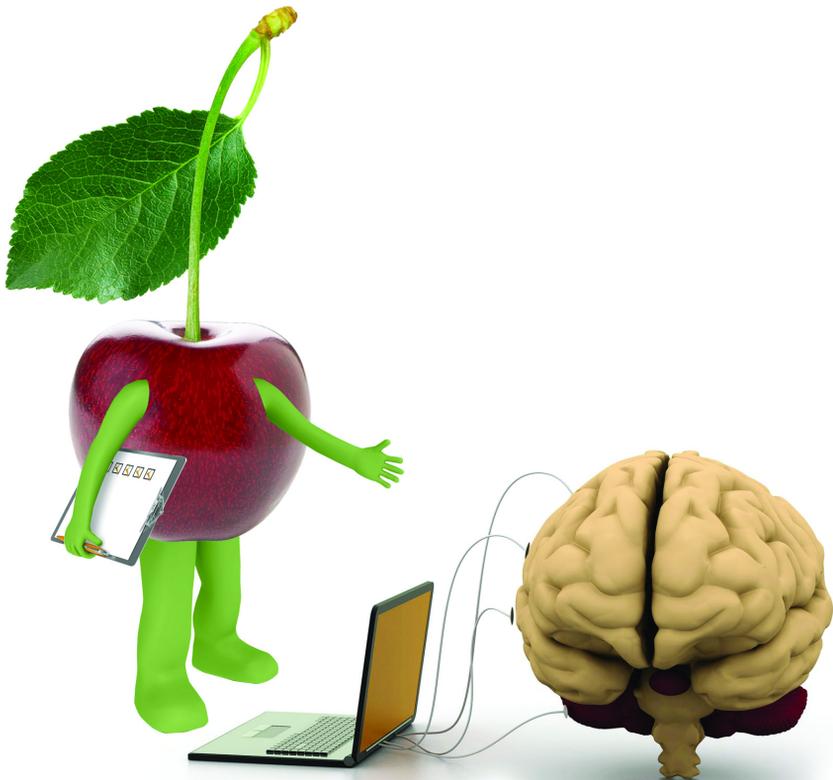


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**NEUROMARKETING — ITS ROLE IN BUILDING OF
BRAND, INTRODUCTION OF PRODUCTS
INNOVATION, AND ADVERTISING MESSAGES**

NEUROMARKETING — ITS ROLE IN BUILDING OF BRAND, INTRODUCTION OF PRODUCTS INNOVATION, AND ADVERTISING MESSAGES

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Abstract

The goal of the article is to present the substance of the neuromarketing, its assumption and possibilities, as well as the method of research of the activity of consumer's brains.

Particular attention was paid to the use of neuromarketing research in branding, efficient marketing of new products and in building effective advertising messages.

An article is also an attempt to show the possibilities of using methods of neuroimaging in improving marketing activities of scientific and research institutions.

Keywords: neuromarketing, brand, products innovation, advertising messages, brain research

Introduction

The goal of this paper is to present the concept of neuromarketing including those methods used for studying consumers' brain activity. The paper focuses mainly on the role of neuromarketing in building a brand, adopting product innovations and advertising. It attempts to highlight the ways in which neuromarketing can be used by research organizations with reference to brand, innovation and advertising.

Neuromarketing essentials

Modern marketing methodologies employed for market research purposes which are predominantly based on asking questions — interviews, questionnaires and all sorts of internet surveys — prove to be a reliable tool for obtaining factual information but are definitely of much less use in determining the subjective feelings of customers and consumers. The classic Engel-Kollat-Blackwell model relating to the making of buying decisions holds that customers behave in a logical and premeditated way.¹ It turned out however that consumers in fact find it difficult to precisely describe different emotions they might have felt in response to a stimulus such as an ad or when using a product or service. This realisation created a need for market research methods that would yield more reliable and practical data to inform better business decisions. That's where **neuromarketing** comes in, drawing on medical knowledge, new technologies and marketing.² The possibility to measure brain wave activity offers insights into the unconscious levels of the mind where stimuli are first registered and reactions to these stimuli are shaped. Owing to the similarity of human brains, in order to carry out reliable neuromarketing research it is sufficient to involve only ten per cent of the number of people normally needed for conducting traditional marketing surveys (A standard questionnaire used for market research has to be filled in by a large group of respondents. With small numbers of respondents the results might be distorted by the “buzz” or mistakes hidden in the answers).³

