

*GAINING A COMPETITIVE  
ADVANTAGE THROUGH  
NEUROMARKETING*



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## **FOREWORD**

*“I would like to thank my parent’s for giving me the love, support and education throughout my life, making me proud of the person I am today.”*

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## **EXECUTIVE SUMMARY**

The market today is located in a large and complex environment, where competition is really high and one of the crucial areas that companies need to focus on is to understand the consumer. What if you find a way of understanding the consumer's brain in depth? Throughout history Marketing Analysts have been struggling with the market trying to understand the consumer's brain and how it works. Nowadays, they incorporate the combination of science and technology in their work as such Neuroscience is a new tool that helps us to understand the consumer, using a new technique known Neuromarketing.

Our 5 senses are the stimulus that makes our brain process more than 11 millions bites of information per second, but the core issue is that of those 11 million bites, only 40 bites of information are processed in the conscious part of the brain. Indicating that more than the 99.99% of information goes to the subconscious part of the brain. Marketing methodologies have to learn how to penetrate that 99.99% subconscious part of the brain. Focus groups and other traditional marketing techniques only analyse the conscious part of the brain in that the consumer has time to think about the response they provide to market researchers. In contrast, Neuromarketing analyses the brain before the consumer has the chance to think about what they have seen, heard, smell, tasted or touched. Therefore, the results achieved are more accurate in that the human thinking does not interfere with their responses.

For companies to obtain accurate results from research they should not only investigate the consumer's perceptions, what they have to do is to understand how their brain responds to certain stimuli. The combination of transmitters, microprocessors, and digital technology help to capture the interplay of the brain's electrical activity. Neuromarketing aims to put high density sensors over the target area in order to collect information for the hundreds of miles of wires that are in the brain, thus making results collected more accurate. Neuromarketing obtains the answers directly from the neurophysiological part of the consumer's brain, without asking the consumer verbal or written questions. This methodology permits researchers to obtain accurate and reliable answers without human thinking interfering in the response.

To understand Neuromarketing we have to look at the main parts of the brain, due to the fact that the scanning devices show us, where in the brain the activity is going on. Therefore, we are able to obtain accurate results of what emotions are being generated upon certain stimuli. The human brain has two sides, the right hemisphere and the left hemisphere. The right hemisphere is the part of the brain that is concerned with creativity and the left is the logical part of the brain. Apart from the two hemispheres, the brain is composed of 4 main parts inside the cortex; the parental lobe, the frontal lobe, the occipital lobe and the temporal lobe; each of them has a different function in the brain and responds according to different stimuli.

The brain reacts to the human senses; hearing, taste, smell, vision and touch. We relate our sense to our knowledge, what the brain stores in the memory is most of the information that are reactions of what we felt in the past. The visual stimulus is very important in Neuromarketing techniques due to the fact that vision takes up the majority of brain activity, what happens is that humans are constantly scanning for things in the physical environment even though we are not always aware we are doing it. For example, in a store, which is the environment, were the consumer has the opportunity to purchase a new product, the consumer is scanning everything he or she sees before the purchase. On the other hand, smell and taste come together as a stimulus that produce similar reactions, hearing is what enables communication between people, different sounds are easy to memorize and make the consumer more emotional. Finally, touch is the sense that contains Sensory receptors all over our body, therefore companies need to analyse the sensory abilities each product has. They need to implement research results on the product before launching it into the market, that way they can ensure that the consumer feels the product better with their sense of touch.

The female brain acts in a different way than the male brain, this suggests it is extremely important to know who the target consumer is, and give the correct test to the right type of consumer you want to attract, because results may differ between the sexes.

Females are a very detail oriented mammal, paying attention to everything in the environment, when they talk to a person they look at their facial expression, and the tone of the person's voice. As females consider everything they hear they make

certain expressions, that if we take a look at them, it is easy to deduce what a female is thinking.

Males on the other hand, when they go shopping they don't connect as emotionally as females do, they simply go and look for the product they are looking for, they are not distracted by other products and are more concerned with features, attributes and benefits of the product. Their process is easy, they simply go to the store get one item, the one they were looking for, and leave immediately.

After understanding the brain and the difference between senses and genders, we will take a look at the 3 ways of using Neuromarketing:

- EEG The electroencephalography is a passive technology that uses sensors to capture those electrical signals that the brain produces.
- fMRI Brain activity can be measured by blood flow, when part of the brain is emitting electrical charges the brain requires extra oxygen for the flow of blood.
- Biometrics is the measurement of many physiological responses.

Using any of the 3 techniques to conduct Neuromarketing we are able to measure and analyse the Neurometrics. Neuromarketing has five main areas of evaluation, which are, in-store marketing, advertising, packaging, branding and the product. These five areas are evaluated by Neurometrics through three primary pillars of evaluation which are; attention, emotional engagement and memory. Following this we have 3 secondary pillars of Neurometrics which are; Purchase Intent / Persuasion, Novelty, and Awareness/Understanding/Comprehension. Finally, as a summary of the whole process of Neurometrics we can say that it is effective.

Neuromarketing has been a huge success, it has been suggested that 80% of the new products fail in the market, but with Neuromarketing this percentage is going to decrease. This is the main reason why companies such as, PepsiCo, Microsoft, CBS,

Intel and other major companies commenced using Neuromarketing more than 6 years ago.

Neuromarketing, not only saves companies time but it also saves them money, and decreases the risk of a possible product failure. Receiving the attention, emotional engagement and memory directly from the subconscious brain obviously gives Neuromarketing a clear competitive advantage in the marketplace.

## **PART I: OVERVIEW (Introduction)**



## I.I Research topic

Given that there are constant changes in tendencies and markets, Marketing techniques have to develop new ways of attracting the different tastes of the growing consumer. Throughout recent years, many traditional marketing strategies have failed. One of the biggest problems of marketing is the way in which it is directed to the consumer with advertisements, which do not inspire the consumer to purchase the product, or the consumer is repelled by the “over-marketing” techniques used.

One of the biggest disincentives is to push the customer to make the purchase by telling them what they have to do. Traditional marketing techniques on many occasions overload the customer with unnecessary information this makes the brain reject what, in the beginning may seem to be attractive to them. What companies need to do is to avoid creating an excess of sales pressure, preventing customer confusion and irritation. Companies need to understand the consumers brain before it overloads it with unnecessary information.

Professional marketing tacticians spend their whole career trying to work on understanding the consumer’s behaviour and penetrate their brain. But traditional marketing techniques only focus on one small part of the brain, and not the brain as a whole. Marketing studies are focused on the part of the consumer’s brain that can be heard, touched or seen, but under all this there is an enormous part that has not been analysed. Many focus groups and other marketing techniques try to penetrate the subconscious mind of the consumer, but how accurate are the results? How sure are you that the consumer hasn’t been unconsciously influenced by the questions being asked? It is important to note that, 99.99% of the buyer’s decisions are made by the subconscious mind.

Our 5 senses are the stimulus that makes our brain process more than 11 millions bites of information per second, but the core issue is that of those 11 million bites, only 40 bites of information are processed in the conscious part of the brain. Indicating that more than the 99.99% of information goes to the subconscious part of the brain. What marketing strategies need to do is to target is how to penetrate those 40 bites of conscious information, or the other alternative is how to influence the subconscious part of the human brain. The main problem faced is how the human brain responds to what it sees, hears, smells, tastes or touches. The marketing areas and strategies must

take into account how the consumer's brain responds to the product at a subconscious level and what they need to do in order to influence it. For a consumer it is complex to express in exact words the emotions they feel after certain stimulus because they have to construct with their conscious mind what they felt with the subconscious mind and later express all those feelings in words. As a consequence, if the consumer has such difficulty in expressing what they have felt in their subconscious mind, then it is virtually impossible for us to understand them.

Traditional marketing is based on the answers consumers provide to questions about a product or the service, however the problem with this method of analysis is that it does not take into account the inner activity in the subconscious and how the human brain reacts to a stimulus, On the other hand, Neuromarketing analyses what traditional marketing does not. After seeing the difference between both techniques we can now understand why many marketing campaigns fail. Many companies launch products and services without analysing, which one is effective inside the subconscious brain. If marketing strategies analyse the neuroscience of humans first before creating those products or services they are more likely to have success.

According to the book "Buyology" from Martin Lindstrom marketing research spends around \$12 billion dollars per year and at the same time 80% of launched products are a failure. The way companies try to understand the consumer is by asking questions like, why did you buy the product? What did you think about the product before purchasing it? As a result, neither the consumer nor the company is conscious of the customers thought process after the purchase; as a consequence companies only have a small proportion of the information needed to understand the consumers thinking and behaviour.

Thanks to technology and science, humans have developed certain ways to broaden our skills in the world. In the eighteenth century with chemistry, the nineteenth century with physics, the twentieth century with microbiology, and now, in the twenty first century with neuroscience. The analysis of the human brain is one of the latest tendencies for many project or product developments leaving in its wake the reasons products fail in the market.

## I.II Research objectives

After implementing the new technique of using brain-scanning devices, it was found that with stimulating different areas of the brain, it responds in different ways. As a result, if companies want precise customer responses, they don't have to investigate their personal tastes, what they have to do is to understand how brain activity works. The combination of transmitters, microprocessors, and digital technology helps to capture the interplay of electrical brain activity.

The brain has a complex structure, and for Neuromarketing it is important to understand the way it operates. It is an interlaced series of neural pathways and networks, and it is this connectivity that allows us to do our daily activities.

*“A man made super computer has about 60.000 miles of wiring inside. The brain's equivalent amount of interconnectivity would amount to more than 200.000 miles of wiring” (DR. A.K. PRADEEP, The Buying Brain, (Wiley: 1 edition, August 9, 2010.), 9.)*

Neuromarketing aims to put high density sensors over the target area in order to collect information for the hundreds of miles of wires that are in the brain, thus making results collected more accurate.

As we learn about the structure of the brain, we seek to understand how all this connectivity and brain activity responds to the five senses. As mentioned previously only 0.01 per cent of information bites humans receive are processed in the conscious part of the brain. Neuromarketing teaches us how marketing strategies target the other 99.99 per cent more accurately.

The advantage of Neuromarketing is that it is the latest technology being used by companies, and this technology makes it easier for market analysts to do their job. If we look at traditional marketing strategies they need large sample sizes to obtain results and Neuromarketing does not. Neuromarketing has the advantage of leaving aside variables such as, language, education, religion and culture. Neuromarketing suggests that brain activity is universal; the language inside our mind is only one, companies can use this as an opportunity for market expansion and increase their profitability through this type of marketing. Neuromarketing perceives the results of our brain activity and neurotransmission before any alteration occurs by the thought process.

