The use of neuromarketing tools in the field of tourism: Discussion of available methodological approaches to understanding the emotions and decision-making process of consumers

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Abstract: In response to changing conditions and growing competition in the tourism sector, there is a growing interest in a deeper understanding of consumer emotions' influence and subsequent behaviour and decision-making. Conventional marketing research methods are often insufficient, as tourists themselves cannot fully verbally formulate their internal preferences. The presented paper aims to provide the field of tourism with alternative research methods. Neuromarketing presents a suitable addition, which with the help of neuroscientific tools, can reveal the mysteries of consumer behaviour in tourism and the individual components of the decision-making process involved in the final choice of destination. For this purpose, a systematic review of existing literature was carried out, followed by a description of development and research trends and the current state of knowledge of neuromarketing in tourism. The records obtained allowed an in-depth insight into how neuromarketing may contribute to understanding the tourists' emotional reactions and how they influence their decision-making. Finally, a discussion of possible methods of future research were proposed.

Keywords: marketing, branding, brand image, neuromarketing, sensory marketing
JEL Classification: M31, O33, Z33

1 Introduction

The modern market is highly turbulent and dynamic (Mufudza, 2018), and at the same time, it is becoming a highly competitive environment (Nogueira & Madaleno, 2021). Cuns et al. (2019) describe how by increasing the diversity of the product range on the one hand and increasing attention to the consumer experience on the other hand, an improvement in competitiveness can be achieved. Shopping is not only rational (Hellenkemper, 2017): Nadanyiová (2015) states that a proportional part of purchasing decisions among consumers is based on emotions. There is a relatively new field of science set to uncover the emotional reactions of consumers and their subsequent behavior: neuromarketing (Berčík et al., 2021; Gkaintatzis et al., 2019). Neuromarketing is a modern discipline that has a relatively short history. The first records were observed in the 1980s. However, the leading development did not begin until 2004 (Bočková et al., 2021). Levallois et al. (2019) investigated whether neuromarketing developed parallel or with a time gap on the academic and practical levels and discovered a paced development of theoretical and practical knowledge. Neuromarketing is a multidisciplinary science connecting neuropsychology with traditional marketing research methods (Hakim et al., 2020). On the other hand, Yoon et al. (2012) mention that consumer neuroscience lies at the intersection of three disciplines: marketing, psychology, and neuroscience. Morin (2011) describes neuromarketing in a little more detail: it is a field at the border of marketing, economics, decision theory, neurology, physiology, and psychology. It has been proven that using traditional marketing research methods is insufficient to accurately identify consumer purchasing preferences because consumers cannot perfectly formulate their purchasing intentions, verbally or in writing. Often, these methods are also labelled ineffective, leading to incorrect interpretation of consumer behavior, as expected behavior does not always reflect the customer's purchasing behaviour (Dursun & Goker, 2018; Pileliene, 2011). This complexity can be achieved precisely based on supplementing research with neuromarketing tools, which bring insights into the

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neuropsychological mechanisms of consumers. This way, marketing questions regarding consumer behaviour and preferences can be answered (Levallois et al., 2012).

Even though neuromarketing as a scientific field is young and not yet fully explored, the technical progress of neuroscience tools in marketing has taken place. Several tools and techniques are used to study consumer behaviour and decision-making. These are devices that measure electrical and metabolic brain activity (Berčík et al., 2018; Hakim et al., 2020):

- electroencephalography (EEG);
- functional magnetic resonance imaging (fMRI);
- physiological functions of the human organism:
    - heart rate (ECG),
    - respiratory rate, blood pressure,
    - ectodermal activity (EDA);
- and reflexes: eye movements (Eye Tracking), facial muscle movements (FaceReader).

Each of these methods enables obtaining other data, so it is advisable to combine them (Bočková et al., 2021).

Electroencephalography (EEG) is a non-invasive tool to measure the electrical activity of cortical areas of the brain using several electrodes placed on the participant's head. Specifically on the prefrontal, frontal, occipital, parietal, temporal, and central brain parts (Khurana et al., 2021). The EEG tool has excellent time resolution, where the brain's electrical activity is measured in milliseconds (Morin, 2011). It is mainly used to measure attention, memory, and emotional valence (Alsharif et al., 2022). Higher acquisition costs, insufficient areal resolution, and the associated incomplete activity records, especially from the distal part of the brain, belong to its shortcomings. Since this method for marketing research is relatively new, its use in scientific research is still limited. Existing studies, for example, dealt with the help of EEG to determine the prediction of consumer purchase intention (Mashrur et al., 2022), to predict consumer purchasing behaviour (Gill & Singh, 2022), or to detect consumer preferences (Mclnnes et al., 2022). Functional magnetic resonance imaging (fMRI) provides slightly more information than EEG about subcortical activity in the brain by recording the ratio of oxygen level to blood flow through the brain. This way, deeper information can be obtained about consumers' emotions, brand memory, preferences, and how different marketing stimuli influence consumer purchasing decisions (Boksem & Smidts, 2015). In already conducted studies, fMRI was used to understand consumer behaviour (Golnar-Nik et al., 2019) and to effectively modify marketing and corporate strategies (Hapenciuc et al., 2019).

