

## Identify Emotion using Neuromarketing to define Consumer Behavior

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### Abstract

At present the interest in identifying and satisfying consumer needs for these companies use various techniques such as the study of market, conducting surveys, product testing by mention a few, nowadays to get a better result precise techniques and tools have evolved a lot. Neuromarketing is one of those advances, which helps us to determine with greater accuracy and depth the preferences of the consumer. Focus on knowing conscious behavior, while the consumer buying behavior is fundamentally unconscious. Today with the help of new technologies more interest has developed in applying the methods of neurology in various areas other than medicine, that are related to human behavior; being the Neuromarketing one of the ways to investigate and know consumer behavior and decision-making purchase, thus supporting us to better understand the psychological behavior and dictate more precise actions to marketing based on the knowledge of the reactions cerebral.

**Keyword:** Neuromarketing; Emotion; Neuroscience; Neuron; Neural network

### Abbreviations

RN Neural Network, EEG

### Introduction

Neurosciences in the set of information technologies help to link their objectives to the companies in charge of marketing, through neuromarketing they can define consumer behavior.

Neuromarketing involves looking at the minds of customers in purchasing decisions to discover Marketing strategies that are enabling and stimulating to attract potential customers. The trend has had an excessive influence on the improvement of companies and brands around the world, not only facilitates the exploration of different market segments. Also, neuromarketing can help you develop a proper strategy, including a combination of marketing and four comprehensive stages of a marketing plan that includes price, product, promotion and place to satisfy different groups of Customer.

The results presented in this study can be useful for professionals and managers who, when completing their activities, must maintain strong and frequent relationships with other organizations. In fact, professionals and managers interested in improving customer value and measuring cross-organizational performance may find an innovative perspective that links the two dimensions. They might find the categorizations presented in this study as a starting point for developing an appropriate performance appraisal framework for evaluating their current business relationships. In fact, the categorizations provide a snapshot of how academics have so far measured cross-organizational performance through customer value and could therefore choose the most appropriate measures for their situation.

The importance of measuring interorganizational performance must be found in the need to have a more objective tool as a possible

tool capable of informing managers about the convenience of maintaining the relationship [7]. In addition, measuring and evaluating performance Interorganizational is of utmost importance to improve performance in itself and the value created for the end user [2]. In fact, the performance resulting from collaboration between two or more organizations, both in the public and private spheres, is decisive for performance at the final level. In particular, customer value can be considered a key element when approaching cross-organizational performance measurement. In fact, it can be used as a useful parameter to evaluate performance [6] in contexts where performance evaluation is quite difficult and complex, such as interorganizational relationships [7]. Clients on the value of the interorganizational relationship affect relational aspects [4], such as the intention to continue the relationship.

So far, academics have thoroughly analyzed the customer's bottom line in relation to the service received. However, less attention has been paid to understanding how and to what extent value has been used for performance evaluation in interorganizational contexts. This study aims to fill this gap, by systematizing the scientific knowledge produced between 1991 and 2020. In particular, the literature review refers to the use of the customer value construct to evaluate the performance of interorganizational relationships, given the centrality of customer value in measuring the effectiveness of interorganizational relationships [3] Academics have carried out some reviews of the literature on customer value and interorganizational relationships [5]. However, to the best of the authors' knowledge, this study represents the first systematic review of the literature to provide a ranking for customer value and interorganizational performance measures, also linking the two constructs and discussing possible differences between different settings.

In fact, to make the literature review as complete as possible and to identify possible differences between different contexts, both public and private literature were included in this study and 1991 was chosen as an appropriate starting point capable of capturing both perspectives. In fact, from this period, two main events occurred. Relying on neuroscience, the best option for companies in conjunction with information technologies to define consumer behavior, given that the studies carried out previously gave erroneous results on consumer buying behavior because they did not enter the mind of the consumer.

## Materials and Methods

Electroencephalography (EEG) has long been a very popular diagnostic tool for brain disorders. The same technique can show brain activity in certain psychological states, such as alertness or drowsiness. Observing brain waves whose different amplitudes correspond to different states of mind, such as wakefulness (beta waves), relaxation (alpha waves), calm (theta waves), light, and deep sleep (delta waves) can tell much about the subjects' mental states.

To aid in the task of measuring brain activity, numerous electrodes (up to 256) are placed at various locations on the scalp. Each electrode, also called a "lead," makes its own recording. To draw meaningful conclusions, the measured electric potential must be compared to the reference level. The dimensions of such potential are: the particular voltage and a particular frequency that vary with the state of a person.

The disadvantage of EEG is that the electrical conductivity and therefore the electrical potentials measured can vary widely from person to person and at different time periods. This is because various tissues (brain matter, blood, bones, etc.) have different conductivities for electrical signals. Consequently, it is sometimes difficult to determine where exactly the electrical signal is coming from.

