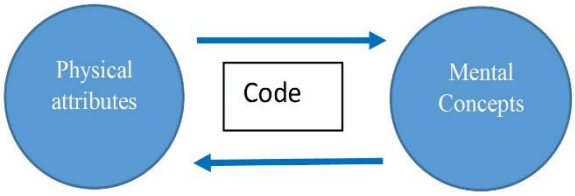
The marketing mix is used to bring a product or service to market by finding the target market, offering a product or service a specific group wants and needs, offering it at the right time, at a place these group of people often visit, for a price people are willing to pay. The goal of good marketing mix management is about placing a product/service in a position of uniqueness, which could also be defined as successful brand management. Successful branding puts a company in the position of being irreplaceable as customer notice a brand as the only one providing a solution to their problems. As branding could only be efficient when product, price, place and promotion decisions are carefully adjusted to consumer needs and wants, it is introduced as a fifth attribute combining the 4 P's marketing mix elements. The additive fifth attribute of branding is especially useful thinking about the use of neuroscience for marketing management, as it is investigated in how far the limbic system makes buying decisions by melding product, price, place and promotion experiences of a product or service. On this background consumers decide if it is useful to be loyal towards a brand or not.

The five attributes and additive remarks from neuroscience are presented following.

Product

As defined by Kotler (2008) A product is "Anything that can be offered to a market for attention, acquisition, use or consumption that might satisfy a want or need. It includes physical objects, services, persons, places, organisation and ideas." Product decisions are a key element in in the overall market offering. "Marketing mix planning begins with formulating an offering that brings value to target customers. This offering becomes the basis upon which the company builds profitable relationship with customers" (Kotler, 2008). To tackle the question how exactly a product satisfy a need or want of customer, neuroscience is used to offer insights in the decision process of customers. It is necessary to understand why customer buy specific products and why they use them in the way they actually do. "Everyone who is honest over its own buying decisions, knows that we often not just buy a thing, but the idea which this thing is representing" (Ariely & Norton, 2009). In a study performed by the University of Toronto, participants were asked to imagine a situation in which they were socially excluded. The other group was asked to notice a situation in which they spend time with good friends. After they brought the situation to mind, they were asked under false pretence to choose for a specific product. To be available there were Coke, cracker, coffee and soup. The outcome of the experiment was, that the socially excluded group much more often chose coffee and soup for consumption than the socially integrated group. But what does this implicate? In fact the human brain associates the physical attribute of warmth with positive feelings as social integrity (Scheier, Held, Bayas-Linke & Schneider, 2010). What does this finding implicate for product decisions? In fact it is scientifically proven that physical attributes and mental constructs are attached to each other (Scheier et al., 2010). Physical attributes of products activate mental concepts in mind. Investigations by Erk at al. (2002) showed, by presenting pictures of sport cars and small cars, that the reward related brain parts are stimulated by products that gained a reputation as status symbols through cultural conditioning (Hubert & Kenning, 2008). The key to the human buying decision can be found in the implicit alliance between physical attributes of a product and the associated mental concepts (Scheier et al., 2010).

Figure 3: Mental Concepts



(Scheier et al., 2010)

Products are experienced by sensory codes via eyes, ears, sense of touch, taste and smell. For product differentiation product design is key. All these signals will be processed in the human brain. How important product design is for buying decisions shows an example out of the food industry. Light products are sold more often when colours of product packaging are less intensive. That is the reason why milk with a lower fat percentage is often presented in a light blue packaging whereby milk with a higher fat percentage is sold in a dark blue packaging (Scheier et al., 2010). Every physical attribute of a product implicates a specific disposition.