Latest studies have shown that there is a high correlation between the results obtained in Neuromarketing and other traditional marketing techniques, the difference is that Neuromarketing is more profound form of analysis. Neuromarketing obtains the answers directly from the neurophysiological part of the consumer's brain, without verbal or written responses as a consequence it is currently the only methodology that can obtain accurate and reliable results.

Throughout this research essay, I am going to prove that Neuromarketing is the best option for companies to obtain a competitive advantage in the marketplace. By understanding how the subconscious affects decision making companies can produce more appropriate products that the consumer is likely to want and therefore will increase their profitability. Neuroscience is the explanation of how a product advertisement or message is perceived in the human brain. It can guide companies to correctly advertise, design and make certain prototypes in the market. Neuromarketing shows a path by which packaging, advertisement and pricing should be done, increasing consumer loyalty and brand image. As a result those companies that apply Neuromarketing instead of traditional marketing gain a competitive advantage in the market due to the use of more advanced technologies and more accurate results from their analysis.

### I.III Need of the competitive advantage

Markets are increasingly competitive, and complex, Neuromarketing can be seen as a challenge or an opportunity for many companies. As mentioned, the main objective of Neuromarketing techniques is to understand the neuroscience and add value to the companies in the way they manage new trends and tendencies. Neuromarketing will increase the development of communication strategies between stakeholders.

The competitive advantage gained by those using Neuromarketing gives the consumer added value and thus they will ultimately be more satisfied with the product or service.

Michael Porter suggests that there are 4 different competitive strategies, *see annex 1*, this shows us that companies that apply Neuromarketing can choose the way in which they want to have take advantage of their competitive advantage in the market without relying on inaccurate results for this decision. For example, consider that company x is a company with a 'narrow market industry' and they decide to apply a Neuromarketing technique in order to decipher how consumers in this type of industry think. They will gain a competitive advantage, by differentiation giving the consumer exactly what they expect. The strategy of differentiation consists in a selection of one or more standards' used by consumers in the market, and then positioning their business only in that range to achieve those standards. What Neuromarketing is providing here, is a complete and accurate analysis and investigation of the standards that consumers want. Many times, the failure of a companies products or business is the difference between what the consumer expects from the product and what the company provides the consumer.

Neuromarketing is not the cheapest way of achieving results, but as the competitive advantage of the product is differentiated this strategy is usually reflected in a more expensive of the product.

*“Brains are more direct and reliable predictors of who we are and how or why we behave in a given way. Neurosciences can potentially influence the business discipline of marketing in a revolutionary way.”* (“DNA INDIA”. [http://www.dnaindia.com/academy/report\\_where-brain-science-meets-marketing\\_1514271](http://www.dnaindia.com/academy/report_where-brain-science-meets-marketing_1514271), Mar 2, 2011.)

If we penetrate the brain directly, and influence the 99.99% of the subconscious part of the brain, we can ensure that there is a competitive advantage compared to those

that base their studies in questions that only focus on the 0.01 per cent related to the conscious mind. As quoted above, Neuroscience is the new revolutionary way of developing marketing strategies, it is the combination of all the studies made by humans to develop technology using the human brain to make business profitable as well as understanding consumer behaviour.

Marketing is the understanding of what the consumer wants and needs, whereas Neuromarketing covers the true desires of the consumer and the emotional effect the product or the service has on the brain.

The most valuable asset a company has are their clients and customers, , those that are capable of giving the real value to their consumers, will have a higher brand equity than to those that do not give their consumer what they really want. For a company to develop loyalty and trust with their consumers there has to be an understanding of what they desire and what they need, in order to fulfil such needs. Neuromarketing gives us the missing tools that provides a true view of what consumers desire, making them more attracted to and emotionally engaged to the with new advertisement, packaging, product and price.

Neuromarketing is NOT the competitive advantage, but it is the path that allows business to achieve it.

**PART II: UNDERSTANDING OF THE BRAIN**  
**(Development and analysis)**

## II.I Development of the human brain

The body's centre of decisions and communication is the nervous system, which is directed by the brain. The two main parts that control all our daily activities are the Central Nervous System (CNS) and the Peripheral Nervous System (PNS). All the commands for body movement and other bodily functions are sent from the brain to your face, ears, nose, eyes and spinal chord, the spinal chord sends these messages to the rest of your body. The environment creates senses that your nervous system detect, and send the message directly from the spinal chord to the brain, and the brain creates a response to them throughout the motor neurons.

The brain is composed of 4 main parts inside the cortex as seen in the Annex 2.

The functions of each lobe is the following:

The frontal lobe is the most important lobe for daily life and activities. It manages problem solving, speech, planning, movement and emotions. In other words it is related to human reasoning.

The parental lobe manages orientation, recognition, and perceptions, in sum it is related to the movement of the body.

The occipital lobe is the part of the brain that processes vision.

And finally the temporal lobe is related to the auditory sense, memory and speech.

During the process, Neuromarketing shows how the different lobes react to the stimuli depending on the type of advertising it wants to show and how they want the reaction of the consumer to be given a certain types of products

On the other hand, the brain is divided into 2 parts: the right and left hemispheres. The right hemisphere is associated with creativity and the left with logic. The neo-cortex is the part of the brain that is only found in mammals, it is said that the neo-cortex is the



evolved structure of the brain; which processes larger amounts of information than any other part of the brain.

As shown in *Annex II*, the cerebellum is the lower part of the brain that is related mainly to movement, posture and balance. This is considered to be the oldest part of the brain; reptiles have the cerebellum and no neo-cortex as such they are exclusively concerned with survival and not able to reason like a human does.

The last part of the brain which is also shown in *Annex II*, is the brain stem, it is responsible for actions within the body that are vital for life, such as; blood pressure, breathing, and the heart beat. It is composed by the medulla, the midbrain and the pons; this brainstem is considered the simplest part of the brain.

Inside the cortex we can find millions of neurons that are composed of a cell body, dendrites and an axon. The cell body is made of a nucleolus and a cytoplasm.

Now that the main parts of the brain have been described, we will take a look to the difference between the right part and the left part of the brain. In most cases, there is a conflict between these two parts, causing problems for the consumer in the moment that they make a purchase.

The next step is to look at the *annex 3* and take the test, to prove that your brain enters into a conflict, and see how you find yourself involved in confusion. At the moment of making a purchase the right part of the brain decides to buy but the left part of the brain says its not logical. Which of the two parts win the battle? This is the moment where the sense stimulus enters, and the more the product provokes the consumers senses the higher the probability that it will make the consumer to buy the product.

The human brain is full of emotions, every neuron transmits these emotions as messages, advertising and packaging designers must take into account that the imagery and shapes must be emotive to the consumer. Companies need to take into account what the experience of shopping must be, which is emotive and self-satisfying to ensure that the customer will repeat the visit.

As previously mentioned the female brain acts and reacts in a different way to that of the male brain. The female brain is designed to be able to multitask, and it has more

connections between both hemispheres than the male brain. As a result, females have more responsiveness to products or services that will make their job or lives easier.

Understanding the brain teaches us that until recently no one in the market had a way to see how the brain feels about the messages and stimuli it is receiving. The shopping environment where we find the products their packaging and presentation is the place stimulates thousands of messages to be sent to the brain about what it sees. It is important to understand which lobe of the brain is affected to see which types of responses are created within the brain. The key question is; Are those responses the ones we intend to get? Or are we looking for different responses? It is very important for merchandisers to analyse how and why the message has been accepted or rejected. What tools does it need to inspire the part of the brain they need to have the desired response.

It is very important to understand that the brain gets frustrated in occasions such as:

1. When a task is taking longer than usual to be resolved.
2. Confusion
3. Messages that are not the ones the brain is looking for, and as a consequence it gets distracted.

All emotions within modern human beings are similar, however they are not affected by language, culture or education. The primal emotions of the human brain react precognitive level, taking less than a millisecond to respond. Given this, the brain is a universal organ, which helps Neuromarketing to make accurate predictions and to get precise conclusions; this is achieved through analysis of the brain.

The brain is an organ that is in constantly scanning the physical environment, it cannot ignore what it sees, breaking through the confusion and the distraction may help to make the product stand out and produce better recognition of them. A way of breaking the distraction that occurs in the brain is by ensuring that the physical appeal of the product and the environment where the product is located attracts the consumer's attention.

Part of the complexity of the issue of distraction in the brain is to look at the way we can attract the brain's attention, it is important to use humour and play creative games because the brain likes the interesting part of life, the use of emotions makes the consumer more likely to grab their attention, the idea is to try to avoid the distractions and the confusion in order to make it clearer and prevent causing frustration.

After understanding what the brain does not want and which parts of the brain affect certain stimulus, generates different answers, it is easier for us to understand the Neuromarketing method. The brain is not an easy organ to understand, however it is important to see which part is the emotional and which is the rational, the left/right hemisphere conflict can be caused in most purchasing occasions, it is important to find a way to avoid it. Females are more likely to be attracted to a product that is useful to them in order to assist with their multitasking nature. Understanding the brain is the first step to take before implementing Neuromarketing.

## II.II Customers five senses

The human brain is thousands and thousands of years old, in order to understand how it responds to different experiences we have to take a look at its development and history. The human brain is developed during infancy and is influenced by different sensory experiences. For example, when a child develops all 5 senses they create better connectivity between the brain cells.

The brain grows and develops during the first 4 years of life. A persons IQ can change depending on the environment he or she was born into, and the sensitive or emotional experiences they had in their infancy. For example children that are reared or experience a stressful environment release stress hormones such as cortisol and adrenaline, these types of hormones teach the child a different type of response such as violence or anger. Therefore, the brain is basically developed by the type of senses that children experience, and those senses are the ones that will always capture human attention.

"As a product of human evolution through natural selection, the brain can best be understood as an organ of learning, adapted for the survival of the species". (Gerald Fischbach, "Mind and Brain", Scientific American, 267: 3, Sept 1992, 48.)

The senses develop in the same way, natural selection in human beings means that we have all the 5 senses fully developed and more so than any other species, instead what we see is some species that they develop some senses more than others. The human senses can be defined as generalist and voluntarism. We show the use of our senses with what we do or create, such as music, arts or paintings. This is called the self-perpetuating cycle: the more we use our senses the more neural pathways we use in our brain, thus we create and create more art, and our senses get more and more fine tuned allowing us to be more and more creative.

When human beings are conscious, all the knowledge of our brain joins together through the senses, as a result of this, we are able to express feelings and emotions.

