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Improving traditional tourism promotion through the application of sensory branding

Author: Branislav R. Tanasic

Abstract

In an attempt to increase the small persuasive power of tourism promotion on consumers, the influence of sensory branding has been explored and monitored by electroencephalographer (EEG device). Combination of promotional technique and sensory branding can significantly increase the positive impact on potential tourist during making the decision process about destination chose. The starting point of this research is the fact that tourism promotion affects the destination choice of future tourists only with 8% (Travelsat, 2011). With the aim to reveal the impact of sensory branding on the future tourists, organized a neuromarketing research using electroencephalographic scanning of the participants, to explore the extent to which sensory branding can increase the impact of promotion on consumers. A comparison of statistically structured results gives an answer to the question of the extent to which this form of promotion influences the behavior and decision-making of consumers.

Keywords: Sensory branding, promotion, tourism, EEG, neuromarketing.

Branislav R. Tanasic
University of the People Sabac
Serbia

Introduction

Sensory branding is a technique of using all five human senses in communicating with consumers, is based on the assumption that this way marketing companies will reach a far higher level of influence than traditional marketing. Hulten Sensory Branding defines as a type of marketing that affects all senses, creating so emotional associations with consumers, ie marketing techniques that aim to seduce the consumer using his senses, and thus affect his feelings and behavior (Hulten, 2011, p. 256-273).

Therefore, sensory branding builds a relationship with consumers by combining modern technology and the impact on the consumer's mind. With the use of new technology, it is possible to create exceptional sensory experiences for consumers, such that they have the impression of a science, a fantastic journey. Such is the new Teleporter 4D technology that uses Marriott hotels. With the help of the Oculus Rift technology, hotel guests were able to virtual visits to destinations in Hawaii, with the feeling that they were physically teleported to a beautiful beach. A Teleporter user can feel the atmosphere of the environment, with built-in heaters on specially designed glasses experience a simulation of a heat of the sun on the face while at the same time fine water sprays disperse water droplets on the skin (Kool & Agrawal, 2016, p. 248).

Electroencephalography (EEG)

Englishman Richard Caton, first notices the ability of a neurons (brain cells), to realize a bioelectric intercellular potential (electricity), which can be detected by a galvanometer. Recorded the electrical activity of the open brain of rabbits and apes using a galvanometer with a mirror. In order to improve visualization of the results, when measuring the weak signals, the wavelength was enhanced by the oxygen lamp, which illuminated the mirror and thus reflected the two metar display on the wall of its laboratory. About his 1875 experiment Caton himself says: "The emergence of an electric current in the brain is related to its function" (Collura, 1993, p. 476). Short and concise statements, set the cornerstone for further research electro-brain activity, actually represents the discovery of electroencephalography.

EEG device detects the changes of the brain electricity by using silver or gold electrodes arranged over the scalp of the respondents. There are international standards that regulate the number and arrangement of electrodes, the most commonly used 10/20 or 10/10 as the expanded version. Actually, the technique is based on measuring the potential differences between these electrodes. This is the oldest neurophysiological measurement method, developed from the galvanometer used by the pioneers in this field of research. Otherwise, the method is widely accepted not only for medical purposes but also as a tool in research neuromarketing.

Neuromarketing

Neuromarketing is not a new type of marketing, it's a new way to approach the study of marketing. It is based on the use of modern research techniques and instruments intended for measuring the level of brain activity, to understand and measure the impact of marketing and advertising to consumers (Tanasic, 2018-a, p. 20383). Researchers have access to devices for unmistakable and direct measurement of brain cortex activity. The most commonly used is the EEG (electroencephalographer), as a cheap and easily accessible device.

It has long been known that electrical currents in the brain in response to stimulation of the senses occur. By placing the electrodes on the scalp, it is possible to register these bioelectric potentials or electrical activities, and this procedure is called electroencephalography -EEG. For years this non-invasive technique has been used in medicine as a diagnostic method. The combination of electroencephalography and a related medical research technique with marketing is called neuromarketing. Newer generation EEGs are equipped with dry electrodes mounted on special lightweight headgear wirelessly communicating with the computer for processing the received data. This convenience allows the researcher to track the respondents on the move through the mall for example, driving a car, a bike, or while running. Functional Magnetic Resonance imaging, FMRi, is a device that can detect and measure changes in deeper regions of the brain, with a surface of the only one-millimeter square. The collected data can be broadcast on the computer screen as a color image display, with clearly expressed active brain arias. The ability of neuromarketing technic to have a direct insight into the events in the consumer's mind removes any nonspecific and confusion about the observed response of the respondents.

Neuromarketing origin in the field of neuroscience and is applied in order to better understand the functioning of the human brain. It is a relatively new field of consumer and marketing research using the latest technology for the study of neurophysiological processes that take place when making individual decisions.