Price

"Price is the amount of money charged for a product or service, or the sum of the values that consumers exchange for the benefits of using a product or service" (Kotler, 2008). Although price is not the major factor affecting buying decisions, it is still an important element, as it determines the market share and profitability of firms (Kotler, 2008). The price level a consumer is willing to pay is hardly dependent from the stimulus the product or service triggers. Although high prices often deter customers from buying a product because high prices are perceived as a loss, it is also possible that those high prices are related to high quality (Lichtenstein, Ridgway & Netemeyer, 1993) in Hubert and Kenning (2008). Price preferences are often hardly to recall by consumers (Vanhuele & Drèze, 2002) in (Hubert and Kenning (2008). Hence, "consumers might be equally aware of both the high-priced product and the low-priced product" (Yoo, Donthu & Lee, 2000) in Huan & Sarigöllü (2012). Although it is difficult for customer to determine price limits, different price levels for products activate different regions in the brain. An experiment investigated by Knutson et al. (2007); in which participants were shown different products and corresponding prices showed, that "activity changes in the insula might reflect the perception of a loss and thus, the neural representation of a negative price effect. In the future this information can be important, for example, in the identification of price limits" (Hubert & Kenning, 2008). Firms always have to ask the question how much a consumer is willing to pay for a

specific product. There can be huge differences within different product types. It is not possible to ask how much a person is willing to pay for a bag. The willingness to pay is hardly dependent from the buying context. If it is possible to reach a higher social status by buying a specific bag, we are willing to pay more than we are willing to pay for bag which is just used to store things on a shopping trip (Scheier et al., 2010). Hofstetter and Miller (2009) said that the consumer's maximum willingness to pay is context related. How important context is when determining the willingness to pay, was investigated by consumption researcher Rob Walker. He created the "significant object" project, in which he and his team bought 100 products for a value of 128 dollar and earned a profit of 3.612 dollar by just telling a unique story about every product (Scheier et al., 2010). Humans pay for reaching a specific goal. Willingness to pay raises when relevance of an implicit goal raises (Scheier et al., 2010). How important prices are for the effect of a specific product is shown by a study performed by the California Institute of Technology. Subjects were asked to taste different kinds of wine while lying under a brain scanner. Two wines were served double: As a cheap version for 5 to 10 dollar and as a luxury version for 45-90 dollar. Findings showed, that the luxury version although taste was the same significantly activated the Frontal Cortex more intensive. Following tastes subjectively better than the cheap alternative (Scheier et al., 2010). Surprisingly also display of prices play a role in consumption. Prices activate areas in the brain, which can be analysed to be responsible for feeling pain. Different visualization of prices results in a different cognition. When a price is visualized with the specific currency sign, the Insula is activated more than by just seeing a number and therefore the brain region connected to feeling pain. This is an effect of the codes our brain adopted and combined with specific mental concepts (Scheier et al., 2010). The number "0" for example activates another mental concept as representing a specific code. The moment Amazon introduced the cost free distribution of products in Europe, the distribution in France was just reduced to an amount of 10 Cents. Although this is a low amount the effect was much lower than the reduction to "0 Cent" (Scheier et al., 2010). The effect of the code "0" can also be identified in marketing strategies of light products. Offering a product as containing 0 calories has a more significant effect than offering it as a light product or a product containing less calories. This effect can be identified as the "Zero-effect" (Scheier et al., 2010).

Place

"A companies' channel decision directly affects every other marketing decision as pricing depends on the distribution channel they use" (Kotler, 2008). A distribution channel is "a set of interdependent organisations involved in the process of making a product or service available for use or consumption by the consumer or business user" (Kotler, 2008). The choice of the optimal distribution channel has an influence on the optimal presentation of a product (Hubert & Kenning, 2008). In two similarly constructed studies, (Deppe et al., 2005)

"*Examined the neural correlates of this ''framing effect.'' A main finding of their investigations was that the medial prefrontal cortex and the anterior cingulate cortex, in particular, play a central role for the integration of implicit framing information, for example, the importance of emotions and unconscious memories in the decision-making process*" (Hubert & Kenning, 2008).

