Neuromarketing as a Novel Method to Tourism Destination Marketing: Evidence from Egypt

Hebatallah Ali Gaafar   **Bassam Samir Al-Romeedy**

Associate Professor at Tourism Studies Department, Faculty of Tourism and Hotels, University of Sadat City

ARTICLE INFO

ABSTRACT

The main objectives of this research are to identify the neuromarketing concept, to address the importance and advantages of using the neuromarketing approach over conventional marketing methods, to demonstrate the factors that affect tourists' purchase-decision behavior, to recognize the awareness and knowledge levels of neuromarketing in Egypt, and to investigate factors that can be influenced by applying neuromarketing techniques. Quantitative analysis was carried out on data from 472 tourists, and 82 destination marketing designers. Results revealed that neuromarketing is positively affected tourist behavior, decision-making, tourist preferences, tourist loyalty, product improvement, marketing effectiveness, marketing strategies, and sustainable product marketing. It was concluded that the usage of neuromarketing in the Egyptian destination is in its infancy, despite the level of awareness about neuromarketing being relatively high. The study contributes to providing destination policymakers full insights about neuromarketing, which provides a full picture for tourists, shows the path of tourism products development, and the need of producing new tourists' products. Destination marketing designers need to integrate neuromarketing in their marketing method, and to create smarter marketing that will increase the effectiveness of their marketing efforts.

Introduction

Tourism destinations are always looking for innovative and better methods to know the customer and generate a desired emotional response toward the product /service (Zahopoulos, 2020), to increase their market share and achieve considerable revenues (Mishra & Shukla, 2020). In today's changing market, the globe is no longer using the same conventional marketing strategies to get an advantage over competitors as only a decade ago (Lee et al., 2007). As conventional marketing methods depend on the rational customers' behavior; however, this may not lead to the targeted results (Hsu & Chen, 2020). It has been proven that a large proportion of customers make their purchase decision on an emotional basis (Nadanyiova, 2017). So, there is a great need to use a new tool to better know and analyze tourists' purchase decision behaviors - neuromarketing.

Neuromarketing is considered an important trend that integrates the study of customer behavior with neuroscience (Zahopoulos, 2020). Consumers are known to be complicated, diverse, and dynamic, but neuromarketing can give greater insights into their buy and switching intents that are buried deep inside their brains (Sharma & Sinha, 2020).

Neuromarketing, the employment of neuroscience techniques in marketing stimuli, has developed as a novel tool for market research, which has a considerable advantage over more conventional methods of marketing (Baghsheykhi & Arabiyeh, 2019; Eser et al., 2011). Neuromarketing combines marketing, neuroscience, and psychology, it utilizes brain imaging technology to efficiently discover the motivating reasons for customer purchase behavior (Baghsheykhi & Arabiyeh, 2019; Hsu & Chen, 2020; Morin, 2011; Nilashi et al., 2020; Yoon et al., 2012). There is a great interest in discussing neuromarketing among experts and marketing scholars, due to its crucial role in discovering and predicting consumer behavior (Isa & Mansor, 2020); it is considered to be the best way to better understand customers' behaviors marketing effects (Alsharif et al., 2021; Ariely & Berns, 2010).

Smitds was the first author who introduced the term neuromarketing in 2002, as a reference to the adoption of neuroimaging techniques in marketing research. He described how neuroscience tools for instance Functional Magnetic Resonance Imaging (fMRI) scanner can be employed to analyze consumers' subconscious processes such as needs, emotions, and wants. In the meantime, the first application of fMRI as a marketing tool was in the late 1990s by Gerry Zaltman of Harvard University (Lewis & Bridger, 2005; Mansor & Isa, 2020).

Lee et al. (2007) published a study that discusses neuromarketing as a new marketing approach and customer behavior. Butler (2008) identified the gap in the research concerning neuromarketing, and recommended a new neuromarketing research model, in order to solve the gap by the contribution of the suggested model. Many scholars have discussed the theoretical dimension of neuromarketing such as Andrejevic (2012); Ariely and Berns (2010); Brainfluence, (2012); and Senior and Lee (2008).

Regarding, the use of neuromarketing techniques, Kenning et al. (2007) were the first authors who discussed the application of the fMRI technique and recommend this methodology to be applied in marketing research as a brain imaging tool (Gurbuz & Toga, 2018). While others have focused on discussing the ethical issues of neuromarketing, for example, Murphy et al. (2008); Sharma et al (2014); and Voorhees et al. (2011). In the context of tourism, many researchers have been engaged in research on the use of neuromarketing in the tourism field, for instance, Kiseleva (2020), and Akynova (2018). While Boz et. al. (2017) have discussed the role of using neuromarketing in tourism pricing psychology.

