

The neuromarketing, asset of innovation dealing with the classic marketing limits

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Abstract:

For more than 10 years, the neurosciences have opened ways of knowledge about the human brain functioning what has allowed marketing to understand better the consumer's behavior particularly in his purchase decision.

This article aims to supply a state of art on the neurosciences contributions (to the consumer's understanding and the fight against the classic Marketing limits) as asset of innovation for the company, the brain investigation techniques beside the main empirical studies in Neuromarketing.

Key words: Neuromarketing, Reptilian Brain, Brain Investigation Techniques, Empirical Studies.

ملخص:

لأكثر من عشر سنوات، يتيح لنا علم الأعصاب العديد من المعلومات حول كيفية عمل الدماغ البشري، مما يسمح لعلم التسويق أن يتعرف أكثر على سلوك المستهلك خاصة كيفية اتخاذ قراراته الشرائية.

الغرض من هذا المقال هو طرح إسهامات علم الأعصاب في مجال التسويق التي تعد ابتكارا للمؤسسة (من أجل فهم سلوك المستهلك والحد من نقاط ضعف التسويق الكلاسيكي)، التعرف على تقنيات الكشف عن الوظائف الدماغية والتطرق لأهم التجارب الميدانية.

الكلمات المفتاحية : التسويق العصبي، العقل الباطن ، تقنيات الكشف عن الوظائف الدماغية، التجارب الميدانية.

Introduction:**The classic marketing limits:**

Today economic, complex and chaotic time, Marketing is going badly; colossal expenses were devoted by companies from all over the world without allowing then any investment return, in terms of money and time, since 75% of the new products, companies' services and creation fail during the first year.

Nevertheless a complete series of studies have preceded their launch: market research of development and the concept test, the business sector analysis of the product development and experiments, tries on the market and the commercial launch (Kotler, 2007, P07).

Let's go backward, before the 1929 crisis, the request was superior to the offer, the manufactories used to produce without worrying their goods sale (products or services) these latter were simple and there weren't any competitors.

The companies started then, to manufacture goods in huge amounts. It was then that the market had to be extended. Competition appeared and the offer became superior to the request.

It's then that the 1929 crisis led to the offensive marketing recruiting clients and getting rid of competitors thanks to the multiple tools of communication which were in a continuous progress up to nowadays. According to Martin Lindstrom, the Danish expert in Neuromarketing, the best seller author: "Buy Ology: truth and lies about why we buy". We are exposed to two millions of commercials in our life. It is as watching eight hours of advertising, 7/7 days during six years. The latter is expensive and more and more ignored by consumers.

Thus it's no longer a matter of selling what was produced but to produce what is likely to be sold. The marketing responsibility start consequently studying the consumer's behavior who aspires to rationality and scientism, thanks to the surveys and focus groups. The marketing is convinced to reach its grail: to know the consumers' preferences and satisfy them.

Unfortunately, these studies like the questionnaires/ surveys suffer from several limits: calling on the declaratory, they don't reflect what the consumer says. It isn't necessary what the links about. In certain thorny cases as the politics, racism or certain sensitive issues, he happens to tamper his real thought, afraid of hurting his interlocutor or to blame himself. For non compliant ideas in the common thought. He is unable to appreciate certain key elements which influence his purchase. For example: a packing or a label color or shape such negligence on can seem insignificant to experts lead sometimes the marketing to make mistakes (Georges & Badoc, 2010, P29). Discussing groups can also

be completely diverted by a character which would overwhelm on others. From a mental view point of his personality, here intervenes the neurosciences: reduce the classic marketing limits, using new techniques of brain exploration in order to understand the consumer's behaviour particularly the elements which influence his purchase decision.

The advantage as a result of the Neuromarketing is not to request to consumers what they think but to observe right away, the areas that bustle in their brains in front of the different stimuli (product, service, trade mark, advertising posters,...).

If we take the Mercedes brand as an example, this latter probably positions in the clients' mind (current or potential) as being a sweet ride, elegant and powerful. But as soon as we ask this question, we are wearing the answer, that's why Neuromarketing measures in depth in the subconscious where the trade mark is really recorded (registered).