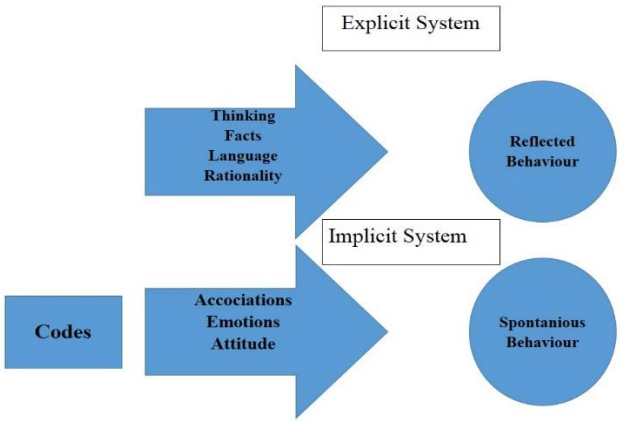
Preferences for a specific retail brand can be analysed by investigating the activation of specific brain regions. Loyal customers include more emotions into the decision process, which can be identified by a more intensive activation of the Prefrontal Cortex (Hubert & Kenning, 2008). "The base for long-term customer retention. Through a learning process, positive experiences are combined with the retail brand, then stored in the memory of the customer and recalled for buying decisions" (Hubert & Kenning, 2008).

Promotion and Communication

The importance of building good customer relationships is more than just developing a good product or pricing strategy. Companies should communicate their value proposition to customer in an effective way (Kotler, 2008). The Promotion Mix is about "the specific mix of advertising, sales promotion public relations, personal selling and direct marketing tools that the company uses to persuasively communicate consumer value and build customer relationships" (Kotler, 2008). It is assumed that specially within communication policy, neuroscience can help to close the existing gap of theory (Pitt, Berthon & Caruana, 2005) in Hubert & Kenning (2008). Through neuroscience it is possible to find answers on the question how advertisements act upon people. When is an advertisement recognized as attractive? As stated before the attractiveness of an advertisement is dependent on the activation of the rewarding system in the brain (Kenning et al., 2007). Aharon et al. (2001) showed "that beautiful female faces led to the activation of reward-related areas in the brains of heterosexual males". The key in successful advertisement strategies can be found in a combination of consistency and novelty. Brands try to secure consistency in commercials by using similar key signals or by using a similar structure (Scheier et al., 2010). Using similar codes makes sense as the human being is hardly dependent on specific habits. However it is difficult to communicate new product developments within such limited possibilities. A solution for this issue can be found in addressing same implicit goals. Axe, a deodorant producer, for example addresses same reward stimulus: Being attractive for females. Although commercials are formally different they address the same implicit goal (Scheier et al., 2010). Ambition of communication strategies is reached by offering specific goals a consumer can reach by using a specific product. Successful communication is more complex than thought. Communication strategies can only be successful when customers build an intuitive alliance between product characteristics and implicit goals (Scheier et al., 2010). Imaging a situation in which we enter a super market where every brand is unknown and we just notice the different products. It would be difficult to decide upon the offered chocolate spreads without associating "Nutella" with happiness and family, as presented in different commercials. Communication is all about conveying indirect experiences and expectations (Scheier et al., 2010). A learning effect can not only be reached via direct experiences but can also be reached indirectly. Similar with the principle of conditioning animals, human beings link specific signals with emotions. It is not necessary to get bidden by a Pit Bull to associate that specific dog breed with danger. Reading news can be enough for reproducing fear. Scheier & Held (2013) offered deeper insights about the implicit and explicit systems in the human brain:

1. The implicit system acts to the greatest possible extend unconscious. It is about decisions made via emotions, stereotypes, automatisms and brand associations. The implicit system controls non-verbal communication, learning and storage of unconscious messages.
2. The explicit system critically reflects information, plans the future and drive decisions on a cost-benefit-analysis.

Figure 4: Explicit and Implicit Systems



(Häusel, 2014)

Today it is known, that the implicit system is responsible for the decisions we make. Researcher assume that up to 95 percent of buying-decisions are controlled by implicit signals (Häusel, 2014).

Scheier et al. (2010) differentiate between two forms of reaching attention.