Neuromarketing has two strong points that participate in examining tourist behavior more accurately. First, it uses technological devices to collect real-time neural data (e.g.: blood pressure, brain activity, heart rate, facial expression, eye movement, and electrodermal activity) (Fortunato et al., 2014). While the conventional marketing

methods depend on tourists' thoughts and feelings, which can be prejudiced due to poor memory or unwillingness to show their true emotions (Hetland et al., 2016). Second, neuromarketing can measure the unconscious responses of the tourists which express 95% of the decision purchasing process, while conventional methods can only address the conscious responses (Zaltman, 2003; Li et al., 2021). Accordingly, neuromarketing is considered the best way of shaping destinations/organizations' marketing strategies (Eser et al., 2011).

Neuromarketing technology can detect elements that generate the positive emotions and feelings of tourists (Senior & Lee, 2008; Fugate, 2007; Ohme & Matukin, 2012). Additionally, it assists marketing designers to avoid elements that cause tourists to dislike the products. It also supports the choice of audio and visual features, in addition to the timing and judgment of suitable media (Fugate, 2007). The data obtained from neuromarketing will allow the destination marketing designers to understand the tourists' preferences for the products, help them to develop marketing strategies, as well as design new products/ services (Ariely & Berns, 2010; Eser et al., 2011; Li et al., 2021; Mansor & Isa, 2020).

Despite the advantageousness of neuromarketing, it has infrequently been employed in the tourism field although it has been used in several other industries, such as beverage, hardware, advertising, and automotive (Touchette & Lee, 2017). The authors believe neuromarketing is a very good opportunity for marketing the Egyptian destination considering tourists' needs especially in the massive competition among tourism destinations. According to Zahopoulos (2020) and Smykova et al. (2020), the use of neuromarketing technology allows destination marketers to find out behavioral aspects and priorities in the development of tourist products.

To the researchers' knowledge, no publication discussed the application of the neuromarketing method in Egyptian destination marketing, nor actually to other attributes of tourism exists because the concept and application are still new. So, this study contributes to providing valuable and comprehensive information about neuromarketing methodology, and its role in understanding the tourists' preferences, and influencing their purchasing-decision behavior, consequently, Egyptian destination marketers can develop or create tourism products that suit tourists' preferences, and achieve their satisfaction.

In general, the use of neuromarketing techniques in tourism marketing is less mature and requires more analysis. Accordingly, the objectives of this research are: a) to analyze the neuromarketing techniques and show how these methods contribute to tourism marketing; c) to investigate the advantages and challenges of using neuromarketing as a novel method; d) to identify the marketing tools that have been used by marketing designers in Egypt, e) to address the factors that affect tourists' decision making, f) to recognize the awareness and knowledge levels of neuromarketing in Egypt, and g) to address the factors that may be affected by applying neuromarketing techniques in marketing Egyptian destination.

The authors hope that this research will offer extensive knowledge about the neuromarketing method and its importance in tourism marketing and its challenges.

The rest of the paper is organized as follows. In Section 2, the literature review and hypotheses development are discussed. In the third section, the methods and results of the research will be explained, followed by testing hypotheses and discussion in the fourth Section. In Section 5 practical implications will be displayed. Finally, the authors present the conclusion and the future research in Section 6.

Theoretical background and hypotheses development
The concept of neuromarketing

Neuromarketing term has emerged in the late nineties of the previous century. Zaltman, a Harvard professor, is the founder of neuromarketing. He stated the probability of using new technology to image the human brain to identify customer behavior (Klinčeková, 2016). The brain is considered as a "black box" that contains customers' preferences and emotions, and neuroscience is the "window" that can better describe the purchasing decision process, which takes place in the subconscious zone, and identify customer's motivations (Barbasso et al., 2018; Fisher et al. 2010; Hazeldine, 2014; Nyoni & Bonga, 2017; Ohme & Matukin 2012; Vecchiato et al., 2013; Venkatraman et al., 2015).

Neuromarketing can be defined as the knowledge regarding the processing of information and humans' decisions and exploring how businesses can connect with the brain in detail (Geordes et al., 2013). Also, neuromarketing can be defined as the study of the customers' brain's processes to figure out the customers' behavior and to develop marketing strategies (Alsharif et al., 2021; Orzan et al., 2012). The core of neuromarketing is to know better and understand the consumer's preferable choices, motivations, way of their thinking, or suggestions. It is a tool to identify their responses to specific stimuli (Mishra & Shukla, 2020; Perrachione & Perrachione, 2008; Singh, 2021; Smykova et al., 2020). Neuromarketing is distinguished from traditional marketing by studying the customer's subconscious mind such as preference, memory, or emotion, while traditional marketing focuses on studying the customer's conscious mind (Markgraf et al., 2012; Revilla-Camacho et al., 2018; Varga et al., 2021). Neuromarketing tracks facts and information about the customer beyond traditional marketing (Baghsheykhi & Arabiyeh, 2019; Bhandari, 2020; Venkatraman et al., 2015).