Unlike the traditional psychological interpretations of the respondents, by introducing neuromarketing methods and instruments, researchers are able to directly monitor the changes in bioelectric potentials of neurons, without unquestionable identification of measures of the activities of certain regions of the brain on the stimulus of the environment.

Neuromarketing experiment, materials and methods

With the aim to reveal the impact of sensory branding on the future tourists, organized a neuromarketing research using electroencephalographic scanning of the participants. In total, 105 examinees were subjected to EEG surveillance. All the respondents of the EEG part of the research were carefully presented and explained the conditions and details for carrying out the research.

Respondents were asked to state that they were free from neurological diseases (ie. epilepsy), that they were not under the influence of alcohol, narcotics or medicines that could impair attention, cause drowsiness or similar side effects. Then they expressed their opinion on the dominant hand, only the right-handed took part in the study, because of the possibility of counter-lateralization of left-handed ones (Annet, 1970, p. 303-321; Bryder, 1982, p. 3) like a miror picture, in compere with right-handed. After that, each respondent read and signed the *Consent for Participation in Research*. The EEG MITSAR 201 equipped with dry electrodes, (Dry EEG Electrode - Florida Research Instruments), was used. Active electrodes, impedances below 5 kOhm, (Harmon-Jones & Peterson, 2009, p. 170-197), are arranged in a sequence of 10/20 series, as follows: Fp1, Fp2, F7, F3, Fz, F4, F8, T3 , C3, Cz, C4, T4, T5, P3, Pz, P4, T6, O1, O2. A reference assembly was used, with a common reference on the ear mussels (A1, A2). Processing and visualization of EEG signals made by computer software WinEEG. Before of data analzsing is required a correction. It is necessary to remove the technical and biological artifacts from the raw EEG image. The signal is usually contaminated with various sources, interference of

50 Hz of network voltage, then strong biological signals, blinking, movement of the eyeballs. The Mitsar software WinEEG provides digital EEG filtering methods, and during the scanning of the subjects we used the following parameters: speed 30 mm / sec, absolute threshold 3 mV, low cut 0.1 sec (1.6 Hz), high-frequency suppression, (high cut) 30 Hz, and a filter (notch filter), 45-55 Hz, was used to suppress the artefact of the mains voltage. Separation of the eye blink artifact from the EEG record was performed using the Independent Component Analysis (ICA) method. This prepared EEG record, using Fast Fourier Transform (FFT), enables the creation of a brain map, (Brain mappings of the frequency spectrum).

EEG surveillance was done on two occasions. During the first scan, the visual promotional material was broadcast to the respondents and using the electroencephalograph directly followed the changes in the cortex of the subjects. By completing the EEG scan, respondents rated the promotional material they saw through the offered closed response types - the Likert scale of 1 to 5, (1. Full repulsion, it irritates me to 5. I'm thrilled), including collecting basic socio-demographic data, followed by a half-hour pause.

After a pause and refreshment, the EEG recording is repeated, but with sensory branding, that is with the specific audio accompaniment of visual content and occasionally the emission of a fragrance supplement, which ensures the participation of the respondents in the experiment ends. The computer used for broadcasting visual and audio stimulus is synchronized with an electroencephalograph`s computer, so each change of stimulus is automatically recorded. This allows the researcher to have accurate real-time information, all changes, and brain responses to each given stimulus during the EEG analysis. Comparison of statistically processed results gives an answer to the question of the extent to which the promotion affects the behavior and decision-making of the investigated sample of consumers.

Promotional materials used during the projection include attractive photographs of the five destinations included in the survey, but now marked with capital letters of the alphabet. In this way, the promotion or the negative affirmation of European famous resorts is avoided. The order of broadcasting of promotional photos was determined randomly.

During the experiment, brain reactions of the Beta and Alfa rhythms of the frontal and occipital cortex were monitored. Theta waves as a form of emotional reactions of the limbic sector are expressed through the changes in the orbitofrontal cortex related to acceptance, and working memory (Aftanas & Pavlov, 2005, p. 85-94), or coding of visual stimuli in long-lasting memory, associated with the left prefrontal cortex (Rositer, Silberstein & Richard, 2001, p.13-22). Then, Alpha asymmetry is monitored, in accordance with Davidson`s model of hemispheric asymmetry, the Alpha rhythm of the left prefrontal cortex reflects the positive while the

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right side is a negative reaction to the stimulus (Davidson, 1992: 39-43). The presence of the Alpha wave in the occipital cortex connects with reduced attention to the seen promotional material, the *idlingrhythms*, which can be interpreted as a lack of interest or a negative reaction (Feige, Schefer & al. 2004. p. 2864).