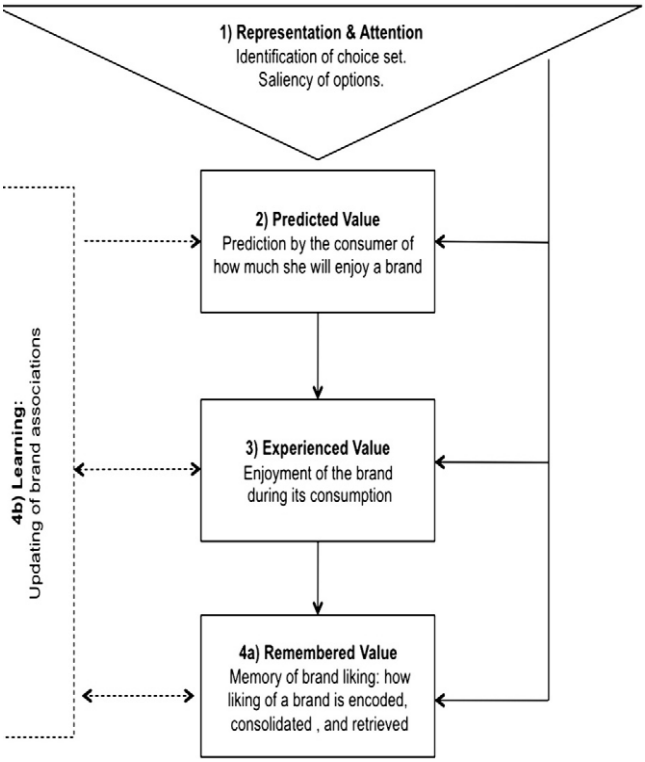
1. Bottom-up: From sense to the brain (packaging)
2. Top-Down: From brain to sensory organ (goals, expectations)

In fact humans are guided top-down. The automatic system in the human brain first asks the questions "What is the product and what can it be used for?" and "Is this rewarding?" Products are recognized as being rewarding when it is possible to reach own goals (Scheier et al., 2010).

Branding

"Brand awareness refers to whether consumers can recall or recognize a brand, or simply whether or not consumers know a brand" (Keller, Parameswaran, & Jacob, I. (2011) in Huan & Sarigöllü (2012). The influence of neuroscience for brand management summarizes what is learned so far about the other categories of the marketing mix. As brands are always associated with specific products, communication of brand specific product advantages is successful, when explicit goals are connected to implicit goals of associated brand attributes. How brand images find their way in our brains is explained by Plassmann et al. (2012): They explained branding as a process in four steps.

Figure 5: Branding Steps



(Plassmann et al., 2012)

The first process in brand decisions involves the recognition between different brand alternatives. This recognition happens via information processing on two states. Plassman et al. (2012) used the example of different beer brands. Assuming consumers have to make a choice between Becks and Heineken, information from external and internal states is integrated. The external information includes social factors, as for example the beer brand, friends chose. The internal information would include the own thirst level. "Humans are predominately visual creatures, and most of the incoming information we receive is visual" (Koch, 2004). But what exactly consumer pay attention to? Attention is the mechanism responsible for selecting information. Information selection happens via different systems. The bottom-up filters, filter the most important information based on visual input as for example colour, size, shape etc. But also higher level factors as for example; faces, novelty and text (Plassmann et al., 2012). All these different features are combined in the brain and can be measured with methods out of neuroscience. How information are processed is important for brand management. Bright colours in food packing for example have an enormous effect on decision making.

"The predicted value of each brand that is available for choice (e.g., Heineken vs. Beck's) represents the consumer's belief about the experienced value of that brand at some time in the future. In other words, the predicted value involves the consumer's evaluation of how much enjoyment will be derived from consuming a Heineken or a Beck's beer" (Plassmann et al., 2012). Schaefer and Rotte (2007) found out that brands associated with positive experiences, as driving a car brand linked to favourable brand associations is favoured because of it activates brain regions connected to the rewarding system. Nowadays it is known that "we associate brands with personalities and are able

to form relationships with brands the same way we form relationships with people" (Plassmann et al., 2012).

"Experienced value is based on the pleasure derived from consuming a brand. According to early notions of utility or value, experienced value is the "true value" that should matter the most for value-based decision making (Kahneman, Wakker & Sarin 1997). Experienced value consists of the (a) valence and (b) intensity of the consumption experience" (Plassmann et al., 2012). Valance studies the influence of positive stimulus in brain regions. It is shown, that successful branding has an influence on experienced value signals (Plassmann et al., 2012). Intensity investigated the intensity of emotional and sensory experiences.