Neuromarketing study can carefully look at several constructs such as purchase intention, novelty, emotional engagement, memory retention, branding, the responsiveness of the consumers, product design and development, advertising efficiency, and consumer decision making (Klinčeková, 2016; Lee et al., 2007). The major goal of neuromarketing is to improve marketing practices (Barbasso et al., 2018; Plassmann et al. 2015; Yoon et al. 2012) or to enhance the prediction of customer behavior and habits when merged with traditional techniques (Barbasso et al., 2018; Boksem & Smidts, 2015; Smidts et al. 2014; Venkatraman et al. 2015).

These days, lots of companies all over the world have started to provide neuromarketing, to identify which stimuli affect the customers' preferences (Nilashi et al., 2020; Plassmannet al., 2015). Such as IBM Waston, which is a computer system that analyzes inputs concerning the customer needs and can predict their

preferences. Microsoft uses the results of Electrocardiography (EEG) to better understand the customers' interaction with computers. It also uses Eye-tracking techniques to learn about the customers' preferences and needs (Klinčeková, 2016). The following hypothesis has been suggested:

H1: Neuromarketing positively affects tourist preferences.

The neuromarketing approach enables tourism marketers to find out why tourists make specific decisions and explore the responsible part of the brain that inspires them to do so (Nadanyiova, 2017). Neuromarketing allows destination marketers to obtain valuable knowledge of the tourists' subconscious mind, with which they will be aware of tourists' behavior and better understand their preferences, this, in turn, may properly support destinations to modify their marketing strategies (Isa & Masor, 2020; McDowell & Dick, 2013; Boksem & Smidts, 2015), and design more successful marketing campaigns (Bhandari, 2020).

Neuromarketing is a vital tool to influence the tourists' buying behavior, through communicating and analyzing brain signals with several marketing stimuli by using sensory stimulation (Kumar et al., 2020; Vrtana et al., 2019). Neuromarketing has a bright future, by applying neuromarketing, tourism destinations marketers can strategize and create intelligent marketing that will boost the effectiveness of their marketing efforts (Mansor & Isa, 2020). So, the application of Neuromarketing in promoting tourism destinations will be worthy. As such, the authors have developed the following hypotheses:

H2: Neuromarketing positively affects tourist behavior

H3: Neuromarketing positively affects decision-making.

Neuromarketing Techniques

In previous times, most destinations/organizations have depended on traditional methods, such as experiments, focus group, standard self-administered surveys to identify their customers' needs, wants, and attitudes (McDowell & Dick, 2013; Gidlöf et al., 2013). These traditional methods have revealed significant results, which have facilitated destinations/organizations to design and develop their strategic marketing plans. One of the main disadvantages of the conventional market research methods is its incapability to learn about the subconscious zone of the tourists' mind, it is only exploring the conscious part of the tourist purchasing-decision process (Brainfluence, 2012; Spanjaard et al., 2014). Consequently, it causes a misprediction of the tourist behavior, as well as a mismatch between the market research results and the real purchasing behavior shown by the tourist (Agarwal & Dutta, 2015).

Neuromarketing techniques are very essential to explore the tourists' minds so that marketing experts can produce or develop the products to successfully achieve tourists' satisfaction (Mansor & Isa, 2020). Neuromarketing assesses responses of the tourist's brain toward marketing messages applying neuroimaging technologies via creating images or pictures of activity inside the brain (Ariely & Berns, 2010; Mansor & Isa, 2020; Palokangas et al., 2010). Many techniques are being utilized for neuromarketing to measure and map brain activity such as functional magnetic

resonance imaging (fMRI), Galvanic Skin Response (GSR), the electroencephalogram (EEG), Eye Tracking (ET), and Face Emotion Analysis (FEA) or Facial electromyography (fEMG) (Santos et al., 2015), Magnetoencephalography (MEG) (Bhandari, 2020), Positron emission tomography (PET) (Klinčeková, 2016), Transcranial magnetic stimulation (TMS) (Isa & Mansor, 2020), and Electrocardiography (ECG) (Nadanyiova, 2017).

Functional magnetic reasoning imaging (fMRI): It is considered as a neuroimaging method, which aims to check blood oxygenation of the brain generated by fundamental neuronal activity (Oliveira et al., 2014; Reimann et al., 2011), as the more brain part is active, the more blood flow and oxygen are required (Mishra & Shukla, 2020). The demerit of this technique is its high cost (Klinčeková, 2016).

Skin conductance (SC) or Galvanic Skin Response (GSR): It identifies the slight changes in skin conductance responses when activating the automatic nervous system, which is connected directly to the responses noted on customers' hands, examining the extra sweat resulting from marketing stimuli (Banks et al., 2012; Fortunato et al., 2014; Klinčeková, 2016).

Electroencephalography (EEG): this technique uses a helmet or electrodes band to measure the electrical activity of the brain when the customers are subjected to marketing stimuli (Bhandari, 2020; Sebastian 2014; Suomala et al., 2012). EEG can measure emotional patterns and can detect psychological disorders (Kline, 2004). It uses portable equipment, and it is considered an inexpensive method. The disadvantage of this technique is the measurement of hidden brain parts; it can only note down superficial electrical waves (Fortunato et al., 2014).