The advances in Neurosciences:

What characterizes the neurosciences allowed considerable advances in recent years. Observing living brains thanks to medical imaging technologies. The latter analyze the brain waves to measure both marketing advertisement and merchandising efficiency of any brand, but without asking questions to the consumers, we look directly into the brain without making human (verbal) interpreting. These techniques allow us to observe the unconscious process which determines our behaviors, but to ask the brain right away what he really wants.

To understand the human behavior, it is necessary to know how our brain works. Hence the brain is subdivided into three distinct parts (See figure 1) – which communicate between one another and each part has its specific function (Renvoisé and Morin, 2005, P19):

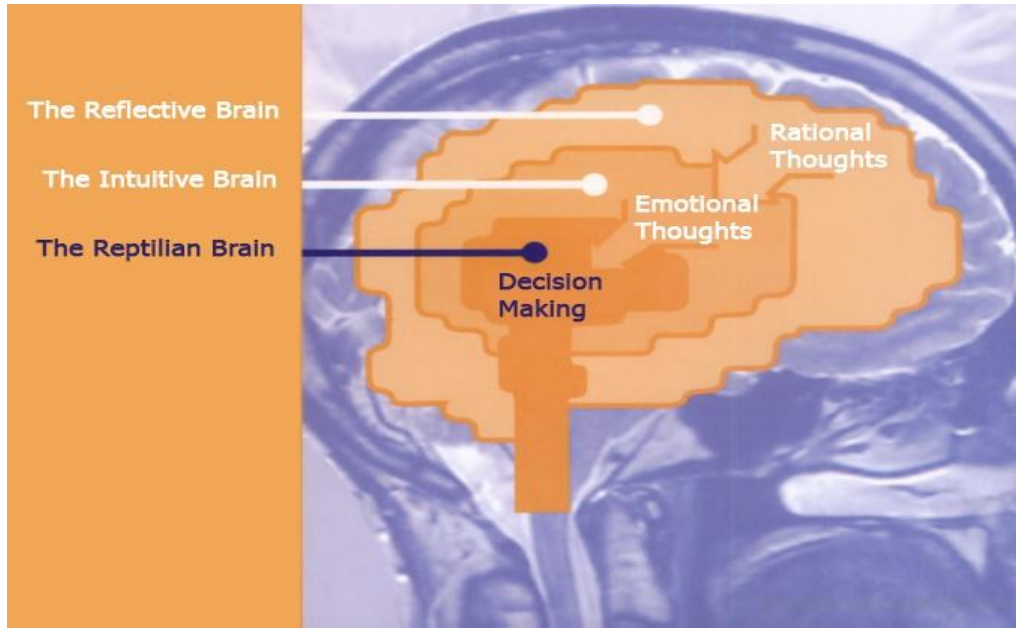


Figure 1: Brain Mapping

Source: Translated from P. Renvoisé & C. Morin, 2005, The cover of the book (*Neuromarketing-the lifeblood of sales*), Edition De Boeck, Bruxelles.

- The reflective brain (neocortex): this brain thinks mentally treats the data rationally and logically and shares its deductions with both other brains.
- The intuitive brain (limbic): this brain feels, treats emotions and deep feelings. It is the seat of memory; it also shares its discoveries with both the others.
- The reptilian brain (primitive): this brain decides, bears in mind. The two other brains contribute, but it controls the decision-making and is the seat of the very powerful “subconscious”.

For Georges and Badoc (2010), the brain is split into small areas (See figure 2) and every area has its specific function.