Electrodermal activity (EDA) is a tool that measures changes in the electrical properties of the skin in response to sweat secretion. This method can identify specific neural reactions that lead to certain emotions (happiness, sadness, anger, and indifference). Baraybar-Fernandez (2017) reported that people have lower EDA with positive emotions, while negative emotions are associated with higher EDA. Since emotional arousal is a significant indicator of product and brand preference, measuring EDA makes it possible to predict whether a product or brand will satisfy buyers' interest. Research using EDA also investigated, for example, whether it is a suitable tool to determine the impact of influencers on the personal identity of young adolescents (Garczarek-Bak et al., 2021).

Eye Tracking is a tool that can measure and inform about the gaze path. A software application can display heat maps with information about the level of interest and the time of visual focus of attention, as well as record the size of the pupils. However, the disadvantage is that it cannot be used to detect the evoked emotions of consumers (Iloka & Anukwe, 2020). Eye Tracking is usually combined with the Facereader tool, which recognizes emotions experienced by measuring facial muscles' movements with special software. It has many advantages: a high spatial resolution and high reliability, and it can analyze the response to taste, smell, and hearing. And information about individuals and the general information is speedy. One of the disadvantages is that the double meaning of certain expressions can be a significant obstacle, and only one person can conduct the research. These two tools were used in combination to determine consumer behaviour when watching an advertising spot (Santos et al., 2015, 2020).

Sensory marketing also uses these tools (Alhazmi & Khan, 2021). Sensory marketing is a product or service promotion that improves the consumer experience using all five senses (taste, smell, sight, hearing, and touch). These human senses subsequently generate a specific focus in connection with marketing. The sense of smell is a focus of "aroma marketing" (Berčík et al., 2021), the taste is used in "taste marketing" (Liang et al., 2016), "audio marketing" focuses on hearing (Malenkaya & Andreyeva, 2016), sight forms "visual marketing" (Zhang et al., 2020), and "haptic marketing" study and use the sense of touch (Rodriguez et al., 2017). This new marketing strategy influences consumers' subconscious and individual senses, perceptions, and behaviour (Krishna, 2012). Kalenskaya (2019) refers to sensory marketing as a low-cost sales promotion tool, which is very effective in increasing profits. However, Gajewska (2019) mentions that effectiveness only occurs when individual sensory attributes evoke positive sensory experiences. Gosal et al. (2021) points out that "suitability" is individually distinctive and depends more on sensory experiences that decide whether a given

consumer will have positive sensory experiences or not. At the same time, they profoundly influence the resulting consumer purchase decision.

Literature review methodology

The following literature review was conducted to explore the background and research developments related to the use of neuromarketing and sensory marketing in tourism. Google Scholar platform was used for searching and selecting relevant articles, with preference given to those articles specifying the practical application of neuromarketing in the field tourism and destination management. The keywords we used for the search include neormarketing, sensory marketing, neuroscience, sound, smell, touch, sight, taste, aroma, facereader, MRI, EEG, tourism, destination management, and travel. Various iterations of keywords and their combinations were used. We examined over 62 articles focused on neuromarketing and sensory marketing in tourism in English language from years 1998 to 2022 based on their relevance and the number of citations. Through the following literature research we gained a comprehensive knowledge of the aspects of neuromarketing in tourism and previous neuromarketing research approaches. This allowed us to determine significant research gaps before designing and conducting our own experimental neuromarketing research in the field.