Eye-tracking (ET): determines the real-time customers' responses to different marketing messages and identifies their cerebral responses (Blum, 2016). ET is a tool used to analyze visual attention and it searches for linking visual attention with the realistic and emotional reactions of consumers (Hammou et al., 2013; Slanzi et al., 2017), it determines eye movement and position by using dedicated eye trackers (Constantinescu et al., 2019). Due to the eye-tracking devices being light and portable, it's promising to generate real-time scenarios and record the natural eye stare of customers (Mishra & Shukla, 2020) but the disadvantage of this technique is its disability to understand the customers' emotions (Fortunato et al., 2014; Nenad, 2011).

Facial electromyography (fEMG) or recognition: It notes down the movement of facial muscles, which is not perceptible to the customer's eye throughout placing electrodes on the muscles of the mouth, in order to identify the emotion's type (e.g.: -contentment, discontent, indifference, etc.) (Javor et al., 2013; Fortunato et al., 2014). This tool has its own advantages, the increasing credibility of its use in analyzing various emotional responses to visual stimuli, responses to smell, taste, and hearing, and the customers' communications and behaviors. One drawback is that the electrodes attached to the face may prevent several facial movements. Another significant drawback for this technique is the double meaning of particular

expressions, which invalidates the sameness of customers' expressions associated with particular feelings (Hafez, 2019).

Magnetoencephalography (MEG): It recognizes changes in the magnetic fields produced by electrical brain activity when the customers are exposed to marketing stimuli (Bhandari, 2020), it's not a widely used method because of the high financial cost of its purchase and operation (Klinčeková, 2016).

Positron emission tomography (PET): It tracks radiation pulse to discover with great accuracy the metabolism of glucose inside the brain, it is a very expensive technique, in which human needs to intake radioactive substance (Stasi et al., 2018), this method is unlikely to be used in tourism marketing (Bhandari, 2020).

Electrocardiography (ECG): It was invented in 1929, it is considered one of the most used tools in neuromarketing research. It rates the electrical activity of the heart by using external skin electrodes (Klinčeková, 2016). The advantage of ECG is its affordability and ease of use over other methods (Nadanyiova, 2017).

Transcranial magnetic stimulation (TMS): It temporarily disturbs specific brain activities in an attempt to observe the marketing stimuli's impacts on behavior via other methods than assessing brain activity (Rypakova et al., 2015).

Cardiovascular parameters (CP): This technique measures the heart rate and its changeability, blood pressure, the relation between heartbeats, and pulse changeover time to conclude attention and emotional conditions of the research subjects (Fortunato et al., 2014).

Nowadays, the most common three methods that have been used in neuromarketing are fMRI, MEG, and EEG, due to their important role in measuring and identifying consumers' brains to marketing stimuli (Mansor & Isa, 2020).

The main goals of applying neuromarketing techniques are; to obtain objective information about the inner workings of the tourists' brains without referring to the self-reports, which have been used for a long time in marketing studies (Dapkevičius & Melnikas, 2009), to address the tourists' responses to the marketing activities (Kumlehn, 2011), this, in turn, help tourism destinations' marketers to get into the tourist brain, which is called the "black box" (Roth, 2014). These techniques tell the marketers the deficiencies in their product/service by realizing if their content is stimulating the intended response (Kampakoglou, 2012). Authors have developed the undermentioned hypothesis:

H4: Neuromarketing positively affects marketing effectiveness.

Advantages of applying neuromarketing in tourism
Neuromarketing is considered an innovative method and opportunity for developing tourism especially post-pandemic. The neuromarketing method will verify which travel products are more attractive to the recent market situation (Smykova et al., 2020). Currently, it's important to integrate the neuromarketing method in the tourism sector, which needs several issues correlated to the development of concepts, techniques, and tools. The neuromarketing approach provides a full picture for

tourists, identifying the path of tourism development and the likelihood of producing new tourist products (Sop, 2021; Vaiciukynaite, 2019). Accordingly, the fifth hypothesis has been supposed**:**

H5: *Neuromarketing positively affects product improvement.*

Neuromarketing emphasizes which emotions are important in tourist decision-making and how to use this information to improve marketing effectiveness (Reutov et al., 2020). The information is put to use in product design, better promotions and advertising, pricing, retail design, and overall improving the consumer experience (Thomas et al., 2017). Neuromarketing may assist with such information by analyzing the brain using neuroscience technologies and contributing to a better and more accurate understanding of the tourist's emotional and cognitive processes (Araújo et al., 2017). The main objective of neuromarketing research in the context of tourism is to enhance the level of tourists ' confidence in the presented tourist products, increase the number of visits, and frequency of revisits (Smykova et al., 2020).