In the next part, we are going to observe how each of the five senses influences the buying brain.

### II.II.I Vision

About 25% of the human brain process is generated because of the visual part of the human, more than any other sense. Given that the activity around us, and information enters through the eyes, 70 per cent of the bodies sense receptors are in our eyes. When you use one sense on it own it is not until you use the sense of sight that you fully comprehend or understand that it is that you have sensed. It is very important to highlight that vision is not an activity that happens in the eyes, it is an activity of the brain. The eyes only receive the light from the environment but the brain performs the conscious part of this process, it recognized the colours, the shape the expression and the visual environment it is in, given that every brain acts in a different way not everyone sees the same colours, shapes, expressions or landscapes.

Humans are constantly scanning physical environments, it analyses the space and the objects within it. When objects are moved from one place to another in store or location the brain tries to scan the space again, however this causes confusion. Therefore, when considering the physical environment of a store, it is important to ensure that when the consumer scans the environment that the set up does not cause confusion and that the products are visually easy to find. For example avoid having tall shelves in stores that makes it difficult for the consumer to see behind them or what is on the top shelf

All primates have 2 eyes, whereby information that enters the right eye is processed in the right hemisphere and what enters the left eye is processed in the left hemisphere of the brain. Human eyes are located on the face in the superior part of the body; this is so that we are able to identify danger, tracking and what is interesting in the world around us.

The curiosity when looking at humans is that they are particularly visual species which are strongly influenced by human appearance, for example good looking criminals have shorter prison sentences, attractive people get better jobs, and so on, studies confirm that self confidence is one of the mayor factors for success, and self confidence is developed in most cases because of your attractiveness.

When positioning a product it is important to take into account all of the factors that show how vision affects the brain. Be specific and avoid confusions for the eye. Locate the most interesting ads at the top of the advertisement, and in general it is better to use easy and fun puzzles for the brain to be attracted to and charmed by what it sees as this will make the product more attractive for the consumer and increase the probability of purchase

### II.II.II Taste

The senses both taste and smell are in charge of recognizing the physical environment; it determines what is good and healthy and furthermore identifies what is toxic. They are both very closely related, which is why we put them within the same realm. Taste occurs in the mouth, by the taste buds, however given that both senses are linked, if the capacity to smell decreases then this results in a decrease in taste, or less ability to recognize flavour will occur. Taste is also influenced by vision, the temperature and solidity of food. The shape and the perception of what we see before we eat makes our brain react before tasting.

Taste cells are not programmed to respond to the same kinds of stimuli. The reaction of taste and the recognition of flavours is very unique in each person, it occurs much like in the recognition of colours, people are able to distinguish thousands of different kinds of flavours, but the flavour that I perceive will have a different impact on you than on me.

As previously mentioned, taste occurs on the tongue and in the mouth by the taste buds which are the papillae. There are different types of taste buds, which are shaped like small spheres. Within these we have supporting cells, which are the taste and the basal cells (stalk cells). Both the stalk cells and the supporting cells are the ones that mainly make up the taste bud. Once we have the sensation of taste the supporting cells make the long microvilli, known as the gustatory hairs, to act. As a result molecules and ions enter the mouth and reach the receptor cells, the sensory dendrites, which are located surrounding the taste cells then take stimulate the gustatory pathways which eventually reach the brain.

For the consumer taste is one of the senses that delights the human and brings them to the world of emotions. For example when you crave a burger it is only the activity of neurotransmitters in your brain that cause the craving not the taste sensors. Certain food stimulates endorphins, and these can be addictive for some people. For the consumer's brain, taste is one of the easiest senses that activate the neurological system, without having the flavour in the mouth people start to crave it, even before feeling it. The stimuli that flavour creates is highly influenced by memory and emotions, it makes it easier to capture the consumers attention. Once you try something once and it is captured in your memory in a positive way, you will do whatever it takes to have it again.

### II.II.III Hearing

Hearing is a very important sense because it enables communication between people, and gives the brain the ability to interpret speech. The ear captures the different sounds, volumes and rhythms for the brain to then process. Studies have shown that perceptions with this sense occur because of the tone of the voice rather than the words used. Individuals have the ability to separate different tones and volumes they hear. All of the sounds created outside the body are processed in the human ear throughout the aerial conduction. If the sound is more intense the higher the vibration the ear receives. The small bones of the middle ear augment the signal from the membrane and transfer it to the inner ear. The muscles of the inner ear contract, and as a result give us the ability to control what we hear. When a sound reaches the ear, about 30.000 neurons activate in the auditory nerve pathways and send these signals to the cerebral cortex allowing us to perceive the sound.

When the human receives the auditory information the process that is undertaken in the human brain is similar to that of the visual process when scanning occurs. Different neurons, ones next to the other create a response to the frequencies created by the sound. As a consequence people cannot decide whether to hear or not, receiving many sounds in a subconscious way. The brain is trained enough to recognize voices and sounds, the voice of other humans are mainly recognized because of the tones of vowels, this procedure of identification is screening of the voice, were the brain receives a frequency and starts searching its memory if the voice is new or not.

The cortical part of the brain is where most of the auditory process occurs. Where different sounds receive a different process depending on the person. After listening to somebody speak the sound goes directly to the left hemisphere of the brain, were the language is recognized and then processed. As a result, the route is divided into two sections the right and the left hemispheres, when sound enters the left ear it goes to the right hemisphere and when it enters through the right ear it goes to the left hemisphere, depending on the type of process the frequencies need. In general terms, the process of the sound almost always occurs in the opposite side of the brain from which it enters.

Hearing is a very important sense to the buying brain, sounds create a link to nostalgic or important memories in our brain. Remember that the consumers brain is highly



emotive; people tend to associate the sounds with different things they have lived or seen in their lives. The frequency and sound that certain products create in the environment are an important component of the Neurological Iconic signature (NIS). For example the sound of a soda opening makes people thirsty, and increases the desire of the product. The sounds of the environment are very important for memory retention, as a consumer the sense of hearing is one of the most influential of our emotions.

## II.II.IV Smell

Smell is one of the least important senses that the human possesses however it is the cushion for our memories and emotions. As the human brain is responsible for storing memories, the creation of the scent is the link for many of the memories we have of our lives. As previously mentioned 60 per cent of the brain is used for sight, in contrast to smell which only uses 1 per cent of the brain, even though it is a lower percentage than the other senses it is powerful for emotional reactions.

Every time we breathe we inhale certain particles through our nostrils, which pass through the cilia to the olfactory bulbs, and then these particles proceed to our brains. We use the sense of smell not only to remember things or moments; we use it for survival. For a hunter animal they have a stronger sense of smell when looking for prey than that of a non hunter animal., Smell was used many years ago for medical treatments and diagnosis. For example the use of dogs, which are trained to detect the smell of sugar, and thus are able to diagnose a person who has diabetes. The human being has 5 million olfactory cells, which help us to deduce certain smells within daily life.

The system that reacts to memories in our brain is called the episodic memory. It stores all memory components such as “What, When and Where”, this type of memory is the most complex one of all; it is developed 5 years after a child is born. It helps people to create relationships between or with places, times and moments. For example when I was young I used to go to a farm every weekend and throughout this period of my life my mother would always buy the same shampoo. Today when I smell that shampoo, it reminds me of all the things we used to do on the farm at that time. Similarly, what the buying consumer does is to link all those memories with the brand environment or product.

*“We make such immediate, deep, and emotional connections with the smells we encounter, it makes perfect “sense” to make scents available to delight and engage the brains of our consumer.”* (Dr. A.K. PRADEEP. The Buying Brain. Wiley: 1 edition, August 9, 2010. Pg 47)

The way the human brain works is just like this, in that once the human brain recognizes the scent and, if the consumer likes the scent, it is highly probable that the consumer will buy the product that provides them with positive memories, when we are able to connect the senses with the emotions to the product we have done almost

all our job. It is also important to understand that certain smells create different reactions in human beings in different environments. For example, the scent of vanilla gives a very different reaction than that of lemon, with Neuromarketing we can take a look at which scent is more appropriate for each product.

Many brands apply marketing strategies, which are targeted through the sense of smell; this is called olfactory brand marketing. For example, we can almost always recognize the smell of McDonalds without even looking, and the same happens with a Starbucks coffee. It is very important to ensure that the smell of the product fits for the product, this can mean the difference between a product with better quality or taste however, and if the smell is not appropriate then the product can be a complete failure in the market. Women have a more sensitive olfactory system than men, it is easier to capture women's attention, studies suggest an accurate analysis of which are the scents, which attracts male's attention. As previously highlighted, smell has to be appropriate for the environment, if the product for sale is luggage then the store should assimilate the smell of luxury leather, in a seafood restaurant the smell of lemon is an important one, and when we are talking about products in the fashion industry it should be a soft and romantic scent.

The sense of smell is another type of thinking, after checking the products and the environment they are in, the company needs to see how it directs the customer's desires. Consider creating a branding strategy and adding a scent to it, the importance here is to have the appropriate scent for the product and for the scent to be directed at the right consumer. In the next section I will explain how Neuromarketing helps us to discover which aroma is the appropriate one for each environment or product.

### **II.II.V Touch**

Touch is one of the oldest and main senses of humans, all senses have a specific organ, for smell the nose, for sight the eyes but for touch our body is our organ. Touch can feel really good and most relationships are based on the sense of touch. If we think about the products that touch the most sensitive parts of your body, lips, hands, neck, tongue, face, fingertips and feet you can find that these products will be the most satisfying and inviting of all.

Sensory receptors are all over our body, it is important to analyse the sensor abilities each product has, and take it to the market in order to make the consumer feel more by the sense of touch.

### II.III Process of purchase of the consumer brain

The part of the brain, which makes decisions, is the ventromedial frontal cortex, which is otherwise known as the VMF. The University of Pennsylvania conducted research; they used scans in experiments to evaluate which part of the brain is making the decision.

To observe the location of the VMF in the brain please see *annex 4*.

The research conducted, showed that people decided to buy certain products, such as juice boxes or chocolates. The results showed that products such as candy had 3 times the probability of being picked than other products. An explanation for this is that the candy product makes people desire more and thus heightens and awakens the senses. Products that we are able to assess their value are more likely for the brain to respond to it; other research has shown that products with high and unreasonable prices produce a negative reaction in the brain.

As a result, the study and understanding of brain structure allows us to understand and determine the process of decision making in the human brain. Companies that measure the VMF activity, can assist in determining what the product should look like, its price, and how can they add value for the customer. The VMF is the closest structure to the “Buy Button” and although many other parts of the brain are active during the purchasing decision, if companies access the VFM to offer extra value to the consumer the company can gain a competitive advantage. Large companies use this idea as a marketing technique, and it has achieved great success.