2.1 Neuromarketing research in tourism

Using neuromarketing technologies in tourism research helps identify those sensory patterns significant for communicating a destination brand (Gretzel & Fesenmaier, 2003). They offer the insight necessary for optimising the destination offer for potential visitors' ideal perception. Karremans, Stroebe & Claus (2006) fully trust the data collected via this novel conceptual approach for their reliability and unbiased nature. Javor et al. (2013) favour an MRI for tourism research. Šerić et al. (2015) explain: "*when a prospective tourist understands the characteristics of the brand's destination offer, lateral prefrontal cortex is activated. (...) brain's reaction is based on all of the information known regarding the destination. This (...) is responsible for the (...) process of destination selection. It is primarily based on the person's own experiences, memories and associations relating to the destination brand. The medical practice confirms that associativeness of the brand can be measured using an MRI technique*". Bastiaansen et al. (2018) prefer the EEG, which also presents an option for a deeper insight into consumers' unconscious perception of marketing messages and other materials. The EEG allows the researchers to record brain reactions at high speed while participants observe the stimuli in a more natural environment (compared to the MRI). FaceReader™ software is also valuable for analysing emotional arousal by detecting research participants' facial expressions. The movements of the participant's face combine into seven specific detectable emotions: natural, happiness, sadness, anger, fear, disgust, and surprise (Zaman & Shrimpton-Smith, 2006). Lee et al. (2014) find that a within-participant neuromarketing research design allows for assessing the impact of marketing materials on the change of perception of the destination. Šerić et al. (2015) warn that using neuromarketing data singularly may not result in a relevant and comprehensive understanding of the destination brand's positioning. Instead, they call for an integrated approach of standard and novel neuromarketing methods in tourism research.

2.2 Sensory marketing in tourism

The satisfaction of all senses is crucial in the act of consumption. The rise of sensory marketing follows the development and alliance of neuroscience, psychology and marketing research with stimulating experimental outcomes (Krishna, 2010). Tourism presents a principal example of consumption experience (Woodside et al., 2000) where the customers came to expect intense or unusual experiences of services and not only the product or service itself (Holbrook, 1999).

The focus on sensory experiences, both in experiencing the destination itself and in its marketing, is crucial to increase overall tourist satisfaction. Achieving positive gratification through sensory experience can happen pre-visit, during, or even after the visit by seeing, smelling, touching, tasting and hearing. Every human sense taken into account in destination marketing impacts how the tourist perceives and remembers the destination image (Abd Rahman, Khalifah & Ismail, 2017). Urry (2002) created the concept of the Tourist Gaze: sightseeing and other tourism activities bring delightful and memorable experiences by gazing at "landscapes, people, sights and weather" (Gibson, 2012). Urry and Larsen (2011) further modified this concept by adding that: "*in almost all situations different senses are inter-connected with each other to produce a sensed environment of people and objects distributed across time and space. There are not only landscapes (and visual townscape), but also associated 'soundscapes,' 'smellscapes,' 'tastescape,' and geographies of touch*". All the sensory elements combined form a 'tourism space' for savouring the destination holistically (Lew, 2002). Pine and Gilmore (1998) encourage service providers to construct products that enhance customers' sensory encounters to make their experiences memorable. They propose the clients' emotional, physical, intellectual, and spiritual engagement by stimulating various human senses while interacting with products or services. The titillation of all of the visitors' senses influences their perception of the destination, preferences and behaviour (Krishna, 2010). Agapito et al. (2012) suggest that intentional sensory marketing can intensify tourists' contentment, loyalty and remembrance by effectively designing, communicating and branding tourist experiences (Morgan, Elbe & de Esteban Curiel, 2009).

Many scholars have examined the character and effects of sensory marketing. Agapito et al. (2014) have decoded the sensory classification of destinations comprising beach vacations, rural getaways, immersing in nature and balanced experience in the country. Based on their findings, extensive strategic marketing plans may be developed for specific attractions. Franklin & Crang (2001) understand the tourist experience as a physical and sensory encounter of the tourist and the spaces through which they move. An engaging research points toward a stronger purchase intention after experiencing a visual sensation that compels the customers to touch displayed products (Hultén, 2012). Oh et al. (2007) offer a tourism experience measurement approach considering education, aesthetics, entertainment, escapism, arousal, memory, overall perceived quality, and customer satisfaction. The component of "aesthetics" is devised to appraise sensory incitements (Agapito, 2012). The consumption experience, according to Mossberg (2007), consists not only of personnel conduct, the sufficiency of products or crowding but also of relevant stimulation of the five senses. Dann & Jacobsen (2003) further focus their research on the olfactory experience, Hashimito & Telfer (2006) study the gustatory aspects of tourism, and Gibson & Connell (2007) delve into the auditory complements of tourism geography.

Sensory techniques have been used creatively and widely to gain a competitive advantage in tourism and hospitality. Establishments have long used sound (e.g., live music) to attract customers. A sensory experience was created during a dark restaurant concept, where the darkness is meant to stimulate the remaining senses. São Paulo offers a whole tourism product, a "map of sensations", focused on sensory and emotional elements of attractions (Agapito et al., 2012).