Neuromarketing takes advantage of the most recent advancements in brain scanning to understand more about the mental processes that underpin tourist purchasing decisions (Eser et al., 2011; Nadanyiova, 2017; Ntapiapis & Özkardeşler, 2020). Neuromarketing is a significant advancement in the realm of understanding how the subconscious mind assists tourists in making decisions (Li et al., 2021; Vences et al., 2020). Tourism destinations can effectively understand the customer's behavior and what processes in the brain are impacted by decision-making through employing neuromarketing (Barbasso et al., 2018; Cerci & Koyluoglu, 2020; Garzón-Paredes & Royo-Vela, 2020; Gurbuz & Toga, 2018). Concerning tourism service quality, neuromarketing enhances the quality of products and services provided to consumers (Dapkevičius & Melnikas, 2009). Baghsheykhi and Arabiyeh (2019) indicated that Neuromarketing leads to increase customer loyalty.

Using the neuromarketing method might help both the tourism destination and the tourists. Tourism destinations would decrease their costs and save a large number of their budgets that are spent on incompetent marketing campaigns, achieving better competitiveness and enhancement, while tourists would benefit from the formation of products and services that suit their preferences, and their decisions would have facilitated instead of manipulated (Hubert, 2010; Fortunato et al., 2014).

Kumar et al. (2020) depicted that neuromarketing tools are widely employed in the tourism industry's advertising. Whereas neuromarketing is a method used to determine how various marketing stimuli, such as exposure to certain commercials, influence purchasing decisions. Furthermore, neuromarketing may discover the true unfulfilled wants of customers; as a result, it can assist produce more helpful and pleasurable products, advertisements, and satisfy the genuine consumers' needs and desires (Alsharif et al., 2021).

A further advantage, neuromarketing is a potential and evolving subject for developing a marketing strategy now and in the future (Revilla-Camacho et al., 2018). Neuromarketing may go on to uncover new advantages that outperform standard marketing research techniques and may be utilized as the cornerstone for a more

effective marketing campaign (Bastiaansen et al., 2018; Bhandari, 2020; Isa & Mansor, 2020). Boz et al. (2017) and Roth (2014) clarified neuromarketing's potential for adjusting price and product development methods.

Neuromarketing research has a significant role in determining branding strategies. As it was discovered that brain parts linked with the reward system are more triggered by brands that prompt consumers to self-identity. In addition, neuromarketing can assist in defining brand names and designing logo elements (Perrachione & Perrachione, 2008).

Another advantage of neuromarketing is the quickness and simultaneous collection of information. Several neuromarketing techniques, like electroencephalography and magnetoencephalography, can record customers' responses while being exposed to marketing stimuli (Fugate, 2007; Hubert & Kenning, 2008; Lee et al., 2007; Ohme & Matukin, 2012). With this aspect, the marketers can ascertain exactly which elements of the marketing strategy should be reinforced or rejected (Akynova, 2018; Fortunato et al., 2014).

Moreover, neuromarketing is considered an effective solution for making sustainable growth (Nilashi et al., 2020). This is demonstrated by the ability of neuromarketing to allocate resources more effectively in conjunction with products and services that are expected to be approved in the market (Constantinescu et al., 2019). In this vein, neuromarketing may significantly contribute to sustainability in a variety of ways, including sustainable usage, understanding of environmental management solutions, green technology implementation, and green product marketing (Nilashi et al., 2020). From the previous discussion, the following hypotheses have been developed:

H6: Neuromarketing has a positive effect on tourist loyalty

H 7: Neuromarketing has a positive effect on enhancing marketing strategies

H8: Neuromarketing positively affects sustainable product marketing.

Challenges of using Neuromarketing
Beyond the advantages of neuromarketing in investigating and discovering hidden data, there are many challenges to applying neuromarketing. Ethical concerns are considered one of the main challenges in using neuroscience techniques in marketing research (Sebastian, 2014). Ethical issues are raised from penetrating the tourists' unconscious minds (Constantinescu et al., 2019). Sharma et al (2014) have argued that the use of neuromarketing gives destinations/organizations the control to deal with their customers as laboratory rats, and have medical imaging of the customers' brains for nonmedical aims**.**

The ethics of neuroscience have been divided into the ethics of practices and the ethical effects of neuroscience (Agarwal, 2015; Ariely & Berns, 2010). Whereas, the focus of ethics of practices is related to the ethics of neuroscience research, where the emphasis is on how these studies are planned and performed from a moral prospect. While the ethical implications of neuroscience mean the assessment of the ethical and social impact of the application of those studies in the real-world (Pop et al., 2017).

There are additional issues about the ethics in neuromarketing, such as the mismanagement of information taken by neuromarketing research, search for the "biological" weak points of customers, generalization of the results gained from a small population, and the results of neuromarketing research conducted for commercial businesses often put out of sight (Nadanyiova, 2017; Sreedevi et al., 2013). That's why, when performing neuromarketing research methods, bearing in mind the importance of approval, privacy (Barbasso et al., 2018; Stanton et al., 2017), and confidentiality is the principle of neuromarketing acceptance and final results validity (Constantinescu et al., 2019; Lim, 2018).