Neuromarketing can be regarded as a derivative of neuroeconomics, a science which combines elements of neurology, economics and psychology to examine the role that the brain plays in making shopping choices and how it analyzes gains and risks connected with taking buying decisions. The research has identified brain areas responsible for feeling pleasure and those activated when a feeling of loss is experienced — so that by observing a consumer's brain activity it is possible to say whether they will buy a product or not (e.g. perhaps because it is perceived as overpriced⁴).

According to the *International Journal of Psychophysiology* neuromarketing is “applying neurological methods to analyse and understand human behaviours regarding markets and marketing exchange”.⁵

Brain study as the basis of neuromarketing

The human brain is a supercomputer which in a second conducts some 200 billion processing operations. The brain is made up of some one hundred billion nerve cells called neurons which are interlinked by means of protruding axons creating neuron networks — highly complex structures capable of processing information at abstract and general levels, specialized in interpreting a given type of stimulus. Whatever we experience, regardless of which senses are engaged, is translated into impulses of specific frequencies. “We don't see with our eyes, we see with our brain”, an outstanding American neurophysiologist, professor Paul Bach-y-Rit said. Each neural network has an entrance gate — a group of neurons whose stimulation activates the whole network. Subsequently, impulses travel further on, activating more distant nerve cells organized in structures of varying degrees of interconnectedness and weight. On the way out of the network there emerges a modified pattern of processed impulses which travel to more distant neural networks and are further processed by the brain, creating a complex structure capable of self-organization — the human mind.⁶

The brain continuously analyses and interprets incoming stimuli and refers the results of this analysis to the surrounding world and its own activity in it. The brain controls all bodily processes, analyzes data provided by the senses and makes countless decisions. The brain produces the human “I”, builds a sense of identity, the model of man's relationship with the world — with other people, things and phenomena it encounters, real as well as imagined. The brain continuously restructures itself — impressions, experiences and whatever we have learned change the physical composition of the brain.⁷

Since close to ninety-five percent of thought processes occur in the unconsciousness mind, most information regarding decision-related reactions can be obtained by predicting consumer conscious behaviour based on studying the activity of the brain itself.⁸

Neuromarketing studies the activity of different brain areas responsible for separate functions:

- ventral striatum — a reward centre,
- nucleus accumbens — experiencing pleasure,
- orbitofrontal cortex — desire to possess,
- medial prefrontal cortex — positive bond,
- prefrontal cortex — self-esteem,
- posterior cingulate cortex — conflict,
- amygdala — challenges and threats,
- insula — estimating gains and losses.⁹

Electroencephalography, or EEG is a method used for the measurement of brain waves and, consequently, the understanding of brain reactions to stimuli. Sensors creating a high-density network are put in a special light cap worn by the subject. The sensors pick up extremely low-voltage signals with one sensor alone making up to two thousand recordings per second. EEG may be combined with oculographic tests which track the eyes movements in a person exposed to a given stimulus.¹⁰

To specify when a given brain area becomes more active, researchers use fMRI, or functional magnetic resonance imaging which measures any increase in oxygen levels in the cerebral blood flow. A person lies down in a narrow chamber surrounded by powerful magnets. These magnets generate electric fields which are presented graphically by means of computer image technology.

fMRI has the following limitations:

- difficulty to precisely correlate in time the brain response to a stimulus with the stimulus itself due to the fact that blood keeps flowing to the brain area studied for as long as five seconds after exposure to the stimulus,
- high cost (specialist equipment and rooms as well as qualified personnel are needed),
- only one person can be tested at a time; the person must remain still as even moving the head by three millimetres may alter the results and render them useless.