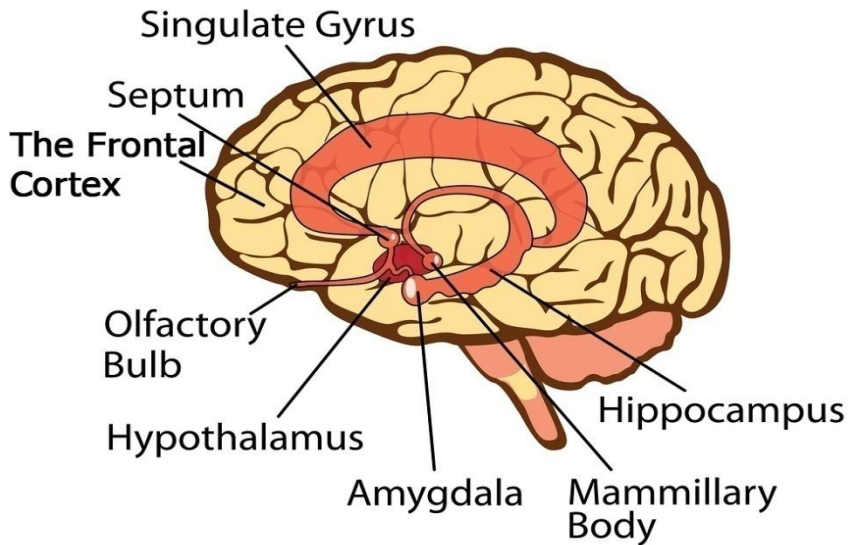


Figure 2: The different brain areas.

Source: Made by Author.

- The nucleus accumbens : is activated by a feeling of pleasure.
- The hippocampus: it's the seat of memory.
- The frontal cortex: participates in the decision making.
- The visual system: it is one of the messages selection spot, it produces the following drugs: Dopamine: which dopes our pleasure, Serotonin dopes us quietness and adrenaline that dopes us to stress.

For a message modifies a purchase behavior, it should first go by the senses filters then the filters of memory next, filters of decision.

This article aims to provide a state of art: the consumer's neurosciences which allow

to decrease the classic marketing limits and understand more the consumer's behavior and on the main brain tools of investigation and the empirical searches in Neuromarketing.

Our article is divided as fellow:

In first part, we'll be interested first of all in definitions: of the Neuromarketing of the consumer's neurosciences and will tackle experience shod (which leads to Neuromarketing birth).

In the second part, we'll present both Renvoisé and Morin's theory about the reptilian brain, its characteristics and stimuli which should be taken into account if we have to convince the consumer to buy.

And in the last part: we'll present the different tools and methods which measure the brain activity to finally get interested in searches and experiments that have resorted to these techniques.

1- Distinction between the Neuromarketing and the consumer's neurosciences:

It is necessary according to the literature issue to distinguish between the "Neuromarketing" concept and "the consumer's neurosciences" expression. Indeed, the first achievements using the neurosciences techniques in the consumer's behavior refer to more than 30 years. But it is only during the 90's after the first scientific achievements publication which have used the Imagery by magnetic functional resonance (IMFR) that both the consumer's neurosciences and Neuromarketing have progressed respectively as a field of academic research and as a commercial practice.

According to Petit, Merunka and Oullier (2014), Neuromarketing is a commercial practice suggested today by more than 150 international private studies companies in the optic of operationalizing the neurosciences contribution for their customer's products or services. As for the consumer's neurosciences, they compose an academic discipline to the economic sciences management interface and of the brain with view to understand better the consumer's behavior. These studies are based on rigorous protocols subdued to an administrative and scientific step which evolves the ethics committee support of people protection and are next published after a scientific expertise.

For Georges and Badoc (2010), the Neuromarketing in contrast to what certain people would like to make it believe in isn't a science; it's just an intelligent reading and oriented on the brain functioning. Besides, the neurosciences contributions can give ideas to marketers on how to convince their leaders, their customers and how to conceive a product that will work well.

We can deduce that both Neuromarketing and the consumer's neurosciences share the same definition, "the neurosciences techniques use as a supplement to with the classic marketing techniques in order to understand the consumer's behaviors thanks to the identification of brain mechanisms which intervene dealing with different stimuli: a product, a brand, an institution, a figure, ..." except that the consumers' neurosciences develops as an academic field or a discipline that refer to the past and that the Neuromarketing is recent and develops as a commercial practice.