So, there is a great need to adopt ethical standards to prevent overstated interference into customers' privacy. Subsequently, there is a Code of Ethics that has been applied to guarantee the ethical application of neuromarketing techniques, named Neuromarketing Science Business Association (NMSBA). The code adopts three major aspects which are; to confirm customer confidence in the trustworthiness of neuro-marketers, to protect the customers' privacy, and to protect neuromarketing buyers as stipulated by NMSBA (Mansor & Isa, 2020). Marketers must abide by the laws outlined in the Code of Ethics (Arlauskaitė et al., 2013).

Neuro-marketers at tourism destinations should give great consideration to ethical concerns when conducting their commercial neuromarketing studies (Pop et al., 2017). Therefore, neuro-marketers must respect the rules and regulations established by the governments concerning customers' rights and safety (Ulman et al., 2015).

Another important challenge of applying neuromarketing techniques is their high costs (e.g:- fMRI machine may cost more than $5 million), so it's recommended to be applied by destinations marketing organizations or large specialized companies to conduct true neuromarketing (Ghorpade, 2017).

Neuromarketing challenges also indicate the recorded data which clarifies the changes in eye movement, brainwaves, or sweat production, can't provide absolute values for these variables (Meyerding & Mehlhose, 2020). So, to solve this issue, it is recommended to merge many techniques to achieve more reliable results (Constantinescu et al., 2019). Other main concerns associated with neuromarketing include customer manipulation, deficiency in transparency, and shortages in customer independence (Kumar et al., 2020).

Methodology

In order to achieve the study objectives, the authors designed two questionnaires; the first one is constructed for domestic and international tourists in both Arabic and English languages, and the second questionnaire targeted marketers of the Egyptian destination. They were distributed electronically via social networking, such as LinkedIn, Facebook, and Research gate in the summer season of 2021. The introduction of both questionnaires was explaining the concept of the neuromarketing method and its importance in exploring tourists' needs and desires as well as improving destinations' marketing strategies, besides authors were addressing the study's objectives. Participants were notified that their answers will be used for scientific aims only and will be collected confidentially.

A random sample of tourists (domestic and international) was selected, only 472 questionnaires were valid for statistical analyses. The questionnaire was divided into two parts: a) the first part deals with the demographic characteristics of the sample in terms of gender, age, educational level, and nationality, b) the second part included 23 items to measure the following variables; tourist behavior (TB) (3 items) developed from Boksem and Smidts (2015), decision making (DM) (3 items) developed by Cerci and Koyluoglu (2020), marketing effectiveness (ME) (3 items) developed from Kumlehn (2011), product improvement (PI) (3 items) adopted from Vaiciukynaite (2019), tourist preferences (TP) (two items) adopted from Klinčeková (2016), tourist loyalty (TL) (two items) adopted from Baghsheykhi and Arabiyeh (2019), and sustainable product marketing (SPM) (4 items) developed from Nilashi et al. (2020). A 5-point Likert scale anchored from 5 strongly agree to 1 strongly disagree was employed, as the respondents were asked to express to what extent they agree with the study constructs.

The results of demographic characteristics indicate that 62.3% of respondents are male. 36.2% of them are aged from 30 to 39 years, followed by 40-49 years old (30.3%). The majority of respondents hold a bachelor's degree82.6%. As for their nationality, 57.4% of respondents are Egyptians, while 42.6% are foreigners.

Judgment sampling was applied in the destination marketers' questionnaire, it was divided into 5 sections. The first section concerns the demographic profile of the study sample, it includes gender, age, educational level, and years of experience. Section 2 includes 4 items to analyze the marketers' awareness about the neuromarketing concept (MA) (A 5-point Likert scale anchored from 5=extremely aware to 1= not at all aware) developed from Zahopoulos (2020), Baghsheykhi and Arabiyeh (2019) and Yoon et al. (2012). Section 3 evaluates the marketers' knowledge about neuromarketing research through 6 items (MK) (A 5-point Likert scale ranged from 5=extremely known to 1=not at all known) adopted from Ariely and Berns (2010) and Lewis and Bridger (2005). The fourth part contains 13 items to explore the degree of use of marketing tools either conventional or modern, which the Egyptian destination marketers use (8 marketing tools related to neuromarketing, and 5 related to conventional marketing) (ranged from 5= always to 1= never) developed from Bhandari (2020), Nadanyiova (2017) and Santos et al. (2015). The fifth part assesses the role of neuromarketing in designing marketing strategies (MS) (3 items) adopted from Bastiaansen et al. (2018). Finally, the sixth part evaluates the neuromarketing challenges (NC) through 6 items adopted from Sreedevi et al. (2013). Both fifth and sixth parts scaled from 5= strongly agree to 1=strongly disagree.