Predicted and experienced value together decides on the motivation to buy products of a specific brand. It can be distinguished between liking and wanting a product, whereas liking refers to the experienced value and wanting to the specific motivation of a person to obtain a given reward (Plassmann et al., 2012).

How a brand is remembered hardly depends upon previous experiences. Considering the example of choosing between Becks and Heineken, maybe Becks is remembered with a tasteful touch of sweetness and Heineken associated with an attractive commercial on television. Remembering a specific brand depends on encoded values and codes. Remembered value consist of explicit and implicit memory, whereas most parts of decision making happens unconsciously.

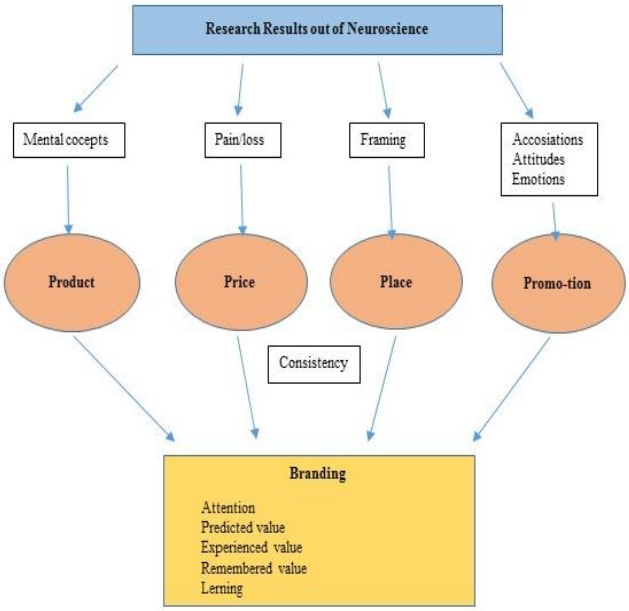
4 ADVANTAGES OF NEUROSCIENCE FOR MARKETING MANAGEMENT

Marketing management cannot be ignored anymore in today's business strategy as it deals with the customer's wants and needs. Marketing management influences every part of the business strategy in our customer based economy. Every decision in marketing management has an enormous effect on value creation and profit. But what can be learned from neuroscience regarding marketing management decisions? Neuroscience is a tool helping managers to better understand consumer preferences in all business parts, by supporting traditional marketing research methods. In the previous section it was introduced how neuroscience can influences the different parts of the marketing mix. But what does this implicate for marketing managers?

The theoretical concept of the marketing mix helps to decide how to lunch a new product or service on the market. The model can also be used to test the existing marketing strategy of businesses. The marketing mix starts at identifying the product or service, which will be the object of analysis before going through the four P's. As the marketing mix is used to answer important 'what if' and 'why' questions, this is the point where neuroscience can add useful contributions. Marketing managers need to answer questions about what will happen when introducing price changes, changing product attributes as for example colour and size, what will happen when the distribution channels will change and which promotion strategy to follow. Neuroscience is an additive tool to answer these kind of questions. Combined with traditional market research tools as for example online surveys and questionnaires, neuroscientific methods help to identify neurological changes connected to product or service decisions related to the four P's. Product or service preferences can be directly detected. The influence of a colour change for a specific product for example can be directly tested. Neuroscience will give additional information if the colour change active brain regions connected to positive emotions. Once the marketing mix is adjusted to findings from consumer research, neuroscience supports the review phase of marketing instruments by testing the overall offer from the customer's perspective. If a product or service meets the needs of the target consumer can be learned much more precisely.

Figure 6 explains the influence of neuroscientific market research for the marketing mix.