Furthermore, the EEG is the most sensitive to a particular set of postsynaptic potentials: those that materialize in the superficial layers of the cortex, in the upper part of the convolutions near the skull and radially to it. On the other hand, dendrites located deeper in the cortex or in even deeper structures (such as the cingulate gyrus or hippocampus) or those that produce currents tangential to the skull contribute much less to the EEG signal. Let's add that the principle of recording neural electrical signals need not be limited to the area of the skull. With this device we can perform encephalography obtaining the signals from the frontal part.

MUSE To carry out this methodology of the definition of emotions will be used Muse is a powerful and compact electroencephalography (EEG) system that takes advantage of improvements in dry sensor technology, bluetooth and battery life, as well as significant advancements in digital signal processing. This device facilitates the access and use of brain wave data, inside and outside the labo-

ratory and in real world environments. The MUSE headband is a tool that measures brain signals as a heart rate monitor detects your heartbeat. It has 7 sensors finely calibrated that detect and measure brain activity, located in the as follows: two on the forehead, two behind the ears, and three reference sensors. This headband will help us perform the encephalogram.

Broadband MUSE is a headband, which will help us perform an encephalogram, and obtain the bioelectrical signals of the brain. The headband consists of 7 dry sensors 4 input channels and 5 output channels. To place the electrodes we rely on the 10-20 system.

In their consumer survey, Morales and Fitzsimons (2007) found that six of the ten best-selling inedible supermarket items elicit feelings of disgust (eg, garbage bags, cat litter and diapers, feminine hygiene products). When placed next to other items in the shopping cart, just by simple contact through packaging, these items “infect” other products whose subjective rating later dropped. The idea of contagion certainly deserves further exploration, even more so that no study has yet addressed the potential impact of “delicious” products on the valuation of other products induced through physical contact between the two. Interestingly, such an influence has been demonstrated with respect to product evaluation when consumers judge an item that has been physically touched by another very attractive person. Furthermore, gender is a critical moderating variable in the realization of this positive contagion effect; the source of contact and the observing consumer must be of the opposite sex for positive contagion to occur [2].

The input of emotions into decisions comprises yet another aspect. Reflecting on the choice to make is not deprived of emotional and often negative side effects (Luce et al. 2001). Especially for big decisions, when consumers allegedly use their analytical skills and keep feelings at bay, tradeoffs related to emotional stress emerge.

Generalizations about emotions are difficult because they are many and of different kinds. As a first step, marketers can turn to comprehensive evaluation of the single or repeating experience.

## Results and Discussion

Apply neuroscience to determine the behavior of an individual using the EGG. It gives us optimal results since it enters the consumer's brain and shows us the brain's reactions to a circumstance. Furthermore, it does not cause secondary reactions nor is it invasive for the patient undergoing the test.

The following table shows us the results of the emotion classification, which gave us a percentage of 100% for the emotions of happiness and anger and a 71.4% for the neutral emotion for the training sample.

For the test sample we obtained 100% assertiveness for happy emotions, 50% for anger and 83% for neutral emotions. These results were obtained from a neural network performed for the classification of emotions, showing that applying this technique is highly effective and with fairly reliable results.

<i>Classification of Emotion</i>					
Sample	Observed	Predicted			
		Happy	angry	neutral	Percentage Correct
Training	Happy	14	0	0	100.0%
	Angry	0	14	0	100.0%
	neutral	1	3	10	71.4%
	Overall percentage	35.7%	40.5%	23.8%	90.5%
Test	Happy	6	0	0	100.0%
	angry	1	3	2	50.0%
	neutral	0	1	5	83.3%
	Porcentaje global	38.9%	22.2%	38.9%	77.8%

**Table1:** Dependent variable: EMOTION.

## Conclusion

Applying neuromarketing is one of the best options to know consumer behavior, by exposing the responses of brain stimuli, by using this, companies could have greater control and knowledge based on evidence of different measures of behavior and / or stimuli, which allowed in a certain way to obtain behavior patterns versus different contexts of purchase or consumption established by customers.

Without a doubt, neuroscience offers us the possibility of optimizing the results of the market study of the application of neuromarketing through. Collection of data that can help them define consumer behavior. Previous research in neuromarketing shows us that this technique will give us accurate data which will be of great help in making decisions.

## Acknowledgements

The best application of Neuromarketing is that it predicts consumer behavior; this being the biggest challenge facing traditional marketing: the relationship between mind and behavior. Advances in Neuromarketing will allow choosing the format that best suits the market study given that what the consumer says and thinks does not always coincide, therefore, if artificial neurons are applied in neuromarketing for market research, this will generate results highly reliable.

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