Analysis and results

Before the first EEG analysis the comparison of the electroencephalographic finding of the best-valued destination (A) with the destination in the fifth place (B), Kolmogorov-Smirnoff tests of normality done. After that, the Crombach reliability test (average inter-correlation among the item – internal consistency), was done, resulting in an alpha score of 0.734. Comparison of mean values by which promotional content was evaluated over the ***t*** test of paired samples shows a statistically significant difference ($p < 0.0005$), between the first position A (4.1714) and the destination B (3.2381), in the fifth place, as an extremely positioned values.

The next step is to analysis the spectral power of theta, alpha, and beta rhythms A and B destination. The analysis of the brain maps of the average values of the respondents provides an image of the differences in the frequency bands and the spectral power of the signal distributed in certain portions of the cortex (Table no. 1).

From a brief description of the brain map or spectral force, a significant difference in the reaction of the participants during the exposure of the promotional material of the destination A (positive reaction, acceptance) and destination B (the promotion is poorly accepted or rejected) is observed in most respondents.

Brain maps description, spectral power μV^2 (First EEG scan)

	4-8 Hz	8-13 Hz	13-30Hz
A	Theta rhythm 4-5 Hz in the prefrontal cortex, as well as significant activity in the left temporal and occipital cortex, left lateralized. Low activity of the 5-6Hz, of the medial and right frontal cortex was observed, as well as strong activation of the left cortex 6-7Hz, then the prefrontal medial and right region 7-8 Hz.	Alpha range 8-9Hz, in the left prefrontal cortex, then 9-10Hz in the medial and left cortex, 10-11Hz, medial and bilateral. Range 11-12Hz present in the occipital part, right lateralized, low activity.	Beta range has no signifi- cant activity.
B	Very low activity in temporal 4-5Hz, and occipital part 5-6Hz.	Low activity in the occipital part of the cortex 8-10Hz, and a very strong activity of the occipittal cortex, bilaterally in the range of 10-13Hz.	Low activity 13-14H in the occipital region.

Table no. 1

The next step is the analysis of the alpha waves of the prefrontal cortex asymmetry. In accordance with Davidson's asymmetry model, the t test for comparison of the average results of the left hemisphere electrodes (Fp1, F3, F4) of the destination A and the same side of the destinatination B was made (Table no. 2). Then this procedure is repeted on the right cortex with electrode Fp2, F4, F8, (Table no. 3).

All participants who highly rated destination A showed significantly higher alpha range values in both hemispheres, especially left-frontal cortex. The results of hemispheric asymmetry analysiss, in all the rhythms (theta, alpha, beta), show a significantly

t-test Alpha asymmetry of the left hemisphere of the prefrontal cortex

Left hemisphere Alpha	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
A left hemisphere B left hemisphere	1.1033	1.45054	.19739	.70741	1.49925	6.590	104	.000

Table no. 2

t-test Alpha asymmetry of the right hemisphere of the prefrontal cortex

Right hemisphere Alpha	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
A right hemisphere B right hemisphere	.93630	1.46178	.19892	.53731	1.33529	4.707	104	.000

Table no. 3

stronger activity of the participants who have more valued destination A. This brief overview of the results of the first EEG scan ends with the Theta / Beta ratio analysis, which high t values indicate the increased attention and emotional involvement of the respondents during the promotion of destination A, (Table no. 4). The presented content is in the focus of attention, accepted and permanently memorized (Morillas-Romero, Tortella-Felici & Putman, 2015. p. 598-606). In the second phase of the EEG experiment, it was repeated but with sensory branding. As with the analysis of the first scan, the analysis of the spectral power of theta, alpha, and beta rhythms A and B destination is first considered (Table no. 5). The experiment focuses on detecting the magnitude of the impact of sensory branding on respondents who have opted for destination A, but it is very important to determine the extent to which sensory branding can contribute to the additional conviction effect of the promotional content of the lowest-placed destination B. In accordance with Davidson's asymmetry model, (as well as in the first part of the experiment), the t test for comparison of the average results of the left hemisphere electrodes.

Brain maps description, spectral power μV^2

(Second EEG scan - with sensory branding

	4-8 Hz	8-13 Hz	13-30Hz
A	Theta rhythm 4-5 Hz in the prefrontal cortex, as well as significant activity in the left temporal and occipital cortex, left lateralized. Low activity of the 5-6Hz, of the medial and right frontal cortex was observed, as well as strong activation of the left cortex 6-7Hz, then the prefrontal medial and right region 7-8 Hz.	Alpha range 8-9Hz, in the left prefrontal cortex, then 9-10Hz in the medial and left cortex, 10-11Hz, medial and bilateral. Range 11-12Hz present in the occipital part, right lateralized, low activity.	Beta range has no signifi-cant activity.
B	Very low activity in temporal 4-5Hz, and occipital part 5-6Hz.	Low activity in the occipital part of the cortex 8-10Hz, and a very strong activity of the occipittal cortex, bilaterally in the range of 10-13Hz.	Low activity 13-14H in the occipital region.

Table no. 5

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