Figure 6: Neuromarketing Mix



Research results from neuroscience implicate new information about mental concepts, implanted in our minds by specific products decisions as colour, packaging and form of a specific product. Researchers get new information about the price consumer are willing to pay for a product. This decision is hardly dependent of the feeling of loss and pain, regulating the maximum amount consumer are willing to spend. Another important attribute will be the decision of distribution channels. Framing decisions are less considered but play an important role, too. Product framing decisions need to be consistent with the mental concept companies want to implicate. Promotion and communication strategy decisions are a key element for successful marketing management. Neuroscience gives new information on the emotions, attitudes and associations triggered by watching commercials. Promotions strategies should be used to support the mental concepts of products and services by communication consistent stories. Consistency in product, price, place and promotion decisions make successful branding possible. As learned so far, successful branding is key for generating value. The Coke/Pepsi example implicated the differences in brain activation between products were branding was successful, between the ones were this was not the case. Branding happens in a five step process from attracting attention to the point were experienced value is remembered and connected to positive brand associations. Research results from neuroscience give new insights on the buying decisions of

consumer by offering emotions, rewarding stimulus and empirical research has shown how important all product attributes are for the buying decision of people. It is important to be aware of the neurological impact product decisions will have for value creation. Using a red label on Coke bottles will have a totally different effect for consumer choice, from selling bottles with a green or yellow label. Before introducing a product, marketers have to be aware of the purpose it is serving. As stated before, the human being always act in a goal oriented way. Marketing decisions have to be consistent with the message marketers want to communicate. How useful would it be to introduce a new Van on the market by trying to connect it with attributes like; Sex, Sport and freedom? The unconscious part in our brain would recognize the confusing signals. Marketing mangers try to transmit before it would be possible to explain what exactly is disruptive for the consumer. The buying decision strongly relates to emotions. People buy things to reward their selves. This is as much counting for food products as for luxury products. With the help of results from neuroscientific methods, marketing strategies can be much more consumer focused. A study of Daimler Chrysler has shown that a picture of a sport car activated the rewarding system in the brain of males much more than a picture of a small car does. This result has shown, that sport cars display social status and rank (Gatterer, 2012). Pricing strategy of a product pervading needs as status and attractiveness will differ crucial from pricing strategies for products pervading needs, as hunger and thirst. As stated before the human being make most decisions unconsciously, this actuality made results from traditional marketing research methods limited and offered the importance of neuromarketing. But that does not implicate the end of the application of the traditional marketing mix. Neuromarketing influences on the traditional marketing mix just offer an additional point of view regarding marketing management decisions. It is important to recognize that neuromarketing is and will not be a self-explanatory marketing management strategy. Neuromarketing is a tool within consumer research getting additive information on consumer preferences and decision making processes. It helps to better understand the unconscious part of human buying decisions. Combined with traditional consumer research techniques, result can offer a more target focused marketing management and safe time, costs and possible generates higher revenues.

5 CRITICAL VIEW ON THE CONCEPT OF THE TRADITIONAL MARKETING MIX

As learned so far the traditional marketing mix, based on the four P's can be beneficial to categorize marketing management. The attributes still have a key function for today's marketing decisions and cannot be ignored. For analysing the influence of neuroscience for marketing management the elements are useful, as they are based on consumer preferences and choice. Though in marketing management considering the marketing mix will not be a sufficient tool to come to all necessary decisions needed in successful marketing management. The external market is not considered at all and the social context of customers is leaved out. Keeping in mind the benefits out of consumer research based on neurological information, social status and cultural background have an important influence on decision making. How useful would it be to introduce a new sports car in regions, were poverty is an actual problem? And although all parts of the marketing mix are considered, the most effective commercial for pork filet would not be successful in the Arabian world.

6 THE FUTURE OF NEUROMARKETING

Neuroscience is becoming more and more important in market research. The positive influence of neuromarketing for business success is still known by many big companies and neuroscientific methods do become more and more an element used by marketers to decide upon products and marketing decisions. In the near future it would be possible that every big company will be owner of a research laboratory for testing the neurological activities during buying decision making. Marketing management will become more and more target focused. A new market will develop, focusing on neuromarketing methods and application. As neuromarketing becomes more and more popular it might be possible that small and medium sized companies get the chance of applying neuroscientific methods by outsourcing it to specialized companies. Big Data management makes the analysis of huge data amounts from neuroscientific research easier to get collected and interpret. Although it is probable that neuromarketing will be included in daily business operations and an inherent part of marketing management, it will not replace traditional marketing research methods.