The above shortcomings make fMRI a perfect diagnostic tool for medical purposes but, unfortunately, of little use for marketing.¹¹

Brain activity uses up around 25 per cent of the available glucose in the human body. If short-lived radioactive markers are added to glucose it is possible to track where these substances are stored and how fast they travel through the body. As

a result of radioactive decay there appear positrons, which when annihilating are detectable by gamma cameras, a phenomenon used in positron emission tomography (PET). PET is a high-sensitivity technique which allows for examination of the usage of glucose during experiments involving cognitive tasks. Mainly used for medical purposes, PET is, unfortunately, of little use for marketing due to the high cost of the equipment and its maintenance and difficulties posed by generating short-lived isotopes.¹²

Of certain, though limited, use for marketing are also biometric markers such as pulse, breathing rate, eyeball movement, eye blinking, galvanic skin response (GSR), facial muscle movements and whole body movements. Unfortunately, these reactions are delayed in relation to the original brain activity — which depends both on a type of physiological reaction and individual features — as well as on the condition of the subject studied (tiredness, health condition, mood, influence of external conditions). Biometrics provide secondary, time-lagged and confounded information and as such are not suitable for studying emotions and cognitive processes. Moreover, a biometric reaction is not always correlated with a cognitive reaction at the conscious or subconscious level (a person in coma may react to hands clapping). Biometrics may be used as a source of additional data confirming the results obtained by means of an objective research method such as EEG, but they will never yield reliable information if used alone.¹³

Brand Essence

Today's world is marked by a continuous information buzz and the ubiquitous nature of a mass media that is fast, mobile and ever bombarding our brains with an avalanche of stimuli. The Internet with its pop-ups and winking banners, digital TV, round-the-clock news coverage, newspapers, magazines, catalogues, e-mails, podcasts, videocasts and communicators are all competing for a consumer's attention. And the consumer finds it more and more difficult to remember the morning news, let alone what they saw on TV a couple of days ago. Incapable of processing all this information, the human brain has been developing ever more effective filters, which in acting as defence systems are hard for brands to penetrate.¹⁴

Creating an optimal marketing strategy for the construction and maintenance of a strong brand in such an information-intensive environment poses a real challenge. Even coming up with a corporate design system compatible with the image of an

institution may prove a problematic task. It is difficult to make the right choices regarding the logotype and colour design that would be associated with a brand, to communicate to the customer its positive attributes and key values, inspire confidence and set the brand apart from its competitors. These decisions are often based on the subjective preferences that can only be verified in practice. The technique of brainstorming often used for work purposes is useful but may generate opinions so diverse that it is very difficult to arrive at the right solution. Sometimes the particular brand qualities that allow a certain brand to enter new markets may be hard to define and articulate.

The art of marketing is not only about presenting a brand to the customer in such a way that they are encouraged to establish a relationship with the brand and interact with it, but also about making that customer relationship stable and lasting.

It is part of human nature to experience the profound need to have relationships not only with other people but also with objects, tools and services that enable functioning in various spheres and aspects of life. People love originality and change while also being attached to permanence and consistency — the qualities that nourish trust and a sense of security. The human brain has sophisticated nervous-system mechanisms which cause important things in life to be automatically perceived as very dear to us. The identification and measurement of the effects of this attachment may yield helpful pointers to the ways in which we design, present and promote brands.

Brands play a vital role in our life, making our experiences and possessions unique, meaningful and intimate. People have always felt the need to organize their lifestyles so that they offer maximum ease and comfort. On the one hand it is tiring to continuously process new information but on the other hand the boredom of routine makes well-known things invisible. In order to see when a consumer's brain is ready for change, and when it actually needs and craves change, it is first necessary to gain a thorough understanding of your own brand — the brand message operating at the subconscious level and the brand's real value — and then watch how the brand perception evolves in the consumer's mind.¹⁵

Customers commonly identify with a brand rather than the qualities of a product offered by a brand. Literature on the subject often cites the so-called "Pepsi paradox" identified during one of the first neuromarketing studies. People involved in a blind taste-test more often chose the taste of Pepsi over that of Coca-Cola but once the companies' logos were revealed the results were reversed. It was found that in the first situation the brain region associated with the reward centre was activated, while that in

the second correlated with self-esteem — this was how brand power manifested itself. The factor accounting for a customer's loyalty is the brand reflected in a customer's self-image, not the product's features.¹⁶