Only 82 completed questionnaires were received. The results of demographic characteristics revealed that 76.8% of respondents are male. 40.2% of them are aged from 35 to 44 years, followed by 45-54 years old (23.2%). The majority of respondents hold a bachelor's degree with 74.4%. 35.4% of respondents have experienced work in the marketing field from 5 to less than 10 years, followed by those who have 10 to less than 15 years of experience with 23.2%.

SPSS v.25 and Amos v.24 were used to analyze the data of the study and test its hypotheses. The SPSS v.25 program was used to perform factor analysis and descriptive analysis, including frequencies, percentages, means, and standard deviations. While Amos v.24 was used to conduct a path analysis to assess the effect of the independent variable on the dependent variables, and to test the study hypotheses.

Results
Exploratory factor analysis (EFA)

The Kaiser-Meyer-Olkin KMO test and the Bartelett test

The exploratory factor analysis was performed using Principal Components Analysis - PCA, and the orthogonal rotation of the dimensions was carried out using the Varimax Rotation method, with the extracted factors assumed to be independent. To determine the sample's acceptability and sufficiency for exploratory factor analysis, the Kaiser-Meyer-Olkin KMO test, and the Bartlett test were used. The KMO test should have a value of more than 0.60, whereas the Bartlett test should have a statistical significance less than 0.05 (Awang, 2012). According to the data in the table below, the percentage of the KMO scale is 0.762, which is more than 0.60. The significance level of the Bartlett test is 0.000, which is less than 0.05. This means that the sample is appropriate for factor analysis.

Table 1
The Kaiser-Meyer-Olkin KMO test and the Bartelett test

KMO		.762
Bartelett test	APPROX. Chi-Square	662.312
	df	328
	Sig.	0.000

Reliability Test
Cronbach's Alpha values are shown in Table (2) for all constructs. Given the Cronbach's Alpha value of .60 (Nunnally, 1978), there is adequate evidence to imply that the constructs' reliability was satisfactory based on the data supplied in the table. As a result of this finding, it is inferred that the scale has high levels of internal consistency and is deemed to be very reliable, where Cronbach's Alpha values are > .718. As a result, all of the constructs employed in this study are based on well-established instruments with excellent reliability ratings, and the internal consistency of each construct is quite good.

Table 2
Reliability levels of the instrument – Cronbach's Alpha

Variables	Cronbach's Alpha	No. of items
Tourist behavior (TB)	.743	3
Decision making (DM)	.801	3
Marketing effectiveness (ME)	.766	3
Product improvement (PI)	.790	3
Tourist preferences (TP)	.790	2
		Continued

Tourist loyalty (TL)	.718	2
Sustainable product marketing (SPM)	.823	4
Marketer's awareness (MA)	.743	4
Marketers'' Knowledge (MK)	.881	6
The use of marketing tools (MT)	.837	13
Marketing strategies (MS)	.800	3
Neuromarketing challenges (NC)	.781	6

Validity Test

The next stage in the study was to assess the validity, which is detailed below. The average variance extracted (AVE) was used to measure constructs validity, which included both convergent and discriminant validity.

Test of Convergent validity

The factor loading of each item is the initial test. The composite reliability of each variable is the second test. Nunnally's (1978) guideline for calculating reliability coefficients was applied to examine this. The final test is average variance extracted (AVE) for each construct, which represents the amount of variation in the item explained by the construct compared to the amount assigned to measurement error (Fornell & Larcker, 1981). To evaluate the AVE for all constructs, the Fornell and Larcker criteria were employed, which verified that the AVE should be > .50. Table (3) depicts that the factor loading for all items is greater than 0.5. Additionally, the composite reliability values of all constructs are above the necessary threshold of .70, as specified by Fornell and Larcker (1981). As well, the AVE values of all constructs exceeded the suggested value (0.50).

Table 3

Results summary for constructs' convergent validity

Constructs	Factor loading	Composite reliability	AVE	Constructs	Factor loading	Composite reliability	AVE
TB1	.821	.883	.691	MA4	.885		
TB2	.759			MK1	.832	.807	.672
TB3	.883			MK 2	.874		
DM1	.801	.901	.703	MK 3	.900		
DM2	.814			MK 4	.881		
DM3	.884			MK 5	.877		
ME1	.768	.879	.743	MK 6	.903		
ME2	.893			MT1	.792	.889	.764
ME3	.779			MT 2	.801		
PI1	.815	.793	.692	MT 3	.774		
PI2	.864			MT 4	.867		
PI3	.822			MT 5	.895		
TP1	.873	.814	.744	MT 6	.911		
TP2	.797			MT 7	.833		
TL1	.888	.914	.776	MT 8	.807		
TL2	.902			MT 9	.851		
MS1	.837	.840	.725	MT 10	.790		

Continued

MS2	.821			MT 11	.881		
MS3	.887			MT 12	.799		
SPM1	.799	.797	.658	MT 13	.805		
SPM2	.875			NC1	.827	.799	.723
SPM3	.868			NC2	.836		
SPM4	.814			NC3	.815		
MA1	.832	.810	.669	NC4	.844		
MA2	.871			NC5	.878		
MA3	.911			NC6	.893		