Obviously not all brains think the same, and it is important to observe how different brains react in different ways, all of them have the VFM but as has already been highlighted there are different factors that influence if the VFM is affected or not. Lets take a look at the different types of brains to see how someone’s sex can influence the moment of purchase.

### **II.III.I Female brain**

As discussed the female brain is different from the male brain, when a product is directed to a female we have to take into account certain facts that attracts the female brains attention. Females are a very detail oriented mammal, paying attention to everything in the environment, when they talk to a person they look at their facial expression, and the tone of the person's voice. As females consider everything they hear they make certain expressions, that if we take a look at them, it is easy to deduce what a female is thinking.

The right hemisphere of the female brain is more developed than the left and as a result females are more emotionally connected, both hemispheres are highly interconnected so be careful when using numbers and be sure to take into consideration emotions. For example, when a female is looking for a product to loose weight she not only looks at the results it will give her but she will also take into consideration appearance and smell. On the other hand, males will be exclusively concerned with the results. When considering these aspects of the female brain it is important to ensure you are not making negative emotional responses that will negatively impact your product.

Females are also passionate mammals; they can have empathy or complete dislike as a reaction to what they see. When they discover a product they can immediately embrace it or completely reject it. It is important to know how to penetrate the female brain, and the way in which to do this is through emotions. It depends on how the brain maintains and develops emotions with products. Females like to make decisions by themselves, thus it is important to not make a female feel pressured to buy a product, the key is to connect with them in an emotional way and let them make decisions by themselves.

### II.III.II Male Brain

Males on the other hand, when they go shopping they don't connect as emotionally as females do, they simply go and look for the product they are looking for, they are not distracted by other products and are more concerned with features, attributes and benefits of the product. Their process is easy, they simply go to the store get one item, the one they were looking for, and leave immediately: no emotions, and no sensations. Contrary to women, men are more interested in statistics and numbers. If you want to grab the attention of a male brain, the key is to highlight some interesting data that the product has, and their attention is attained. The male's brain is blocked when there are two products with similar characteristics, or when certain obstacles get between the purchasing processes. Statistics show that 29% of men decide not to buy because they could not find a parking space near the store and 43% of males don't come back to the store if they know that the product is out of stock. Men do not look for products that connect emotionally with them, however they do search for solutions. The decision process to purchase within the male brain is linear, the key with men is to go directly for what they are looking for and need, no distractions, when the male brain is fulfilled in this way it acts as a process of elimination and satisfaction occurs when they find the exact product they are looking for.

Certain studies confirm that men like online shopping more than going to stores. They simply purchase online from the comfort of their own home, and as a result they do not have to worry about the distance from the parking lot and the loss of time. They simply find what they are looking for and the product is directly delivered to their house. When the product is directed at men, companies have to take into account what the consumer is thinking and how they react.

During marketing courses I have undertaken, I learned that the consumer is the centre of the universe, and the consumer's brains are the ones that make the purchase. Depending on which type of consumer you have, it is important to take a look at which factors influence the VMF and therefore causes the 'buying button' to be pushed.

In the next chapters, we are going to take a closer look at how Neuromarketing develops all the theory we have seen, how with scanning devices and the latest technology companies can gain a competitive advantage, how they can catch the consumers attention, and make your product stand out in the market. Remember that

the consumer is the centre of the universe and companies have to do anything they can grab their attention. The human brain is the motor of the consumer and the important part of marketing is to understand how the brain works, in order to be successful in this area the use of technology makes it easier. Traditional marketing methods are good however with the increased interrelatedness of the world which is due to globalization makes the market more competitive; as a result companies must use the latest technological resources to avoid losing market share. Understanding the human brain and now Neuromarketing, we will take a look at the advances of technological resources available in order to make companies more competitive.



**PART III: APPLICATION OF  
NEUROMARKETING (Results)**

### III.I 3 types of Neuromarketing

Traditional marketing research methods larger sample sizes in order to ensure that the statistical data is able to be used Many consumers are brought together in order to ensure that variable such as language, culture, education and other factors that can make the response of the consumer different than the others, do not affect the market research. On the other hand, the scientific method of researching markets through neurological testing requires a smaller sample size than traditional marketing. As neurological testing analyses brain activity below its conscious mind, where the brain activity recording occurs as a result of the reaction of a stimulus. Even though we can come from different cultures and places, the language within the human brain in general terms is universal. Because the brain is universal, the sample size Neuromarketing requires is more or less 10 per cent the size of a traditional method sample size. Although the sample size is smaller, our neurological brain testing has to be careful with the basic neurological fact that: the answer a brain provides when we are asked a question is different from the answers the brain gives from the perspective of Neuromarketing.

### III.I.I EEG

The electroencephalography is a passive technology that uses sensors to capture electrical signals that the brain produces. The procedure is easy and relaxing. Most neuroscience procedures have used this methodology over a long period of time. It covers the whole brain, making it the best option for any good neurological testing company. Sensors are placed on the head and they read high-density signals from the brain. Each sensor measures up to 2,000 low voltage signals per second, which is produced by neurological activity. As has been shown, different areas of the brain are in charge of many different functions; as such it is better to have a better coverage of brain activity in order to see the most exact response to different stimulus. Interconnectivity is crucial, and measuring a greater area of the brain you have less probability of losing the analysis of interconnectivity and have better neurological results.

The EEG sensor is very sensitive, any movement or activity sends signals and generates brain activity. Neuromarketing has to eliminate any noise or movement made by the human body that can alter the results of the stimulus, for example in the blinking of an eye, this action sends a series of neurological messages, this can produce changes in the results, as a consequence of this we have to be aware of any factor that can cause our brain to send more information than the information we are looking for. The sensors must be placed all over the head, if they are only placed in the front part of the head, in general terms, the brain activity we are going to record is only the noise of the movement of muscular activity and not brainwave signals. Accurate analysis will increase depending on the number of sensors you put on the head, and the amount of brain activity it is recording. Some companies prefer to combine two methods to make the results more accurate, not only the placement of EEG sensors but also sophisticated eye tracking equipment, that help not only to see where the customer is observing but also the response of its observation during the neurological tests.

Observe [Annex 5](#), here you can see how the sensors are placed all over the head, it is a simple procedure, the only contraindication is that patients cannot have allergies to certain materials that the EEG has, like metal, and the plastic hat. When consumers who participate in testing are going to undertake EEG testing, this does not require any special preparation in that the person does not need to fulfil special tasks prior to testing. The plastic hat with the sensors are placed over the entire head, the consumer

sits in a relaxed position and the initial analysis of the procedure starts. Brain activity can only be obtained if the patient is relaxed, with open or closed eyes, and taking deep breaths. For patients that have brain injuries it is better not to take recordings for the purpose of Neuromarketing, because results may be altered. The procedure can last between 15 to 25 minutes and after it has finished the patients can continue their normal everyday activities.

Now take a look at Annex 6, this is where we can observe that the electrical signal is written and amplified, it is shown in a series of lines which interpret the activity of different parts of the brain at different moments. To gather the electrical charge, it uses electrical sensors attached to the head with a paste that helps the conductivity of the electrical signals. The only requirement is complete relaxation of the consumer, to avoid misunderstandings within the results.

## II.I.II fMRI

fMRI is functional Magnetic Resonance Image; it has been used for many years. In the case of most physical injuries the use of an fMRI scan is a normal procedure, and nowadays it is being used as a neurological device for research. *Annex 7* shows an fMRI device, which undertakes this procedure. As you can see there is a long tube where the consumer lies down, surrounded by magnets. When the person is being tested these magnets produce electrical fields, which records the patient's brain activity. Brain activity can be measured by blood flow, when part of the brain is emitting electrical charges the brain requires extra oxygen for the flow of blood, in this case the fMRI scans the part of the brain demonstrates increases in blood pressure. The process of blood flow is sometimes slow and it can take up to 5 seconds for the blood pressure to increase. So if we show a consumer an advertisement of a product and we observe the reaction 5 seconds afterwards, the results of the information given may be altered because of the brain thinking process. As a result, this may not be as accurate as the EEG, because the EEG gives immediate response in less than milliseconds. Additionally, the fMRI is a very expensive procedure, which requires very specialized equipment that is not easy to acquire, furthermore requiring highly trained staff to operate the machine. The patient cannot move during the process, because even a really small movement will change all the results. Even though it is a very good method for medical issues, when we are talking about marketing is a very difficult and costly tool to use.

In order to see the results of an fMRI test please see *Annex 8*.

### III.I.III Biometrics

Biometrics is a general term that gives us the measurement of numerous physiological responses. It does not analyse the brain; instead it shows how different parts of your body such as respiration and the heartbeat respond to certain stimulus. Other ways of measuring biometrics is the blinking or movement of the eyes, DNA, finger prints, voice, hand measurements, the galvanic skin response, facial movements and expressions, and in general terms, all body movements. Biometrics is divided into two main pillars of the biometrical authentication: physiological and behavioural, in *Annex 9* you can clearly see how biometrics divides into two parts.

What biometrics does is that it introduces certain systems so that they have access to all those elements that biometrics measures.

For Neuromarketing purposes biometrics is not the best measure because it covers up physical indicators, and does not measure brain activity. The effect can take more time than the response. The body reacts after the brain thinks and therefore is not beneficial to market research. For marketing purposes, the time it takes for the body to respond is crucial; results may change if we observe the response of the body after the reaction of the brain.

The main problem is that most human physical systems respond at different times, the physical response may vary too. Science has tried to adjust all these differences between humans, however in spite of the work done in relation to this the results will never be the same as if they are for measures that examine the immediate response of the brain.

Biometrics does not define how specialized brain responses occur. They cannot show an exact measure of emotions at the primarily point of action, they are recording the secondary response to stimuli and therefore are not the main indicators of neurological activity. Only direct methods such as the EEG can show us exact brain activity. The brain is the place where the most complicated and profound responses occur, the subconscious brain is where factual figures to marketing success investigations are shown. Elements such as interest, purchase intent, and brand loyalty are formed, and the memory is what keeps these thoughts in the human body. Many studies use the EEG in order to analyse brain response and biometrics is used in order to confirm the brain responses and extra information obtained from the EEG.