Product innovation

The costs involved in bringing new products to market (time, company resources, financial resources, and even company reputation and brand image) and of modifying existing products are usually very high while the failure rate is unfortunately high. An estimated 70 to 95 per cent of implementation efforts end in failure. According to some estimations, nearly half the resources invested in new product development is spent on projects that will inevitably end in failure. Only some 10 per cent of all products and services newly brought to market will last on the market for longer than three years.¹⁷

New product development involves four major phases: creation of product concept, design and building of prototype, testing, and market implementation. Knowledge of consumer reactions at each stage of product development may help the company achieve success.¹⁸ Unfortunately, experts in behavioural economics have observed that purchasing decisions are neither fully rational nor predictable, and to a large extent are influenced by subjective emotions.¹⁹ Moreover, people have different cognitive constraints, meaning that the effectiveness of various marketing techniques appealing to specific emotional states is also limited as the marketing message sent is not necessarily received, interpreted and understood in the intended way, as professor Dan Ariely of Duke University says in his book *The Upside of Irrationality: The Unexpected Benefits of Defying Logic at Work and at Home*.²⁰

Special attention must be given to the development of innovative products. In this case, not only should researchers focus on the needs of prospective buyers, but also confront their ideas with the lack of knowledge or awareness of the product on the part of potential customers, who have no previous experience of the new solutions offered. The phases of product concept development and building of a prototype carry a particularly high risk of failure.

The largest proportion of errors relate to the way in which a research process is conducted and the quality of data gathered. Acquired information is frequently over-generalized while in the case of testing a new solution meaningful data is often overlooked.²¹

Advertising message

Advertising is “an art that supports commerce”.²² Effective promotion communications may encourage positive perceptions of a brand and company image and contribute to directing consumer preferences towards a given product. The introduction in the last century of film, radio and television provided an impulse for the first marketing revolution and significantly enriched the communication channels available, creating favourable conditions for more effective advertising. Companies received new tools that enabled them to increase the scope of their activities and reach out to new markets and wider target audiences.²³

The number of ways to reach out to consumers is limited only by the extent of sensual perception. Through the senses, advertising messages reach out to consumers' minds, becoming part of their lives. Images, sounds and physical impressions are registered by means of the perception processes to be computed at the level of the nervous system by the brain. Here they are transformed into notions, inner images, memories and plans going under the common name of hallucination. A given neural network responsible for the processing of sensual stimuli can at one time be engaged in processing either perception or hallucination-based data, but always separately, never simultaneously. This is why a person seemingly engaged with reading a book may after a while realise that actually rather than reading they have been intensely hallucinating, creating mental images that have totally obliterated the meaning of the words in the book.

In human beings, the most sophisticated and fastest sense processor is the visual perception system — one only needs to glance at a picture to remember it. The content of images is registered consciously while their parameters — unconsciously. Brightness is one of the most important features of visual impression — bright images carry positive associations and are mentally connected with safety while darkness is associated with mystery. Dark images stimulate curiosity that might even verge on the fear of whatever threats may lie in the darkness. In advertising, bright images should be used to convey a sense of credibility, comprehension and clarity of message or to teach something new. Careful thought must be given to selecting colours for advertising messages as colours are culture-coded in terms of both the positive and negative associations they carry. So the colour red signifies love, passion, and affection but also aggression. Colours affect our wellbeing and the perception of reality. Red raises blood pressure while blue and green have a calming effect. Advertising messages use appropriate colour tones to

create an intended feel or highlight particular brand qualities. Pastels are associated with gentleness, sepia with tradition and history while bright colours accentuate individuality.²⁴

Moving images make more powerful impressions on the mind than do static ones. The observer's subconscious instinctively tunes in to the moving elements of an ad due to the fact that the brain prioritizes the detection, recognition, interpretation and evaluation of movement — a skill which determined survival in prehistoric times. People pay special attention to visual stimuli — hence the high marketing efficacy of video advertising which has already come to dominate the Internet and is an ever greater presence on mobile devices. Interestingly, we prefer clockwise movement and movement from the peripheries to the centre of the observed field. In being aware of these preferences of the brain may more effective advertising messages be constructed.