The Neuromarketing was born in 2004 (Bridonneau, Mather & Parique, 2011, P09), during an American neurologist's "shock" experiment "Read Montague" (Droulers & Rouillet, 2006, P03) who was request for a marketing study, in order

to determine why Coca-Cola dominates the market at the expense of Pepsi. The experiment occurred as follows: a blind taste was given of both Coca-Cola and Pepsi to volunteers who preferred Pepsi, but in ease both drinks names were Coca was their favorite. Next their brain is mentioned analyzed to find the reason for that contradiction, they were placed in MRI (Magnetic Resonance Imaging) while classing between Coca and Pepsi. At first blindly then précising both brands, and that's where was observed, during the first stage: the brain zone which was violently enaldded during Pepsi tasting is the "Putamen" and clearly is less when it's a matter of Coca. Noting situated in the reptilian brain and activates during an instant pleasure. Whereas in the second stage, at the sight of the trade, additional zones activate: the prefrontal cortex and the hippocampus (the awareness zone and memory), Montague finally concluded that the impact of Coca Cola in our brain is more important than the pleasure (of taste) occasioned by Pepsi consumption which proves that the consumer is irrational in his choices and that his subconscious has influenced his purchase decision since he has given priority to his commitment to Coca-Cola brand (which has resulted from his successful marketing strategies) to the detriment of taste significantly better than what Pepsi offers. After having defined what are the consumer's Neuromarketing and neurosciences, we are going to get interested in the second part of this article dedicated to the reptilian brain features and stimuli.

2- The reptilian brain characteristics and stimuli (the decision maker):

The latest researches in neurosciences release the idea that human being's confidence should be developed from the primitive brain in order to generate his understanding and his emotional intelligence, since the amygdale, a component of the primitive brain and that this one hasn't influence on the amygdale allowing thus emotional climbs to dominate and control the thought. The neurosciences contributions show us that it's thanks to communication with the responsible part of the decision making, in other words the primitive brain, that we maximize our chance to sell a product or an idea. Hence, the marketing responsible could create percussive wrappers, notices and messages due to Neuromarketing in order to attract the customer's primitive brain satisfy his needs and retrain his loyalty.

As it was mentioned above the reptilian brain is the main organ responsible of the decision making. According to the eminent expert at neurosciences Robert Onstein, in his book "The evolution of the consciousness" our reptilian brain or the oldest brain has been concerned solely by our survival, for ages and is the seat of the very strong subconscious. Moreover a group of researchers has tried,

in the beginning of the 1990s to answer the following question: to what extent were our behavior and decisions making made consciously? Much to their surprise, they realized that 90 à 95% among them were unconscious. For instance how to cope with a sudden danger? Unconsciously: the human defends himself, remains in place or escapes: according to these researches: the incoming information to our sense has already been treated unconsciously and influenced by the emotional (fear, danger, low self-esteem, shame, courage, self-esteem, etc.) By our previous experiences (the memory), it demonstrates that the reptilian brain, the unconscious seat is the real decision maker. Renvoisé and Morin (2010) raise the six characteristics and stimuli of the reptilian brain that we'll discuss and approach below:

▪ **The reptilian brain strongly reacts to feelings:**

Searchers in neurosciences have shown that the human beings make their decisions emotionally and they next justify them rationally. Emotions are actually taken care and treated by the intuitive brain and the final decision is made by the reptilian brain, nevertheless the latter is responsive dealing with emotions.

If we really observe how our decisions are made, there is a large portion of emotions; the brain which thinks, argues, calculates is the same which laughs, cries, feels pleasure and replicates. The human relies on the reason convinced that the emotion is going to bother him. But actually the reason is nothing without the emotion. This amazing discovery that we owe to the American Phineas Gage (Damasio, 2010, P21), a famous patient in the neurology field but what really happened to Gage? We are in summer 1848, Gage is 25, works as a foreman in the railways construction works. In the opinion of his employers, he is far more provided physically of good qualities. They say that he is the most appreciated, competent and efficient of all those who are serving them. During the project; arrived to a river, the field is very regular made of rocky lies extremely hard, rather than circumventing every escarpment. He decided to blow up the rocks here and there in order to obtain a better rectilinear path and more horizontal. Gage supervises with competence the series of operations, particularly while blasting the mines. These ones require preparation and several steps obeying a precise order. A hole should be first dug in the rock, then half filled with powder, next a wick is inserted and the hole is stuffed with sand which should be compressed using. An iron rod that he actuated in a series of blows very well calculated. Finally the wick is lit and everything is all right, the explosion happens into the rock. The sand stuffing is essential otherwise the issued gas from the powder combustion will disburden out of the rock without