7 NEUROMARKETING ISSUES

As stated in the introduction, neuromarketing implies some disadvantages which could not be ignored. In the following practical and ethical issues are discussed.

7.1 PRACTICAL ISSUES OF NEUROMARKETING

Although neuromarketing gives us new insights about physiological processes in the decision making process, applying methods from Neuroscience is still very expensive. Small and medium sized businesses do not have the possibility to perform own research in the field of neuromarketing, they have to rely on results from companies in other segments. Another issue is the data amount gained from brain research. Real-time analysis of neurological information results in a huge amount of data, what makes analysis complex. Additionally consumer free-will could be problematic. Consumer research only can be performed when enough test persons are willing to be part of neuroscientific research. The main issue of neuroscience however can be seen in the experimental context, such tests are performed in. Conditions in laboratories differ arbitrative from conditions in the outside world and could falsify research results by influencing data reliability.

7.2 ETHICAL ISSUES OF NEUROMAKETING

Ethics and privacy concerns are an often discussed topic when dealing with neuromarketing. People are afraid of manipulation and in times of spyware and other applications used to get private information of people, they fear that losing self-determination rights is a daily risk. Truly saying, neuromarketing enables researchers a view in the human mind and offers possibilities to encode emotions and decision making processes, we would and could not voluntarily provide to others. For guaranteeing a ethical and law confirming marketing research, the European Society for Opinion and Marketing Research and the International Chamber of Commerce developed the international code on market and social research based on key fundamentals securing, that market

researchers have to conform to all national and international laws, behave ethically and acting transparent. Issues as for example honesty, data protection, professional responsibility are covered (Gatterer, 2012). Though marketing research is regulated by law, a dilemma would arise when informing subjects of experimental set-up and possible results would lead to a biased research results.

The term neuroethics was firstly introduced in 2002, because of the young age of that discipline, there is no consistent definition of neuroethics (Gatterer, 2012). Neuroethics cover topics like personal identity, autonomy and human dignity. Concluding the issues neuroethics deal with, range from fundamental philosophical human concepts like free will to more practical issues like privacy and clinical practice (Gatterer, 2012). Neurotechnology offers possibilities which enables marketers to use information "with the potential to trigger very positive affective responses in consumers" (Wilson, Gaines & Hill, 2008). Although insights from marketing will not find the "buy button" in our brain, many argue that marketing will be used to sell people only what they want instead of encouraging people to buy what they really want (Wilson, Gaines & Hill 2008). But as the "application of neuroscience to marketing may form a basis for understanding how human beings create, store, recall, and relate to information such as brands in everyday life" (Lee et al., 2007). Neuroscience is only a tool that can be used to motivate or manipulate customers. While motivation is beneficial for both parties, manipulation is beneficial for one party. Neuromarketing is not totally new, but used over years to manipulate people by commercial advertisements. Houses are furnished with high quality accessories to attract people, food products are presented in brighter colour and bigger size (Georges, Bayle-Tourtoulou, & Badoc (2013). Although neuroscience is just used for market research instead of "brain washing" it is necessary to overcome a miss use of neuroscience in marketing, consumers should be protected against an excessive use of neuromarketing techniques and further limitations by law should be discussed in the near future.

8 CONCLUSION & DISCUSSION

This paper investigated the topic of neuroscience as a marketing management tool. In existing literature neuromarketing is discussed as a procedure to influence the buying behaviour of consumers. However this research is aimed at addressing the influence of Neuromarketing for marketing management and discussed the benefits neuroscience has on the concept of the traditional four P's marketing mix. Further the paper dealt with the influence of neuroscience as a market research tool for brand management. A critical literature review was conducted in order to examine the contribution of neuroscientific results on the attributes of the marketing mix.

The literature review revealed that the upcoming trend to use methods and procedures from neuroscience for marketing management originate from the limited capabilities regarding reliable research results from traditional market research methods. Neuroscience has the opportunity to positively contribute to decisions regarding product placement and branding strategies. Neuromarketing addresses market relevant issues by investigating the activities in the human brain with the help of neuroscientific measures and procedures. Nowadays these can be efficient used to get new insights of consumer preferences regarding brand selection, influence of advertisements and consumer buying decisions by analysing the consumer-product relationship.