### III.II Neurometrics and Neuromarketing measures

Neuromarketing has five main areas of evaluation, in-store marketing, advertising, packaging, brands, and products. These five areas are evaluated by Neurometrics through three primary pillars of evaluation, which are attention, emotional engagement and memory. Then we have 3 secondary pillars of Neurometrics, which are; Purchase intent/persuasion, novelty, and awareness/understanding/comprehension. In summary, if we look at the whole process of Neurometrics we can say that it is an effective marketing tool.

### **III.II.I Attention**

Attention is where marketing starts, it is very important for people to take notice of the product or the brand. As we know the brain works mainly from electrical activity, many neurons connect through each other and send brainwaves at constant frequencies. As a result, other neurons are stimulated and in less than a second, the whole brain is sending different electrical messages to other parts of the brain. All this activity can be seen in the EEG sensors where effective analytical procedures receive the information, divide it into essential fractions and this is where we can observe brain operations as they are.

Attention is one of the most important actions conducted by the brain; Neurometrics is created by the moment-to-moment fluctuations of the brains neurological activity patterns. It analyses how attention grows and declines from one second to another. What humans are aware of is what they are paying attention to because they are processing the information and thinking about it. What they are not aware of is what makes them pay attention. Only brain Neurometrics can show us what part of the message is the one that captures the consumer's attention.



### III.II.II Emotional engagement

Given that attention is the most important pillar of Neurometrics the second pillar is emotional engagement. Just like attention, emotional engagement can increase and decrease over time. Our subconscious brain is in constant updating the information we receive about the world around us, changing the emotive links depends on the reaction it observes. Given this, emotional engagement is also a moment-by-moment element. In this case, Neurometrics identifies emotional stimulation; it observes how the brain together with the nervous system reacts in response to the stimuli. We can observe the reaction to these stimuli if we observe brain activity during excitation, intensity of the experience or other responses that engage the emotional area of the brain. The response to emotions in humans is intentions, attitudes, decisions and types of behaviours. Many human beings react only through the type of emotion they are feeling.

When a consumer enters a store or buys a product it's important to analyse the connection they feel with what they see after the product attracts their attention. The fundamental key element of Neurometrics in this aspect is how the connection between the attraction and the product is a part of daily life. Does it decrease or increase? The response shows us whether or not the consumer is responding in the expected way to the message we are trying to send.

Emotions influence consumer behaviour in a way that consumers cannot control. When a product captures the consumer's attention and develops an emotional link, we are only missing on part of Neurometrics, which is memory to complete the analysis and see if the consumer will become loyal to the product or service.

### III.II.III Memory

Memory is the third step, if the product cannot be recorded as important in the memory it is very hard to have an influence on the consumer for a long period of time. The wavelength of brain activity when it is a memory process is different, we can record when the brain is processing and memorizing certain facts. There is a type of memory that is called implicit memory, where memory can influence attitudes decision and behaviours in a subconscious way, and only Neurometrics can identify and record this type of memory.

We are going to continue by looking at the three secondary pillars that measure Neurometrics. The secondary pillars of Neurometrics are derived from at least 2 of the 3 primary pillars.

### **III.II.IV Purchase Intent/ Persuasion**

When a consumer watches an advertisement there are many variables that take affect the time between watching the ad and making the purchase. The intent of purchase and persuasion is a combination of two primary pillars of Neurometrics, which are emotional ‘engagement and memory’. When a consumer watches an advertisement whether or not they are engaged emotionally, and then records this information in their memory that they will go out immediately to make the purchase, this would be a zombie reaction and normally the brain does not work that way. What this will do is record the product in its memory and in the future when they visit the store and see the product, if the advertisement made them feel engaged to the product in an emotional way then they will be more likely to or easily persuaded to make a purchase. Advertisements that combine these two main pillars of Neuromarketing are more influential in making the consumer buy what they see. In most cases, you do not go out looking for the product per se however the next time you see the product on the shelf your memory is called into action and remembers the emotions you felt with the ad, and you say to yourself, “ok, lets try it”. At that precise moment when you decide not to purchase the product in this case the effect that the advertisement had on you was an effect of persuasion.

### III.II.V Novelty

Novelty is the combination of the two primary Neurometrics which are memory and attention. For example, A girl who had acne problems which caused her self esteem issues, this is someone who went out looking for a solution to her problem. She had tried all the products in the market but none of them gave her the solution she wanted. One day she was walking to the mall, and saw a stand that had a product with different components and better results to treat the acne. Initially what caught her attention was the advertisement that had a famous person that was promoting the product that it gave them excellent results for their acne issues, in that particular moment she memorizes where the stand is located. She decides to purchase and try the product and figures out that it works for her. As a consequence of all of these actions Novelty is created. Novelty not only influences the purchasing decision but it generates interest and attraction. It is very important to understand that novelty is an emotion that also happens moment-to-moment and companies have to avoid the risk of the message being lost over time.

### III.II.VI Awareness/understanding/comprehension

In many cases the message we are trying to send to the consumer is not understood the way it is supposed to be. We have to be sure that the message is clear and avoid confusion in the meaning. The combination of the two primary pillars for understanding awareness and comprehension are attention and emotion, this not only captures your attention but it makes you connect emotionally with what you see therefore the understanding of the ad is sustainable. The degree of understanding must be high and then the key is to see if the consumer is loyal to the product by all the Neurometric measurements. Awareness is also a moment-to-moment Neurometric, when the message is sent the response happens immediately, and it has to be careful not to change the meaning of the message over time. Messages that are not clear, don't create consumer awareness and the understanding is confusing and comprehension is weak, in this case the advertisement has no real value for the consumer.

Annex 10 summarises the Neurometric components. If we combine all the Neurometric measurements we can see that they are effective.

Neurometrics has been described as;

*"The quantitative study of the electrical activity of the brain and nervous system"* ("Merriam Webster". <http://www.merriam-webster.com/medical/neurometrics>. 2011.)

We just described that the main and secondary pillars of the variables that measure the brain activity is by wavelengths. It shows us how the consumer is responding to the stimulus. When Neurometrics is used for marketing purposes we can record the response to different individual situations. It can help to make better decisions including the position of the brain and how the consumer perceived and saw the product or message. As previously mentioned the question is; Are the words in the advertisement the right ones for what the message that is intended to be transmitted? Which types of designs are good for the consumer's perspective and which just does not capture their attention? From the sales perspective, the question is; is there a way of optimizing my budget? Which are the commercials that engage the consumer after it captures their attention? There are many questions that Neurometrics will help a

company to solve. By conducting Neuromarketing tests on consumers and analysing wavelengths it is much easier to see if they are making the right marketing decisions. These days, most large companies take advantage of science and technology together, thus by looking at brain and muscle activity, eye tracking and many other emotional indicators, companies that use Neuromarketing are able to obtain a competitive advantage over their competitors.

What if you had a company and you find a way that answers the questions any marketing department would need? What if with the technology available today your company can make the consumer more engaged with your product thereby creating more loyalty because you can prove you can provide the consumer with the exact product the consumer is looking for, simply by asking it in a subconscious way. Neurometrics is the only measurement that can give you those answers and it is the only method of revealing how the subconscious part of human brain makes decisions or perceives the product.

### III.III The product in Neuromarketing

The consumer's need is reflected in the product in the market. When a consumer chooses a product to purchase they are influenced by the perception caused in their brain. Many products are the reflection of the consumer's personality, and in this chapter we are going to analyse how this perception can be distinguished using the Neuromarketing technique. The place where the product gains value is not in the production area of the company instead it is in the consumers mind, and thus the perception of what the consumer sees. If the consumer identifies with the product, he or she will purchase the product. The consumer joins all of its sensory information, the brain processes and integrates this information thus creating a concept of perception. The coming together of all the senses and millions of neurotransmitters when a consumer feels, sees, smells, hears or touches creates the perception of the product and as a consequence positions the product in their brain, this process is all done by memory and perception filters in our brain.

The perception filter is what makes the consumer select what is seen, and ultimately to make a decision. The perception filters are influenced by the internal and external factor of a human being; at the same time the consumer needs references to analyse the value each product gives them. When there are two similar products the consumer needs to compare the advantages of each product and see which of the two will give them more satisfaction, this process is made up by references from the consumer's past experiences. Even when we are talking about an innovative product the consumer needs a point of reference, because the product can be a total failure if the consumer does not even understand how it works. Another factor that can influence the perception of a consumer is the fact that some consumer tends to copy the behaviour of others. In general, consumers perceive the product as a good product because many people buy it, and many consumers also perceive the product as a bad product because few people buy, this is called the gregarious behaviour and it is observed like a social contagion. Many businesses launch their products similar to those that many people buy and their marketing technique is to make interested consumers buy the product and create gregarious behaviour in the market. When we combine this theory with neuroscience we are able to see some interesting facts. Most of our neurological functions are based on human experience, and as a result the human being cannot make decisions without the influence of their external factors.

As previously mentioned, the brain has a conscious process and a subconscious process; perceptions are also divided into these two blocks, the meta-conscious perceptions and the conscious perception. Both of them are situated in the conscious process of the human brain, but one has more influence from senses than the other one. The meta-conscious perception is used when a consumer has to take risky and big decisions, when the product involves a long-term investment or increased price, for example, when investing in an apartment. On the other hand, the conscious perception is when the consumer makes purchases of products that do not require much thinking, like perfume, shampoo or soap. These types of products are influenced more by the senses than a car or an apartment, even though the consumer thinks when they buy it, they are less influenced by their emotions.

‘Priming’ is a way to make the consumer remember the product; it’s a type of memory that is activated by recognition. When companies use a technique of marketing communication campaigns they are trying to link the characteristics of the product with your memory, as a result when you sense any component of the product priming takes place, and senses of your brain perceive the product in a more conscious and rapid way.



### **III.III.I What is a brand?**

A brand is no more than a perception, when people decide to wear or use a product because of the brand they are trying to reflect a part of who they are or what they want to be, they identify with the brand and feel a need to belong to the social environment where the brand is. The brand develops a higher reference to social concepts, values, and emotions. The impact one brand has on the brain will never be produced by any other brand and the impact is unique because the brand is unique. The impact the brand has on the brain linked to the right hemisphere of the brain where emotive activity takes place. The brand has a fundamental influence in the purchase of the product, Neuromarketing techniques have studied and proved that a product can have the same components but the name of the brand changes the perception of the product and not only influences the purchase but it influences other factors such as the price, the type of consumer and the market. The brand is the main factor of differentiation between products.