2.3 The use of sensory marketing and neuromarketing tools by a destination organisation

Destination marketing organisations (DMOs) are competitive bodies that organise all the products and services offered in the destination and deliver them to businesses or end customers. The usual tasks of the DMO include primarily marketing and promoting a destination (Hanna et al., 2018) while also productively managing, planning, operating and monitoring everyday tourism activities (Hounnaklang, 2016). Crompton (1979) defined destination image as the entirety of beliefs, notions and convictions about the destination that its visitors, potential visitors and residents (Stylidis, Sit, & Biran, 2014) hold. A favourable or unfavourable destination image defines behaviour such as visit or recommendation intentions (Josiassen, Assaf, Woo, & Kock, 2015). Abd Rahman et al. (2017) stress the value of incorporating sensory elements to enhance the destination image by destination managers. Šerić et al. (2015) promote the application of sensory marketing and neuromarketing in brand management, specifically in destination image and positioning. They base brand-positioning efforts on successful differentiation from the competition and find insight into the customers' subconsciousness very beneficial. The outcomes of neuromarketing research data collected at the precise moment of perceiving promotional media can become a foundation for implementing the correct destination demand elements for global brand positioning (Lindstrom, 2008) and brand differentiation (Markgraf, Scheffer & Pulkenat, 2012).

2.4 Existing neuromarketing research

Korenková et al. (2020) investigated respondents' opinions (emotions) about the presented communication proposals. The use of neuromarketing tools, combined with traditional marketing research tools, are used in their article to comprehensively obtain data to improve companies' success in a highly competitive environment. The conclusions of the research prove that the resulting data provided more options on how existing marketing strategies can be changed to be more effective (save money, and time, attract consumers based on positive emotions). De-Frutos-Arranz & Blasco (2022) confirm that consumer emotions and their disclosure are vital to designing and implementing effective marketing communication forms. Gaafar & Al-Romeedy (2022) found that incorporating neuromarketing into a destination's marketing strategy provides a comprehensive picture of the destination and shows new avenues for strategy development (such as product development). Mengual-Recuerda et al. (2020) investigated the influence of various stimuli in gastronomy (food presentation, design, taste, and food service) using a combination of neuro-tools and traditional marketing research tools. It has been found that the design and presentation of food are crucial for creating consumer interest. Although, Pícha et al. (2018) did not directly examine the effect of neuromarketing on local food, their article gave rise to the idea of our next focus, for the support of local food is important for the destinations and, for example, the use of sensory marketing could help this. Giraldi et al. (2022) investigated multi-sensory stimuli (sight, smell, taste, hearing and touch) to achieve a greater intensity of the tourist experience of the visited destination.

Several experimental projects in tourism research have been conducted with the help of neuromarketing tools in the last decade. Bastiaansen et al. (2018) analysed participants' emotional responses by measuring the ERP component changes, showing them destination marketing materials complemented by (or lacking) a clip from a popular movie with destination-promoting content. Boz et al. (2017) examined the effect various approaches to pricing had on customers using numerous tools, including positron emission tomography, magnetoencephalography, eye tracking, facial coding system, and galvanic skin response. Boz & Yilmaz (2017) measured the influence of attractiveness of job candidates on recruiting managers using a neurological data gathering tool, the Eye Tracker. Murakami et al. (2021) conducted an experiment analysing the influence of photographs and videos of scenery on stimulating tourists' interests in visiting

Japan by recording the brain activity of subjects, which is monitored by using near-infrared spectroscopy (NIRS) and evaluated for each image using Semantic Differential (SD) method. Zurawicki (2010) used scanpaths and saccades when exploring the browsing habits of the visitors of tourism websites to make sense of how they perceived them. Finally, Hadinejad et al. (2019) assessed the emotional impact of the different background sounds of three Iranian tourism advertisements using a FaceReader™, skin conductance, self-report surveys and interviews.

3 Discussion

Based on the above literature review, the use of neuromarketing tools is under-researched in the field of tourism, and there are many research gaps. The following is an overview of several possible methodological approaches to understanding the tourism consumer's emotions and decision-making processes with the help of neuromarketing.