Movement is not the single most important attribute of an advertisement. Other features that play a role in focusing the viewer's attention include originality, error and ambiguity.

Originality. The human brain naturally focuses on elements new to the environment. This phenomenon played a role in increasing survival chances and also allowed for making improvements to objects and methods of activity. When the brain encounters something novel that gives a pleasurable experience, it obtains and stores the relevant data for future use. This mechanism is responsible for the creation of the reward systems in the brain — the neural structures emerging in response to received information about new experiences. Novelty attracts a consumer's attention and generates the desire to try out something new, be it a new product or service, keeping the consumer motivated to make new purchases and, consequently, increasing brand loyalty. Effective advertising makes use of easily discernible visual or aural elements such as colour, contrast, juxtaposition of small and large forms or soft and loud sounds. Good practice is to stick to a maximum of two distinguishing features in order to avoid a situation where the overstimulated brain simply ignores the message.

Error. This element is very attractive for the brain as a great way to focus attention. Consequently, a message with an embedded error will stand apart from other ads.

Ambiguity. The brain loves puzzles. It focuses on the feeling of curiosity and the difficulty presented by the puzzle, which lengthens the attention span and makes the puzzle-solving experience more memorable. In this way a kind of fascination is born. An

ambiguous facial expression of a model appearing in an ad is an effective marketing technique since it hints at some mystery.²⁵

In designing advertisements it is very important to synchronize sound with image. The brain matches whatever is spoken by a character in an ad to the way it is spoken — observing whether lip movements are in sync with the sound. If the image lacks consistency in this respect, the phenomenon known as mismatch negativity (MMN) occurs. The prefrontal cortex makes an additional effort to sort the impressions received while the brain gives up tracking the main message, rendering the ad ineffective. Conversely, the proper synchronization of sensory perceptions involving the visual and auditory cortex reinforces the intended advertising effect.²⁶

Effective advertising is a vehicle used to deliver crucial emotional messages that can favourably affect a company's image. It is a central pillar of marketing communication with the customer in that it builds desired associations and generates customer interest, engagement and trust.

The role of neuromarketing in building a strong brand

Building a brand is tightly connected with a consumer's emotional sphere and as such it relies on evoking positive feelings, providing enjoyable experiences and appealing to pleasurable memories and notions. As emotions are inherently tied to the subconscious brain activity, it is obvious that neuromarketing research may offer insights with the potential to be used in brand building.²⁷

The neuromarketing brand model which involves an understanding of how a consumer's mind forms a brand image at the subconscious level can be used either to design a totally new, strong and durable brand or to reinvent and expand the existing brand. Through implementing this model a consumer can be made to feel passionate about a brand. This passion is on the one hand romantic and on the other hand based on a wise and caring friendship or even love. Human beings have the same expectations towards brands as towards important people in their lives. The complexity of consumer- brand relationship lies in striving to reach a happy balance between the comfort and security of the well-known and the risks and fascinations of the original and new. The neuromarketing brand model is useful for the appraisal of sponsored events and speakers, who have a large influence on forming brand perceptions in consumers' minds. Used at the initial stage of a promotion campaign, the above model guarantees that a given event or a speaker will have a positive influence on a company's image.

At the stage of developing an outline of the marketing strategy concept it might be helpful to proceed in the same way in which the human brain organizes the chaos of the surrounding world — working from concrete and tangible elements towards abstract problems and metaphorical concepts. Arguably, this is the way in which the brain imposes meaning on the world — by first deciphering the form and shape of an object and then moving on to abstract tasks. Interestingly, brands are analysed by the brain in exactly the same way.

We distinguish seven aspects of the neuromarketing brand essence model:

- form,
- function,
- feelings,
- values,
- benefits,
- metaphors,
- extensions.