### III.III.II Product Packaging

As previously discussed, attention is one of the fundamental factors that Neuromarketing takes into account. There are no companies that want their product not to be noticed on the shelf. On the other hand what marketing tries to achieve is to capture as much of the consumers attention as possible. Attention is caused by many stimulus, in this chapter we will take a look how the product can obtain more attention through Neuromarketing. The packaging of the product is a fundamental factor, when a consumer sees a packaging that he or she would never imagine; their attention has been captured. Immediately when this occurs the consumer has more time to analyse and observe how the product can satisfy their needs. When the product is in the consumers mind for a long period of time a better result is achieved. The biological process affects relationships and perceptions in our brain, as a result it affects the attention and the time a product is perceived by the human mind. Packaging has to take into account all these factors to grab the consumer's attention. The package must transmit sensory benefits as quickly as possible. All these sensory messages have to describe the product and the benefits it can give to the consumer, as a result not only the attention from the consumer takes place, however it stores the information and through the senses it is verified that the product is congruent with its packaging. Then the consumer stores the benefits the product gave them in their memory. For example the label of the product must contain not only attention grabbing colours, but colours that match the type of product they are selling. Colour can be a big influence in the consumer, remember that vision is one of the senses that takes up most brain activity. Through the senses, the consumer sees, perceives and memorizes the product. When we use Neuromarketing to develop what a consumer is looking for in their product, it gives us clear tools to develop characteristics that can seduce the consumer and make the product more attractive to them.

### III.IV The price in Neuromarketing

The price of a product is a fundamental factor for a consumer when deciding to purchase. We are going to take a look at why sometimes the price is accepted and sometimes the consumer rejects it. There are some prices that consumer's love and some that people simply cannot stand and the product is rejected because of the price. Hence, price is a fundamental factor of the purchasing process. One of the errors made by companies when establishing a price is that they put company costs as a priority rather than the consumer. When the cost of the company is more important than any other factor the consumer is immediately the last consideration for a company.

There are 3 main factors we are going to analyse when talking about the perception of price. The price is as important because establishing a non-attractive price can take a business into bankruptcy.

The first factor suggests that there is no effective strategy to determine the appropriate price of a product if the brains perception is not studied.

The relationship of the product and the price depends on the perception of the consumer and the value that the consumer gives to the good or service.

When the value of the product is less than the price established by the business their inventory starts to grow and the company starts facing problems because their product is not being sold in the market effectively.

The price has to be at equilibrium between company needs and the perception of their consumers. When we talk in Neuromarketing terms, we observe in the human brain the tangible and intangible benefits the product or service has for the consumer. In traditional marketing methodologies, the price is what the consumer gives in exchange of a product. In Neuromarketing techniques, the price is a stimulus that enters the consumer's brain, and is immediately associated with a group of concepts that gives the perceived value of the product. From here we can say that for many people there are more important factors than not only the money during the process of purchasing. For example there are customers that time is more important than the money, and they prefer to pay for a delivery service than to spend their time going to the store.

Many companies are using Neuromarketing to analyse, which are the elements, and factors that increase the value of the product. When a business uses Neuromarketing

as a strategy to establish the price of a product, they should include the fantasies, the memories and the experiences that generated emotions in the consumers mind and as a consequence change the perception of the price of the product in the human's brain. This is why certain brands are able to have a higher price than others, even though the product is very similar. They have the ability to impact the emotional part of the human brain.

Price is a factor that always integrates emotion and the rationality inside the brain at the moment of purchase. When the stimulus is emotional, the brain acts faster than when they involve only rationality. The price has to show not only a monetary cost but also a relationship between the cost and the benefit of it. Price is the same as other variables of the marketing mix, it is one of the characteristics that determine the product, it has a direct relationship with the cost and the satisfaction a product can provide the consumer. The human brain perceives the price as good or bad depending on the type of benefit they will gain by making the purchase.

### III.V Competitive advantage of Neuromarketing

Neuromarketing is the latest of the marketing booms, it not only has new methodologies on how to understand the consumer, but it is also constantly changing and developing. It is the most accurate procedure to understand the consumers mind. Neuroscience is recording revolutionary advances about the human brain everyday. One of the new advances that Neuromarketing is interested in is Brain Computer Interface (BCI). Which is the direct communication pathway between brain activity and a computer device, another method that has been implemented is the “neuroscience-based 3D virtual reality in-store research methodology”, which can show companies how the consumers subconscious brain responds to package designs, the type of products, the layout, the materials, and the way it is presented on the shelf.

As we have observed Neuromarketing is not only a type of marketing, it is one of the latest advances in science and technology developed for the benefit and profitability of companies. Not only do company’s gain with the understanding of the consumers brain, consumers do too. Imagine if all products you find in the market were launched after scanning what your brain wants? If this is done then consumers will always find exactly what they are looking for.

The value of Neuromarketing is very difficult to surpass, it is has the highest competitive advantage amongst other traditional marketing techniques. To know exactly how the subconscious part of the brain will respond to the introduction of a new product, a new campaign, a new package, a new advertisement, new material, this is the biggest advantage that Neuromarketing has. If only 0.01% of our brain is conscious, and your company applies the only technique available that gathers information of the other 99.99% of the brain that the competition is not focusing on, you are going to have the competitive advantage in the market.

Neuromarketing, not only saves times for companies, it also saves them money, and furthermore not using it may risk a possible product failure. Receiving the acceptance of the subconscious brain obviously gives Neuromarketing a clear, competitive advantage in the marketplace.

### III.VI Companies that perform Neuromarketing observe the advantage

There are many large companies that are using Neuromarketing as a research tool. Some time ago, they used social psychology to make us buy products such as Pepsi or coke, or in order to determine the size of the popcorn we buy at the movies. However, nowadays companies are no longer using psychology instead they are scanning our brains in order to see exactly what are patterns of behaviour are. Within the marketplace, 80% of the new products fail, however with Neuromarketing this percentage is likely to decrease this number. This is the main reason why companies such as, PepsiCo, Microsoft, CBS, Intel and others have been using Neuromarketing for more than 6 years.

Illustrations of which companies are using Neuromarketing are as follows;

- The company, PepsiCo, and their Frito-Lay unit, were going to launch a new product that contained only 100 calories, for the launch of the product they hired NeuroFocus to conduct their research. As a result of the investigation they had to completely change the packaging and the advertising campaign, before this they had used the unit of Neuromarketing. With Neuromarketing they tested the type of packaging and advertisement they should use in the U.S.A and abroad, they also discovered that the shiny bags with “healthy” potato chips did not produce an emotional engagement of the product, as a result they had to change the image of the package.

*“Frito-Lay Chief Marketing Officer Ann Mukherjee says brain-imaging tests can be more accurate than focus groups. Frito-Lay brain-tested a commercial that traditional focus groups panned.”* (Laurie Burkitt, “Neuromarketing: Companies Use Neuroscience for Consumer Insights” Forbes Magazine, Nov 16 2009.)

Because of the EEG scanning device used in Neuromarketing it has been discovered that the orange substance that Cheetos produced was the main reason why consumers are attracted to the product. Before, focus groups said the contrary, and it was thought that the orange substance that sticks to your fingers wasn’t attractive, but the truth is that our subconscious mind loves it.

- The TV chain CBS wanted to test the response of new programs, A&E undertook an investigation of the neurological response to the advertisements of the programs they had.
- Intel wanted to increase the understanding of the global programs.
- PayPal wanted to change their corporate identity to look more refined. They wanted to persuade people to participate in more online shopping, and show that it is a fast and secure way of shopping. During the launch campaign brain activity showed that security was the biggest concern for consumers.
- Hyundai was going to launch a new sports car. Before producing thousands of the new cars they decided to use Neuromarketing to observe the possible response of the consumer. They took 15 men and 15 women as a sample and asked them to look at specific parts of the vehicle. An EEG was used for this experiment that took an hour. All the results were recorded in a hard drive and then analysed. After the process Hyundai made certain changes to the car before they started the mass production of it. Hyundai using Neuromarketing prevented losing hundreds of thousands of dollars even millions of dollars in decreasing the risk of rejection of the product in the market.
- Yahoo has also used Neuromarketing, they produced a commercial where you can see happy dancing people, but before launching the commercial and spending thousands of dollars on air time they decided to analyse the brain response. After applying Neuromarketing it was observed that the consumer was emotionally engaged and recorded the commercial in their memory, the brain waves were recorded in the limbic system and frontal cortex of the brain and when the advertisement was released to the public it was a huge success.
- Microsoft is also using Neuromarketing to observe how consumers are involved when they use Xbox. They put the EEG sensors on users of the game and during the test they made them observe some videogame advertisements. They wanted to observe which parts of the ad make the consumer buy the videogame. Results showed that consumers were more likely to buy a new videogame that appeared on the ad than to buy an old video game that did not appear in the ad.

These are some of the many companies that with the use of Neuromarketing have changed their marketing strategy and as a result have become more successful.

This is why we can see that so many companies have decided to use Neuromarketing as the latest marketing technique, it may be a really expensive tool to use, however large companies that have enormous production lines prefer to spend their budget trying to understand their consumer before launching a new product. As we have seen after doing EEG tests the methodologies used, the packaging or many of the advertising campaigns changed because results suggested that the consumer was not being engaged by the product in the way that they need to be in order to guarantee product success in the market, with consumers. Neurometrics shows how and which parts of the consumers brain is having the activity. All companies have to do is to decide which of the pillars of Neurometrics they want to use, do the EEG tests and then apply the research obtained through the study to then develop the product. Analysing the brain directly by using Neurometrics, rather than using traditional marketing research strategies give those companies a competitive advantage against their competition. As mentioned 80 per cent of the new products in the market are a failure, therefore if you have the opportunity to be a part of the 20 per cent success, your company will most definitely gain a competitive advantage in the market. Consumer decisions are made in the subconscious mind in seconds as a result of Neuromarketing these companies are able to understand what the consumer wants, likes, fears and desires. Knowing exactly what the consumer is looking for satisfies the consumer's needs, and this makes the results of a new product more successful than others that don't use a Neuromarketing techniques. Companies that have used this marketing method say that

*“Neuromarketing removes subjectivity and ambiguity by going right to measuring observable brain behaviour.”*(Kevin Randall, “Neuromarketing Hope and Hype: 5 Brands Conducting Brain Research” **Fast Company**. 15 Sep 2009.)

This new marketing technique has been a complete success for those companies that have decided to use it.



**PART IV: (Conclusions and Recommendations)**

## IV.I Conclusion

Neuromarketing is the new era of marketing methodologies. The consumer is the centre of the market, without understanding the consumer it is very difficult to launch a successful product. Old marketing techniques analyse consumer behaviour inside certain environments, and even though they give us some useful results, most of them are not accurate and do not analyse 99% of the human brain being the subconscious part, which is where decision making occurs. This is the main reason why 80% of new launched products are a failure in the market.