breaking it. The metal bar shape and the way it is manipulated is also essential. One afternoon, Gage has just poured the powder in the hole and asked the worker to help him to coat it with sand. Somebody behind him called him, and Gage looks far off and starts to stuff the powder with his metal bar, his assistant hasn't poured the sand yet, right away, this set fixes to the explosive charge and the mine blew up in his face. The metal bar penetrated his blowup in left cheek and drilled his skull basis crossed the front of his brain and went out quickly though the top of his head. Gage survived to this accident and recovered in less than two months but lost his left eye. However what's amazing outcome will be surpassed by far by the extraordinary change of personality that this man is getting to know. (His character, his tastes, his empathies, his fantasies and ambitions. All this will change. He used to rant very easily and became rude at his speech, he lost the responsibility sense and he no longer was able to make a single decision. As a result, Gage got expelled of his work and for 12 years he hasn't stopped changing jobs and countries leaving behind him the foul man' memory. Thus this story proves to us that when we make a decision, it's the emotion which takes over, this helps to make a selection in all information that the brain should treat but we don't often happen to have consciousness and we look for subsequently as already mentioned a rational justification to our choices, so one of the most important features of the reptilian brain is that it is sensitive to emotions.

The manufactories can use this feature on their internet sites, their advertising notices, marketing documents... though a good choice of the content (symbols, slogans, logos, colors, icons shapes, pictures, etc) baring in mind the most powerful words and combine the whole by linking them the emotions, which will allow emotional traces in the prospects' brain.

▪ **The reptilian brain is egocentric:**

It feels interest and sympathy for itself, and all what concerns its survival and its welfare. It thinks that it is in the world centre and nothing else is as important as it is.

Of course if our reptilian brain hasn't worried about others' injures, in an accident, for instance, it's because it is actually reassured that we aren't among those who are injured. However we are able to react emotionally. Yet these reactions take place at the level of whether the intuitive or reflective brain.

It is necessary for the companies to take this feature into account during an advertising message performance, of a slogan or any desired. Positioning, high lighting the consumers' frustrations and how their product/ service remove them

and that promotes the reptilian brain well being and will be finally convinced to buy the product. Ex: while an investigation led by a delivery company of pizza door to door about their customers' main frustration, the answer was amazing it regarded neither the taste nor because the pizza was hot or cold but it was due to the fact that they couldn't know the time when the pizza should arrive. Equipped by this information, an American company specialized in pizza sales and delivering door to door has guessed a successful slogan; that reduce this frustration intensity: "Provided that it's delivered in 30 minutes or it is free" So this example creates an interest and reassures the customers' reptilian brain.

▪ **The reptilian brain is sensitive to contrasts:**

Contrasts are expressed by objections in commercial evidence and arguments. For example: before/ after, with/without, risky/safe, slow/fast. This opposition facilitates decision making by the reflection and promotes thus the product sale. The companies can use this characteristic by ennaemcery their quality/price, ratio with whom we find on the market (competitors with in the same industry). Surprised by this comparison, which is a contras in the prospects' eyes, mainly if the comparison is evident, this will lead the prospect to buy without thinking.

▪ **The reptilian brain chooses tangible information:**

The reptilian brain seeks constantly tangible evidence, for instance: numbers, estimations, satisfaction rate, agreed tests...Which can reassure it in decision making. It is unable to take into account abstract information. Though , it appreciate the practical and proven ones the factories can use this characteristic by highlighting on the websites and on the social networks satisfied customers' testimonies by their products contributions as tangible proofs, this will help very much the prospects to choose them.

▪ **The reptilian brain often remembers the beginning and the end of message:**

The reptilian brain tends to remember only the beginning and the end of an advertising message, a political speech, an oral presentation but substantially all what's between, this feature warns us during any oral message formulation. That's why that the best is to put all what's important, at the beginning and is necessary to repeat it at the end.