The Form of a brand represents its physical aspect and offers a customer the most direct, tangible contact with the brand. The brand form is registered at a deep level of the subconscious mind. It is a face and voice of a brand. Formal elements of a brand include all components of corporate design — logos, colours, graphic design and typography used in marketing communications. The form of a brand is concerned with all types of sensory stimuli: visual, auditory (tone, timbre, volume, melody, tone, beat, harmonic qualities) as well as those related to smell and taste. Even the basic physical features of products such as a product's shape, dimensions, colour or texture carry mental associations. A brand's formal elements are its basic distinguishing features affecting how a brand image is formed in the consumer's subconscious mind and are often protected by intellectual property rights. Formal elements of a brand should be specified in detail while their usage needs to be regulated by brand identity guidelines.

Function. This aspect is concerned with how a brand functions in a customer's life with emphasis placed on its indispensability. Brands with the highest scores in the function category are subconsciously perceived by customers as indispensable. Of importance is also the unique character of a brand which makes it stand apart from its competitors.

Feelings. These are the automatic emotional associations that arise at the mere thought of the brand. A successful brand has a unique emotional identity encoded at

a deep subconscious level of a consumer's mind. Brand emotional identity can be reflected in the appropriate in-store environments, architectural solutions, employee dress code and display elements. Appealing to emotional archetypes is a way to stimulate the customer's interest in the company's offer. Pleasurable experiences arising during contact with a brand lead to consumer attachment and enhance customer relationship. Emotions evoked by a brand may originate in different circumstances and can be associated with a place, a social occasion, an opportunity to use a brand, the act of preparing to enjoy the brand and remembering using it as well as with a broader cultural context in which a brand functions or a life event in which it played an important role.

Values. Values are social and moral standards a brand aspires to be identified with. Values enhance brand-related sentiments. Brand-associated values may be personal, spiritual, cultural, environmental, national, legal, economic, philosophical, and historical or connected with a phase of life.

Benefits. Benefits are usually articulated as statements and affirmations about what the brand can do for us. Benefits are often associated with a customer's personal identity.

The following categories of benefits may be distinguished:

- promoting physical beauty,
- representing intellectual accomplishment,
- being fashionable and trendy,
- improving sexual attractiveness,
- being "in the know", technically and intellectually advanced,
- achieving career and financial success,
- having pride in family and their accomplishments,
- being exclusive and elite,
- providing access to power and resources,
- reflecting genetic and racial pride,
- supporting uniqueness of personality.

Metaphors. Metaphors accurately describe certain attributes of a product or service, but are not literal. Metaphors are often evocative of more ambitious expectations customers have of a brand. The most apt metaphors function as slogans and promises made to the customer. The most effective marketing campaigns are those built around one metaphor which best encapsulates a company's raison d'etre. The metaphor expresses ambitions of people behind

a brand. It is useful only if reinforced by relevant product/service attributes stressed in marketing messages.

Extensions. Brand can be extended to different categories of products due to the brain's capability to make implicit connections among any of the other aspects of the brand essence. These associations may concern a brand's additional functionality, form, benefits or any other attribute. A brand extension is more likely to be successful if it seems natural and will not require the consumer to restructure subliminal associations with the brand to make room for its new application. There are various ways to extend a brand: a brand can be given an additional functionality or it can be extended through different types of merges, e.g. functionality merge (introducing a brand to market segments dominated by other brands where it can partly take over rival brands' functionality), occasion merge (enlarging the number of situations and circumstances in which a brand may be used), technology merge (taking over and integrating with related technologies).²⁸

It is feelings that play a critical role in the mind's perception of a brand.

Although brand identity is constructed upon its physical properties a consumer's mind quickly abstracts from those and evaluates a brand in terms of values and benefits it offers.

Brands can be reinforced and reinvented in various ways. Companies with a well-established presence in the market should focus on the identification of impressions — the visual elements and other types of kinesthetic stimuli (auditory, smell, taste, touch) that activate and preserve memories and, in consequence, create a lasting customer bond. In the case of new brands it is worth concentrating on anchoring in consumers' minds brand benefits and functionalities.

The brain often uses emotions to elicit information — in complex purchasing decisions emotions always play a pivotal role. A strong brand becomes a symbol to which a customer is emotionally bonded. Time and experience are also relevant — years of successful co-operation with a company, its staff and representatives are bound to produce positive, pleasurable impressions in the consumer's mind and create mental images of a well-made product or professionally delivered service, raising customer trust and confidence in effective co-operation in the future.