Nowadays with the help of technology and the study of how emotions and memory influence consumer behaviours most of the successful companies are using Neuromarketing because of the competitive advantage this methodology offers.

Neuromarketing has two main factors that make it different and add value to the investigation. The first factor is that Neuromarketing is global; any research you do in one market/ country can be applied in another market or country. The brain activity in humans has only one language, which makes it universal; although cultures are different brain activity is the same in every human being. So being able to get to the universal language inside the human brain, talk to it, understand it and be able to translate it for the uses of marketing gives Neuromarketing a competitive advantage in the market.

On the other hand, Neuromarketing not only captures the attention of emotions and memories of a global consumer, but it records the information of the unconscious part of the human brain. The only marketing methodology that is able to understand the human brain activity is Neuromarketing.

Most of the global brand companies gain a way of doing market research through Neuromarketing in one place and can be used in another. Brands start to discover what the standards are of a message, they have to implement in a new product or service that not only affects the whole human brain and captures its attention, it also applies the same marketing results to all the consumers of specific brands around the world.

Marketing techniques have to adapt to the new era of technology and the impacts of globalisation, the old marketing techniques have too many disadvantages, when they

are compared with marketing techniques that use brain scanners and emotional stimuli to understand the consumer. Attention, emotional engagement, and memory are the basic areas that Neuromarketing evaluate through the brains activity, and provide us with the answer Marketing specialists have been searching for over time.

The only way that marketing and market research can be at the same technological level as the market today, is to apply the innovation of neuroscience to the research of marketing. The world is facing an increasingly competitive market which is growing more and more each day, it is not easy to launch a product that has more value than any other existing product in the market.

As we have seen, the female brain is different than that of the male brain, by using Neuromarketing techniques we can discover exactly what parts of the brain are stimulated with certain stimuli and how can we apply this for every type of product that is aimed to a specific type of consumer, male, female or both. On the other hand the stimulus of emotions through senses can give us an accurate response of how the perception of price and the product can vary depending on different Neurometric results. Neuromarketing gives us enough accurate information about consumer behaviour and the desires the human brain has in today's global environment and market.

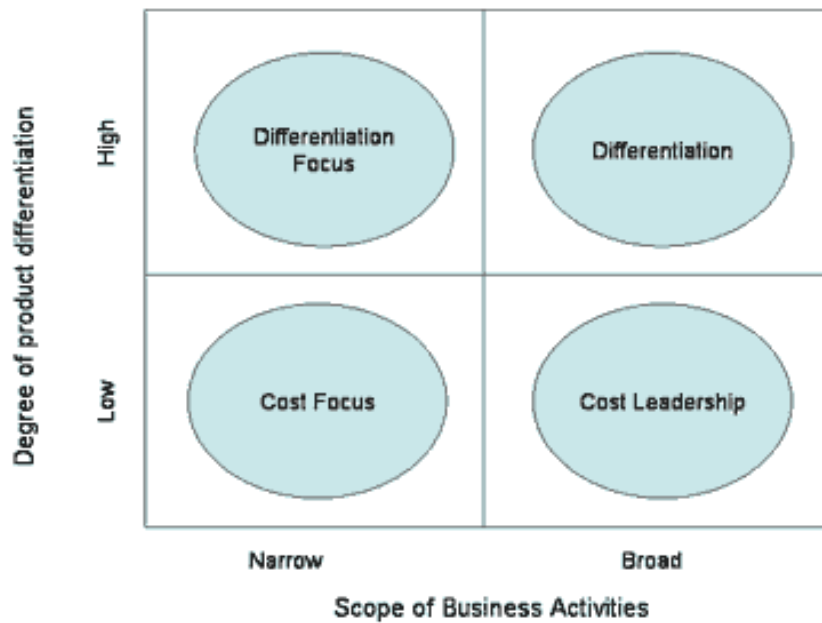
Gaining a competitive advantage by understanding the subconscious mind of the consumer is one of the most successful tools Marketing specialists or researchers can use for global companies. Neuromarketing is not only an innovative system of marketing; it is the new era of marketing research. Today the world is all about technology; you either use the advantages of technology in the market and gain a competitive advantage or let others gain it, leaving you with old traditional marketing that may some day be rendered futile. There are many limitations due to the variables within traditional marketing techniques that cannot accommodate to the new global world, and as such ignores the subconscious part of the human brain, being the most important part when consumers make the decision to purchase a product.

## **PART V: (Annexes)**

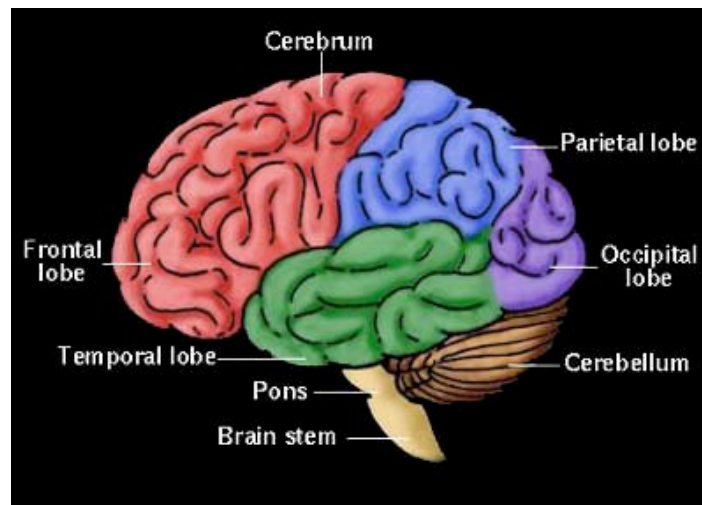
## V.I Appendix

Annex 1: “The four strategies relate to the extent to which the scope of a businesses' activities are narrow versus broad and the extent to which a business seeks to differentiate its products.” (“Michael Porter”).

[http://tutor2u.net/business/strategy/competitive\\_advantage.htm](http://tutor2u.net/business/strategy/competitive_advantage.htm)



Annex 2:



("The brain as meaning maker or 'organ of learning".  
<http://www.holisticeducator.com/brain.htm>, 2003.)

Annex 3:

Look at the chart and say the **COLOR** not the word

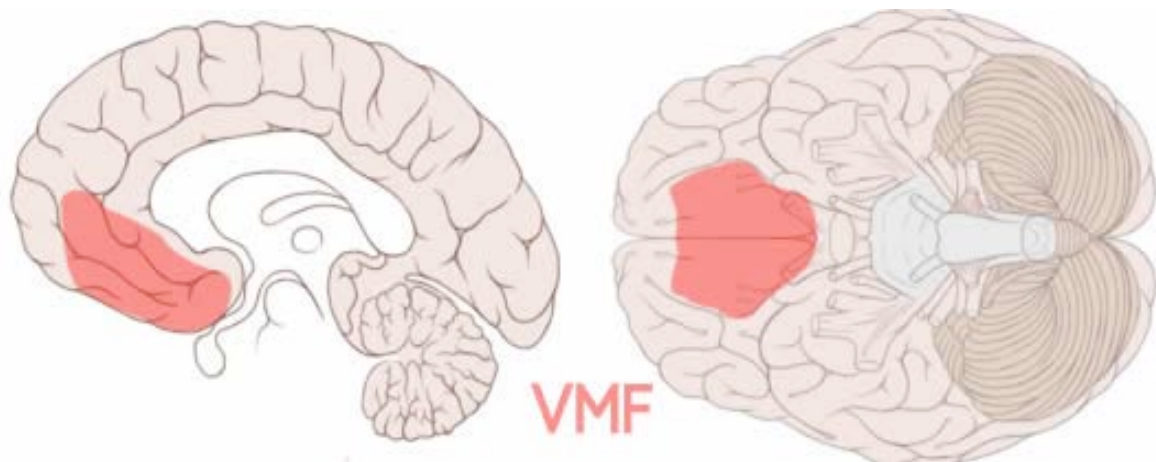
<b>YELLOW</b>	<b>BLUE</b>	<b>ORANGE</b>
<b>BLACK</b>	<b>RED</b>	<b>GREEN</b>
<b>PURPLE</b>	<b>YELLOW</b>	<b>RED</b>
<b>ORANGE</b>	<b>GREEN</b>	<b>BLACK</b>
<b>BLUE</b>	<b>RED</b>	<b>PURPLE</b>
<b>GREEN</b>	<b>BLUE</b>	<b>ORANGE</b>

**Left - Right Conflict**

**Your right brain tries to say the color but  
your left brain insists on reading the word**

("Left right conflict". <http://www.naute.com/puzzles/puzzle3.phtml>. 27, sep 2011.)

Annex 4:



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(“Closer to the buy Button”,

<http://www.neurosciencemarketing.com/blog/articles/vmf-buy-button.htm>.

May 25, 2011.)



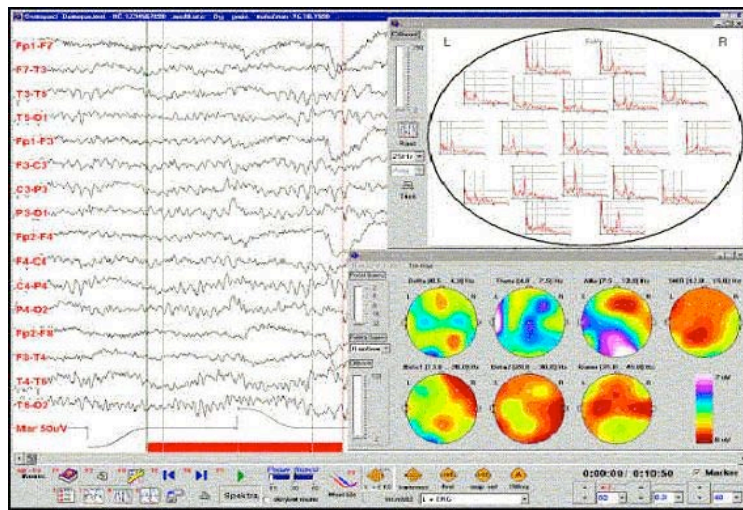
Annex 5:



(“Neurologia Pediátrica”.

<http://www.neurologiapediatrica.es/electroencefalografia.html>. N/A.)

Annex 6:



“Neurologia Pediaত্রica”.

<http://www.neurologiapediatrica.es/electroencefalografia.html>. N/A.)