It is possible to consider the given topic from several points of view. The first thing to mention is the marketing point of view, from which it is possible to assess, for example, the designs of printed information materials of destination organisations or individual businesses regarding the effect on emotions (from the point of view of visual stimulus). It would also be possible to assess proposals for e-communication outputs (social networks, web, and reservation systems). Furthermore, it could be valuable to examine emotions when dealing with clients in the tourism industry in business-to-business (B2B) and business-to-consumer (B2C) proceedings. Testing the difference in the perception of emotions in the case of the B2B and B2C sectors would yield valuable data.

A managerial perspective with a personnel orientation presents another possibility for neuromarketing research. The employee perception of changes to various stimuli (for example, uniforms, workplace equipment, and work tasks) or general personnel evaluation might be assessed. The management could specifically benefit from uncovering the employees' perception of the work environment as a tool for understanding their needs.

Neuromarketing tools could also be used from the point of view of operations in the tourism industry for the examination of architectural designs of interiors of individual tourism businesses with an emphasis on design (hotel lobbies, hotel rooms, catering facilities, info centres), assessment of new building designs or reconstruction or visualisation of planned tourism products by experts and public. More specifically, the research might focus on examining the emotions of guests when they enter hotel rooms or the design of food and beverage service and whether the food and beverage arrangement is essential and influences the enjoyment of food and beverages or not. Another possibility could be the application of sensory marketing, and its individual stimuli, and neuromarketing tools to strengthen the local foods of a given destination. Furthermore, examining the perception of individual monuments in a specific destination by chosen visitor segments for effective targeted communication would be beneficial.

Finally, evaluating the influence of various stimuli in a destination (music, videos/images, smells) on end consumers' emotions would prove a curious intersection of sensory marketing and neuromarketing research. Comparing the experience of tourism activities with and without materials offered by the destination would comprise an exciting destination management research. Such an examination might provide insight into various forms of supporting marketing and educational materials and their importance regarding the final effectiveness and consumer decision.

These research proposals have not yet been addressed in the available literary sources.

4 Conclusions

In this paper, we have discussed possible methodological approaches to neuromarketing research in tourism. First, we conducted a systematic review of the existing literature on neuromarketing and sensory marketing, followed by a report on the current state of knowledge of sensory marketing and neuromarketing research in the tourism industry. Many possible approaches to tourism research using neuroscientific tools have been proposed and confronted with the existing scientific literature.

Nevertheless, the mentioned literature cannot be generalized and categorized for it is impossible to find connections between a specific solved problem in the field of tourism, and specific neuroscientific tools, whose choice largely depends on what neuroscientific tools are available to the researchers at the time. In a fully equipped laboratory, a combination of several tools can be used for research and to obtain more data and more complex and comprehensive results; that is, however, still exceedingly rare. Usually, the researcher uses only one neuroscientific tool.

As part of a detailed analysis of the available literature in the field of neuromarketing and sensory marketing in the tourism industry, our effort was to find an approximate match between the research problem and the selected neuroscientific tool from said literature. For evaluating marketing promotional proposals (photos, videos, websites,

placement of tourist advertisements, perception of the image of a selected destination based on the design elements of destination advertisements) Facereader, EEG, and Eye Tracking is used the most. Eye Tracking is also appropriate for gaining insight into the choice of specific advertisement design, positioning of text, photos, and videos that are attractive for tourists. Contrastly, thanks to Facereader, it is possible to evaluate complex emotions from the facial expressions of the observed subject from the entire time of observation of a given marketing stimulus (website, advertisement, advertisement placement), and it is also possible to evaluate the individual percentage representation of emotions in specifically selected periods (in a few seconds). EEG is the tool to measure electrical impulses in the brain using electrodes sticking to the research participant's head. EEG can quickly determine the level of calmness and agitation. These methods and their combination are used to provide different information, more specific findings, and suggest changes more goal-setting (e.g. increase tourist satisfaction, or increase the potential number of visitors to the given destination). In the field of gastronomy and hospitality, there was the more frequent use of the already mentioned Facereader, EEG, and also the sensing of galvanic skin reactions (electrodermal reaction, EDR). EDR measures the various electrical conductivity of skin caused by the reaction to external and internal stimuli. The internal stimulus means e.g. response to the taste of food. External stimulus is reactions, e.g.,to the design of the plate and the presentation of food or the perception of the behavior of waiters. In the future, we will select from the possible methods of neuromarketing research that have used only the Facereader tool that our research team has in disposal. First possible specific research area could be the designs of printed information materials of destination organizations and their effect on emotions (from the point of view of visual stimulus), or assessment of proposals for e-communication outputs (social networks, web, and reservation systems). Practically applicable goals will be identified based on interviews with representatives of the destination management organization. This will be followed by empirical research in cooperation with selected destination organizations.

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