Defining key brand attributes from the customer's point of view poses considerable difficulty due to the subjective nature of brand perception. Traditional market research methods such as focus groups yield no reliable data about either perceptions or mechanisms involved in remembering information. Reliable data can be obtained though by neurological tests measuring consumers' emotional responses to brands.

A brand may be associated with “trust” and “a sense of security”, but neuromarketing tests can show that consumers also react to its other attributes expressed in terms of personal relations such as being “friendly” and “supportive”. The results of this type of research enable a company to introduce additional elements to its marketing campaign, select relevant additional symbols and images and reformulate the marketing message so that the campaign highlights newly discovered features and is better aligned with customers' genuine, though unarticulated, sentiments towards the brand.

The role of neuromarketing in introducing product innovations

Researchers involved in bringing new products to market hope that thanks to neuromarketing they will gain a better understanding of consumer preferences unaffected by the bias of conscious evaluation. Neuromarketing research raises the chances for successful launch of a product, reduces the risk of failure and contributes to the increased return on investment by giving answers to the following questions:

- How do consumers react to a product concept?
- How do consumers react to product functional features?
- Is the packaging design likely to capture attention, induce emotional engagement and reinforce remembering impressions?
- How does the product rate compared to its competitors?
- Which product attributes are assessed as the most and least valuable?
- What product names elicit the most intensive subliminal reaction?
- What price level will encourage customers to make a purchase?

Total Consumer Experience (TCE) is the methodology that permits tracking brain responses at different stages of a customer's interaction with a product. Neurological testing measures brain wave activity at successive stages of a customer's contact with the product — from removing product packaging to using it to subsequent rituals and memories.

From the neuromarketing point of view, the most important element of a consumer's interaction with a product is the Neurological Iconic Signature (NIS). Using the NIS in advertising boosts purchase intent and the overall efficacy of an ad. By measuring brain responses at different stages of the Total Consumer Experience it is possible identify

points of heightened brain activity, which represent the NIS for a specific consumer experience. Recalling consumer memories through advertising to the NIS stimulates a consumer's brain to desire to repeat the pleasurable experience. Consequently, in between successive contacts with the product, the consumer craves and seeks the product.

Thanks to the TCE analysis it is possible to identify the moment during a consumer's interaction with a product when the impressions are the most intensive offering the consumer the highest level of satisfaction. This moment can be alluded to by the product packaging, advertising, marketing communications and entire promotion campaigns.

Neuroscience can be used to test the potential of innovation concepts. Since brain analyses have continuous character, it is possible to identify potentially viable elements even in the apparently misguided concepts. Thus it is possible to 'save' the promising elements of a concept, which opens up possibilities for formulating new concepts and testing a number of variants.²⁹

The role of neuromarketing in shaping advertising communications

John Wanamaker, the famous founder of the first department store, expressed his opinion about the effectiveness of advertising in the following words: "I'm well aware that half the advertising budget is wasted. The problem is I don't know which half it is".³⁰ So what should be done to not only attract but also engage the customer by creating a durable bond? How to construct an advertising message that would attract customers like a magnet? Neuromarketing studies can offer answer to these questions by making it possible to analyse the key factors determining the effectiveness of advertising.

The factors determining the effectiveness of advertising include:

- **Second-by-Second A-E-M Response.** It is possible to measure attention levels, emotional engagement and memory retention for every second of the commercial, which permits analysis of its effectiveness and offers insights into possible improvements. Actually, the advertisement effectiveness evaluation based on the first five seconds of an ad enables marketers to assess the risk of viewer flight or tune-out. Similarly, the way the spot ends is important, because brand logos and product messaging are placed near or at the end.