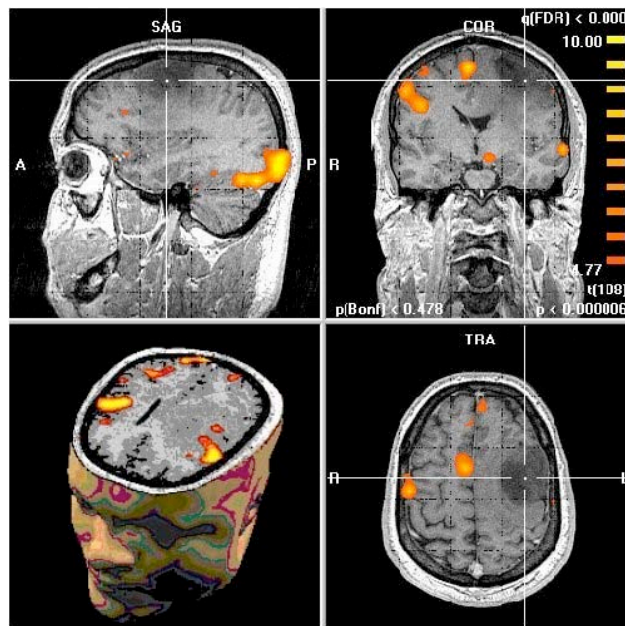
Annex 7:



(“Resonancia Magnetica Funcional”).

<http://neuromarca.com/neuromarketing/fmri/>. 2009.)

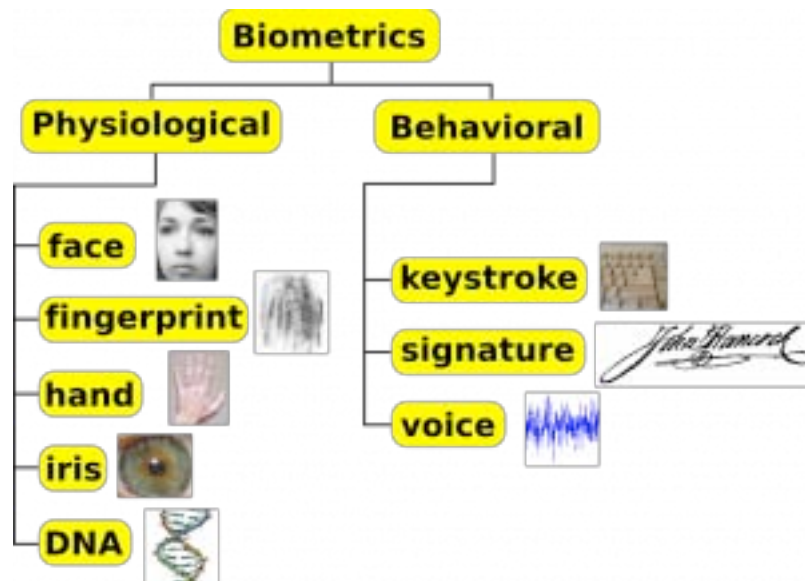
Annex 8:



(“Resonancia Magnetica Funcional”.

<http://neuromarca.com/neuromarketing/fmri/>. 2009.)

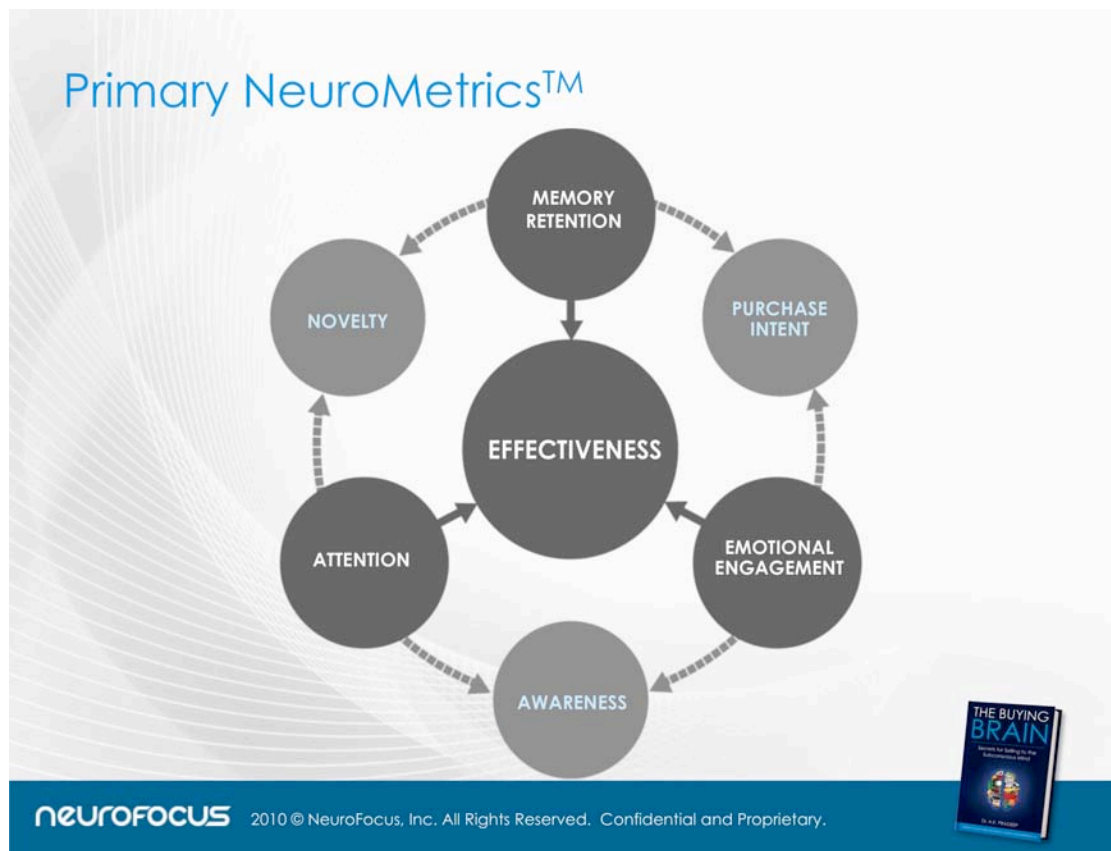
Annex 9:



(“Biometrics access control system”. Rob Gibson.

<http://iwatchsystems.com/technical/2011/03/03/biometric-access-control-systems/>. March 3, 2011.)

Annex 10:



1. (Dr. A.K. PRADEEP. The Buying Brain. Wiley: 1 edition, August 9, 2010. Pg 109.)

## V.II Glossary

### I. EEG

“Electroencephalography (EEG) is the recording of electrical activity along the scalp. EEG measures voltage fluctuations resulting from ionic current flows within the neurons of the brain. In clinical contexts, EEG refers to the recording of the brain's spontaneous electrical activity over a short period of time, usually 20–40 minutes, as recorded from multiple electrodes placed on the scalp.” (Electroencephalography” <http://en.wikipedia.org/wiki/Electroencephalography>. 21 oct 2011.)

### II. fMRI

“Functional magnetic resonance imaging or functional MRI (fMRI) is a type of specialized MRI scan used to measure the hemodynamic response (change in blood flow) related to neural activity in the brain or spinal cord of humans or other animals. It is one of the most recently developed forms of neuroimaging. Since the early 1990s, fMRI has come to dominate the brain mapping field due to its relatively low invasiveness, absence of radiation exposure, and relatively wide availability.” (“Functional magnetic resonance image”. [http://en.wikipedia.org/wiki/Functional\\_magnetic\\_resonance\\_imaging](http://en.wikipedia.org/wiki/Functional_magnetic_resonance_imaging). 21 Oct 2011.)

### III. Biometrics

“Biometrics is the science and technology of measuring and analysing biological data. In information technology, biometrics refers to technologies that measure and analyse human body characteristics, such as DNA, fingerprints, eye retinas and irises, voice patterns, facial patterns and hand measurements, for authentication purposes.” (

<sup>1</sup> “Biometrics”. <http://searchsecurity.techtarget.com/definition/biometrics>. October 1998.)

### IV. CNS

“The central nervous system (CNS) is the part of the nervous system that integrates the information that it receives from, and coordinates the activity of, all parts of the bodies of bilateral animals—that is, all multicellular animals except sponges and radially symmetric animals such as jellyfish. It contains the majority of the nervous system and consists of the brain and the spinal cord. Some classifications also include the retina and the cranial nerves in the

CNS. Together with the peripheral nervous system, it has a fundamental role in the control of behaviour. The CNS is contained within the dorsal cavity, with the brain in the cranial cavity and the spinal cord in the spinal cavity. In vertebrates, the brain is protected by the skull, while the spinal cord is protected by the vertebrae, and both are enclosed in the meninges.” (“Central Nervous System”. [http://en.wikipedia.org/wiki/Central\\_nervous\\_system](http://en.wikipedia.org/wiki/Central_nervous_system). 15 Sep 2011.)

#### **V. PNS**

“That portion of the nervous system that is outside the brain and spinal cord. The peripheral nervous system (PNS) is one of the two major divisions of the nervous system. The other is the central nervous system (CNS) which is made up of the brain and spinal cord.” (“Definition of Peripheral nervous system” <http://www.medterms.com/script/main/art.asp?articlekey=8258>. 21 Oct 2011.)

#### **VI. Dendrites**

“They are treelike extensions at the beginning of a neuron that help increase the surface area of the cell body and are covered with synapses. These tiny protrusions receive information from other neurons and transmit electrical stimulation to the soma.” (“Structure of a neuron” [http://psychology.about.com/od/biopsychology/ss/neuronanat\\_2.htm](http://psychology.about.com/od/biopsychology/ss/neuronanat_2.htm). 2011.)

#### **VII. Axon**

“A long fiber of a nerve cell (a neuron) that acts somewhat like a fiber-optic cable carrying outgoing (efferent) messages. The neuron sends electrical impulses from its cell body through the axon to target cells. Each nerve cell has one axon. An axon can be over 20 cm (a foot) in length, which for the human body is remarkably long.” (“Definition of Axon” <http://www.medterms.com/script/main/art.asp?articlekey=7797>. 21 Oct 2011.)

#### **VIII. Nucleus**

“The nucleus is a membrane bound structure that contains the cell's hereditary information and controls the cell's growth and reproduction. It is commonly the most prominent organelle in the cell.” (“Nucleus”. <http://biology.about.com/od/geneticsglossary/g/Nucleus.htm>. 2011.)



## **IX. Neurotransmitters**

“A chemical that is released from a nerve cell which thereby transmits an impulse from a nerve cell to another nerve, muscle, organ, or other tissue. A neurotransmitter is a messenger of neurologic information from one cell to another.” (“Definition of neurotransmitter”.

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