▪ **The reptilian brain is visual:**

It has been scientifically proved that the optic nerve transmit 25 times higher of information than the auditory nerve, what makes the reptilian brain very visual and decides quickly starting from the things which surround his field of vision. If for example we see a dog running towards us, the reptilian brain is immediately informed by the optic nerve and reacts quickly and unconsciously

dealing with danger without even our reflective brain recognized that it was a dog.

Hence, this reptilian brain feature helps the factories to conceive advertising messages, by relying more of the visual (pictures showing the product functioning and efficiency, photographed or filmed customers' experiences...) rather than concentrating on written or announced messages to counterparts.

After having drawn up the reptilian brain features and stimuli, let's now turn to investigation tools of the brain activity as well as the main experiences in the field.

3-The investigation techniques of the brain activity and the empirical major research in Neuromarketing:

The consumer's neurosciences progression has allowed a strong explosion of brain activity studies, suggested by private factories in Neuromarketing. This progression is due inevitably to methods development and measurement tools and of zone evaluation that become active of the consumer's brain dealing with different marketing stimuli (factories, product, service, public personality,...).

We are concerned first of all to the main Neuromarketing tools/techniques there we approach the empirical studies which resorted these tools.

3.1 The investigation techniques of the brain activity:

The investigation tools and techniques of the human brain differ according to the measured system type. Whether it is central or peripheral, each one has its own tools that we approach below:

a- Estimation techniques of the central nervous system activity:

It includes the heart rate, the electro dermal activity. The face muscle activity (electromyography) and finally the eye-tracking.

The heart rate (HR) : The heart rate is measured thanks to sensor set at the fingertips or on the chest by an electrocardiogram, in order to record the heart activity. Thus the registered heart pulse can reveal to us: pleasure attention, memorization or even fear felt by the human being. Bolls lang and potter (2010) have used this measure in order to evaluate attention fluctuations held into radio advertising messages. However, the heart rate used alone, has shown that it is insufficient and limited.

The electro dermal activity (EDA or RED):

Recorded by a galvanometer at a skin surface, this electric activity reflects variations of skin micro-sweating (Petit, Merunka & Oullier, 2014, P09) which allow studying: attention, excitement and the motivational reactions dealing with images or messages. Nevertheless this tool remains limited, since the signal

registration as the series of neurophysiologic signals as the FC is sensitive to intrinsic and environmental factors which can modulate its variability.

Therefore any inter individual comparison should be done on the basis of an inter individual signal change percentage between a registered value or of a rest recorded before the experimental session.

The face muscle activity (or electromyography):

The electromyography records the face muscle contraction (activity) which expresses different emotional reactions (anger, joy, disgust, fear, compassion, surprise) thanks to the multi-electrode, put on the face. These reactions may help us to know what the human feels dealing with different Marketing stimuli. However, this tool remain also limited as the subjects are careful to their reactions while we place electrodes on their face, they can control what is expressed and skew them, unlike to what we are seeking as spontaneous reactions which really define the contrast.

The eye tracking:

There are different eye tracking tools, their policy is simple: place an infrared light directly on the eyes, that is detected by a camera, it permit to record the eye movements, time and about what they are set. The majority of measuring devices of the ocular activity also permit to measure the pupil dilating with different marketing stimuli.

b- Techniques for estimation of the peripheral nervous system activity

It contains techniques in metabolic and hemodynamic imaging (PET, FMRI) and techniques of electric magnetic imaging.

The metabolic and hemodynamic functional brain imaging, we can clearly see two types: the positron emission tomography and the functional magnetic resonance imaging, that we are treating below.

The positron emission tomography:

This technique consists to inject radioactive isotope in the blood stream , which allows to identify the areas that have consumed more oxygen and glucose, knowing that at the base; the neurons consume energy when they switch from an idle state to an active condition.

Thus, we note on a medical imaging devise, the areas where the radioactive isotope has focused, what reveals to us that those areas had been enabled facing different marketing stimuli. Nevertheless, this technique is little used in Neuromarketing, as the radioactive isotope localization is long and doesn't afford detecting the activity changes less than a few seconds.