As Neuromarketing can be used to support traditional market research, it was a topic of interest to investigate in the direct influence of neuroscience for marketing management attributes as; product, price, place, promotion, which are all parts of the traditional four P's marketing mix (see Figure 6). Neuroscience support the marketing mix decisions to successfully launch a new product or service and testing existing marketing mix strategies to its effectiveness. The buying decisions of customers is dependent of the emotions a product or service reproduce in the human mind and connected to the rewarding and punishment system in the brain. Neuromarketing research results have shown how product attributes create specific mental concepts, whereby pricing decisions determine the degree of feeling a loss during the buying process. Branding strategies can only be successful at the time when, product, price, place and promotion decisions are consistent with the mental concept business want to create.

Market research was always key to successful managing marketing strategies. By adding measures from neuroscience businesses and marketers have the possibility to address consumers' unconscious minds. Evaluating consumer preferences by investigating in the needs and wants has many advantages for marketing management; adjusting products and services to concrete necessities of target customers reduces the risk of profit loss connected to wrong product placement and ineffective marketing strategies. But marketers should always keep in mind, that neuromarketing cannot be used to locate a buy button in human's mind and only be used as an additional market research tool beside traditional market research. Neuroscientific research is quite complex as data amount, gathered by neuroscientifc methods and procedures, is huge and the experimental set up in which subject are put into can falsify test results. Neuromarketing is expensive not only because of the needed equipment but also because of the needed expertise knowledge from external sources. Application of neuromarketing in market research is only beneficial when results are interpret precisely and gathered information consistently included in all attributes of the marketing mix.

Although neuroscience can be advantageous for marketing mix management practices, there are also some key drawbacks which must be mentioned. Beside practical issues privacy and ethical concerns of consumers must be recognized. People fear that neuromarketing could reveal the deep insights of their unconscious minds and manipulate their buying behaviour. Even though researchers stated that finding a buy-button in human's brain is not possible the picture of marketing used for techniques similar to "brainwashing" stays in people's memories. This sorrows makes strong regulation of neuroethics and laws to secure people's privacy rights important.

Neuromarketing will become more and more a topic of interest the upcoming years, as researchers bared the potential of neuroscience for marketing management practices and the benefits offered as an additional tool to personalise branding strategies with results from neuroscientific market research.

Another phenomenon which is not discussed in this article is the influence of neuroscience for social marketing and web based applications. Many researcher investigated in adopting the traditional marketing mix for online marketing purposes.

How neuroscience will be beneficial for online marketing management is not investigated but could be a topic of interest for further research.

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ATTACHMENTS

Figure 7: Definition of Neuromarketing

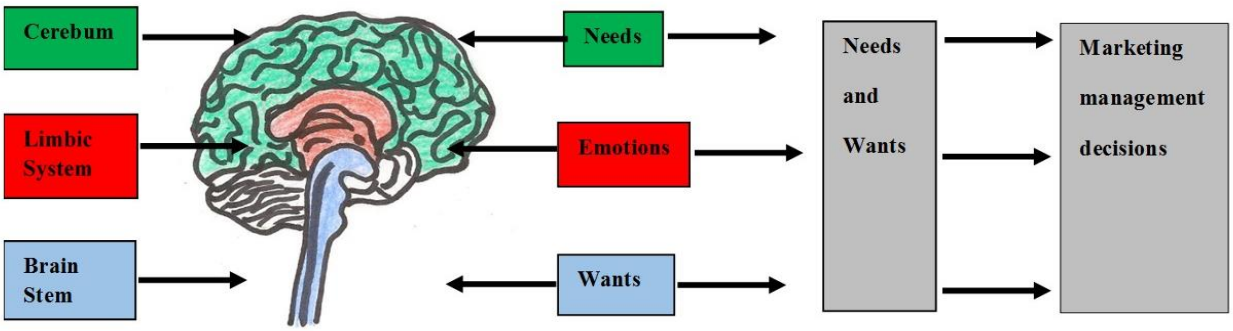

Figure 8: The 7 P's Marketing Mix