- **Advertisement effectiveness after multiple viewings.** After multiple exposures to an ad, it is possible to measure advertisement effectiveness and to observe when this effectiveness begins to decline. This knowledge can, consequently, inform better decisions regarding buying advertising space.
- **Neurological compression.** It is possible to identify the most effective, from the neurological point of view, moments of an ad and compress the ad to the absolute minimum, which is useful in the case of mobile and internet messages.
- **Parietal (touch, taste, smell) brain stimulation.** As well as telling a story, an effective advertisement also stimulates the brain regions responsible for appreciating a product.
- **Activation of the mirror neuron system.** Mirror neurons are involved in feeling a desire to instantly consume a product or a willingness to possess it. Moreover, mirror neurons are responsible for “mirroring” purchasing decisions observed in other people since they are involved in imitating behaviours and emotions.
- **Neurological Iconic Signature (NIS) embedding.** NIS responses are identified through Total Consumer Experience testing, and can then be applied to verify how well the “face and voice” of the product are embedded through the length of a commercial. Advertisements that embed the NIS score higher on overall advertising efficiency and generate significantly higher levels of purchase intent.
- **Audio coherence and music/voice effectiveness.** It is possible to measure the efficacy of music and narration in an advertisement. Music builds the emotional context used by the brain to interpret the message content.
- **Character Effectiveness.** Through eye-tracking it is possible to evaluate the effectiveness of a character or a spokesperson in an individual ad and to diagnose the underlying dynamics of each. This allows advertisers to determine whether a given ad character has enough neurological impact to justify creating an entire portfolio of ads featuring this character.
- **Out-of-Home (OOH) advertising neurometrics.** It is possible to identify moments in the ad that generate the highest purchase intent. The display of static or dynamic components of an ad that generate the highest purchase intent has been found to result in significant increases in sales.³¹

Neuroscience also gives hints as to how to increase the effectiveness of printed ads. Logos and symbols should be placed in the central visual field or with a slight bias to the left visual field, images — on the left side while semantic elements on the right. When

designing an ad the following recommendations should be considered: use up to three visual elements, use vertical rather than horizontal placement and separation, and insert a space between individual elements.³² In our culture, images are traditionally presented in rectangular frames so using oval frames may become an important distinctive feature of a brand. If the contours of an image are blurred the mind interprets the image as extending further beyond the vision field. An interesting gimmick used by marketers is to use fragmentary close-ups of advertised products, which stimulates the viewer's imagination to venture beyond the image presented.³³

Neuromarketing methods can offer marketers helpful insights into consumers' subconscious responses to the basic advertising premises, which generate time and money savings and eliminates the need for extensive market research. If a given concept at an early stage of development has elicited a positive consumer's response, advertisers can focus on delivering the advertising message. Neurological testing allows for unequivocal and precise appraisal of a proposed copy — through measuring consumers' subliminal responses in real time. The results may be used to identify and isolate the most effective components of an ad, which raises the efficacy of the whole production process. Finished ads can be tested to ascertain their overall effectiveness against campaign objectives.

A neuromarketing perspective on brand development, introducing product innovations and shaping advertising messages in the context of an R&D organization

To survive on the ever-changing market, all commercial entities, both enterprises and co-operating research institutes, use complex marketing strategies to build strong brands and encourage customer relationship based on trust and emotional engagement. Neuromarketing studies provide valid objective data that can be used by organizations for the purposes of creating flexible brands swiftly accommodating to the realities of today's marketplace.

Advertising activities fulfil a number of functions including the enhancement of the positive image of an organization, dissemination of its scientific achievements and fostering co-operation with industry. It is through promotion efforts that R&D organizations inform of their capabilities and development plans. As well as offering a better understanding of consumer values and behaviours, neuromarketing testing also gives knowledge about what attracts consumers' attention and what drives brand loyalty.

It is important to note that neurological studies of consumers' subliminal responses to product prototypes, technology demonstrators and research services offered by R&D organizations can identify a product or technology that can best meet the expectations of prospective users.

Neuromarketing opens up many possibilities but its practical use is constrained by our incomplete knowledge of the human brain. Luckily, brain research is continuously progressing.³⁴

The implementation and exploitation in practice of neuromarketing methodologies requires commitment on the part of both scientists and representatives of the business world, which can foster creating links between these two spheres while the interdisciplinary character of research is likely to significantly improve the quality of services offered by R&D organizations.³⁵

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