The functional magnetic resonance imaging (fMRI):

This technique provides to estimate the brain activity following the change of the oxygen contributions and the blood flow (when the neurons work: produce electricity, consume much more blood and change in metabolism).

The (fMRI) is provided with a good spatial resolution (inferior to the millimeter) and loads to see activity modifications in the whole brain in surface, cortical or sub cortical areas) while the human beings perform tasks. Hence, we obtain images from the brain areas which work when we do such or such action, when we have such or such thought and we take such or such decision.

The areas which bustle at the fMRI are

- The nucleus accumbens: the pleasure centre, bustles when we show to someone what he really desires, something serious for him: alcohol, sex, game, food or related products that can announce pleasure.
- The lateral prefrontal cortex: bustles when we are requested to decide. When the desire resists to instinct.
- Amygdale: hustles when something scares us and we get aggressive towards it or when we are anxious.
- The limbic cortex: bustles when we are emotional and when we open our memory.
- The premotor area: hustles when we are seeing a gesture and we get read to imitate it.
- The occipital cortex: hustles when we are watching.
- The temporal cortex: hustles when we are listening.
- The ventral putamen: hustles when we feel a sense of satisfaction.
- The medial prefrontal cortex: hustles when we judge of a value.

The electric and magnetic imaging techniques:

Consist of the electroencephalography and magneto-encephalography.

- **The electroencephalography (EEG):** this technique allows to record activity variations of the neurons using electrodes placed in touch with the head skin though a conductive gel. In this way we observe thanks to the EEG the brain electric waves. In most cases, those device have 64 sensors, each one controls the brain 2000 times per second. So, in one second, we obtain 128000 recorded data. However those device measure three parameters: (the attention, the emotion and the memory) facing a commercial for instance which doesn't last one minute to get reliable results.
- **The magneto encephalography:** This technique permit, to measure a variation of current mislead in a hole of reels (call squid) dispose in a helmet.

If the method defer from the EEG, she possessed the comparable characteristics (average definition spatial and good temporal resolution in the order of millisecond). She serve for record the modifications the cerebral activity when the subjects carry out a decision's task of purchase during the presentation of sequences video in the inside of supermarket.

It seems reasonable to share the opinion of Renvoisé and Morin on the characteristics and stimuli of the reptilian brain in order to attract the customer and convince it to buy. This can be done through captivating and attractive communication campaigns (posters, advertising spots, slogans, Internet sites, etc.) that use these features with tact (the strong reaction to the emotions, to contrasts, to information tangible, the egocentrism, the remembrance only of the beginning and the end and the importance of the visual and its quick storage). Concerning the techniques of investigation of the human brain (to identify the different areas of the brain that are activated when the visualization of different Marketing stimuli), it seems to us that the techniques like the eye tracking, the FMRI and electro-encephalogram (EEG) are the most powerful and this for the following reasons: the eye tracking measure the dilation of the pupil and records the movements of the eye, which allows us to identify what interest the customer as well as being the least expensive technique. The FMRI is more efficient to accurately identify the areas of the brain that are activated but it remains very costly and inaccessible to the majority of companies practicing the Neuromarketing. However, the EEG is responsible for measuring the three parameters: the attention, the emotion and memory, not very expensive but very handy to give efficiency scores for the observed advertisements.

3.2-The principals empirical of investigation in Neuromarketing :

We tackle in this under-section the principals empirical studies (Petit and others, 2014) that were excel in the Neuromarketing (using his techniques of investigation), according to the chronological order :

Erk and al (2002) : those researchers were interested to the evaluation of products in the purpose to identify the neuron's participates zones in a task of judgments bases on des esthetic consideration for the cars . So, it's about visualization of 12 persons a cars model (sport, limousine , little cars ...) than ask them to demand the incitation of their attractions for every car starting from a point's scale .

Result : the sport's cars had more success beside the subjects since the powerful activity was observed in the associates areas to the perception of reward (striatum).

Deppe and al (2005) : those researchers were interested to the evaluation of products marked in the purpose to know the neuronal base of the trademark's choices. So ,it's about propose to the subjects (about 22 persons) a consumer products : beer for men and coffee for women who are asked to make a binary choice between familiar brands and others less familiar.

Result: The familiar brands were requested by the prefrontal cortex (vm PFC). Subjects what made both then choice and decision making easy.

Knutson and al (2007): these searches got interested in the consumers purchase decision prediction; the aim of their study was to know what reveals the observation of the brain activity on the price influence on a product choice. Therefore, the investigation takes place as follows: 27 volunteers do their shopping in (fMRI), they offered then 20 \$ a range of products is suggested to them. They could leave, at the end of the experience, keeping their baskets or with their endowment.

Result: The searches have discovered that if the brain area involved in good things anticipation namely the nucleus accubens, bustles during the observation of certain products. The subjects will consequently buy them even if they haven't seen the price. Bu when they see the price another area which anticipates the unpleasant things hustles, namely the insula, so in this case the subjects won't buy any of these products.

Langleben et al (2009): these searches got interested in advertisements assessments; their goal was to answer to the following question: "which brain activity arouse more than less shocking videos in messages of public health prevention in order to fight against smoking. The investigation occurred as follows: 18 smokers are placed in (MRI). Then we make them watch and listen to preventive anti-tobacco videos more than less strong in sensation.

Result: The videos with high in sensation, hustle the areas linked to the visual attention where as the videos with low sensation drive a higher activation in the intellectual areas participating to the memorization and the decision making (PFC temporal and posterior parietal).

Astolfi et al (2009): these searches got interested in a commercial memorization and its prediction in order to know if there are brain requests differences which allow to predict recalled and non-recalled commercials. For it they proceeded

to the following investigation: ten subjects watch a film cut by commercials. Ten days later, they carry out a commercials recall task. The tool used was the “electroencephalograph”.

Result: during the visualizing of those advertising spots, this is the prefrontal cortex and the parietal earlobe which activate. Those activations were permit to predict that the advertisings remembered by subjects.

Falk and al (2010): those researchers were wont test the prediction of consumer’s behavior (purchase or not) following a message of prevention, starting from the cerebral activity virtue of IRMF. Thus, the experiment was enrolled like this: visualize to subjects (20 persons) the poster’s recommend the use of suntan cream. We demand to them after, their attitudes toward this one and if they have the intention or not to buy it. One weak latter, without they were informed, the evaluation of their use of suntan cream was doing.

Results: the use of cream is positively and significantly linked the augmentation of activity at level of the central prefrontal cortex, a brain’s area that we cannot associate to the evaluation of cost and the benefits in decision’s hold . That proves that the IRMF predict the purchase’s decision.

From these many experiences, we note that some techniques like IRMF (Imaging through Magnetic Resonance) and the EEG (the electroencephalography) were provide their effect and permit well and truly to predict the consumer’s purchase act.

Conclusion:

Traditional market studies lead marketing to make mistakes, in fact, using the declarative, they do not really reflect the real expression of the consumer, and it’s not necessarily what he thinks.

Thanks to the new brain research techniques where marketing is associated to neuroscience and therefore customers are no longer asked about their thinking or preference. The Neuromarketing rely on observation of activated areas of their brains when dealing with different stimuli (product, service, brand, advertising displays, ...).

Thus, the contributions of Neurosciences were revealed to us that the reptilian’s brain answer to six stimulus : (he is egocentric, visual, sensible to contrasts , react greatly to emotions, prefer the tangibles information and remember just the beginning and the end of an event).

A good control of those characteristics will procure to us the capacity to convince the consumer creating an advertising messages powerful and a communication's companion which attract and stimulate his brain.

Some techniques of investigation of brain like the IRMF (Imaging through Magnetic Resonance) and the EEG (the electroencephalography) were provide their effect and permit well and truly to predict the consumer's purchase act. those techniques can prove more useful for the Marketing : during the intermittency and the target of consumer , the concept of product (packaging , odor, tasting ,...) but also the wording of the request position through the company and his strategy of communication.

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