Descriptive statistics

A- Descriptive statistics for variables related to tourists

Table 4

Mean and SD for variables related to tourists' sample

Variables	Mean	SD
Tourist behavior	3.88	.74
Decision making	3.93	.85
Marketing effectiveness	3.57	.96
Product improvement	3.79	.77
Tourist preferences	3.81	.88
Tourist loyalty	3.67	1.03
Sustainable product marketing	3.72	.92

Table (4) shows that the average mean of tourist behavior items was 3.88, and the standard deviation (SD) was 0.74, which means that the tourist's behavior depends largely on his emotions and feelings towards products and services, in addition to his dependence on the way he thinks about buying. Regarding the tourist decision-making constructs, the average mean was 3.93, and the SD was 0.85, which indicates that the emotions, feelings, and desires of the tourist highly influence his purchasing decisions for some products and services.

The average mean of the items that measure the marketing effectiveness was 3.57, and the SD was 0.96, this is due to the fact that the use of modern technologies increases the effectiveness of marketing. The effectiveness of marketing is based on the company's services and products that are compatible with the desires and needs of tourists. For product improvement items; The average mean was 3.79, and the SD was 0.77, as accurately identifying the tourist's needs leads to the design of high-quality products and services that are matching these needs. Concerning the items which measure tourist's preferences, the average mean was 3.81, and the SD was 0.88, as the organizations/destinations seek to learn about the preferences and interests of tourists, this, in turn, makes them realize the keenness of these organizations/ destinations to meet their desires and needs, and then it is reflected positively on their desire for purchase.

The average mean of tourist loyalty constructs was 3.67, and the SD was 1.03. The high level of tourist loyalty is due to the fact that organizations/destinations providing services and products that meet their desires and needs, of high quality and at

competitive prices, make them associate with them, and then repeat the purchases process, which reflects their loyalty.

Concerning sustainable product marketing, the average mean was 3.72 (SD= 0.92), which indicates the tourists' acceptance of the use of sustainable ways to promote tourism products /services to preserve the environment, they agree with and support the usage of green technology in marketing, in addition to marketing green products.

B- *Descriptive statistics for variables related to Egyptian destination marketers'* *sample*

Table 5

Mean and SD of awareness and knowledge about neuromarketing

Variables	Mean	SD
Awareness about neuromarketing concept	3.40	.97
Knowledge about neuromarketing research	3.26	.88
The degree of neuromarketing techniques' utility	1.57	.61
The degree of traditional techniques' utility	3.81	.83
Marketing strategies	3.51	1.11

Table (5) reveals that there is a relatively high level of awareness about the concept of neuromarketing, where the average mean was 3.40 (SD = 0.97), as the marketers are well aware that neuromarketing is related to the analysis of tourists' responses to marketing stimuli, in addition to its focus on identifying the factors that affect the tourist's thinking, and is also linked to influence the tourist's mind, not manipulation. They also agreed that neuromarketing is considered one of the modern strategies that focus on analyzing the emotions, feelings, and ways of thinking of the tourists.

Regarding the level of knowledge about neuromarketing research, they have a moderate level of knowledge, where the average mean was 3.56, and the SD was 3.26. In this regard, the sample members moderately know the following aspects of neuromarketing research, neuromarketing is a newer and more scientific method of doing customer research; the goal of neuromarketing is to gather insights that cannot be obtained through traditional forms of marketing; neuromarketing discovers emotional involvement as a basis of future purchasing decisions; it identifies memory recall, awareness, and attention as the pillars of future purchase intent; neuromarketing also allows to go closer to the unseen component of neural connections entering the human brain 'black box'; and it is the study of neural processes, with an emphasis on underlying psychological and biological processes.

The results demonstrate that the Egyptian marketing designers rarely use neuromarketing techniques in marketing the Egyptian destination, where the mean was 1.57 (SD= 0.61). The marketers emphasized that they rarely use the following neuromarketing techniques: Electroencephalography (EEG), Electromagnetic, Functional magnetic resonance imaging (fMRI), Electrocardiography (ECG), Eye-tracking (ET), Facial electromyography (fEMG), Skin conductance (SC), and Voice recognition. On contrary, they often use the traditional marketing tools, as the average mean was 3.81 (SD= 0.83). The marketers indicated that observational research, focus

group, surveys, interviews, and tourism exhibitions are the most traditional tools used in marketing the Egyptian destination.

For marketing strategies; the average mean was 3.51 (SD=1.11), where marketers approved that the use of modern marketing tools which apply state-of-the-art technology, improves marketing strategies, and increases their success and effectiveness, in addition to the possibility of reaching a large number of potential tourists, which in turn increases sales and profits.

Regarding the challenges of implementing neuromarketing research (fig.1), the results indicate that the most challenge facing the application of neuromarketing is difficulties finding participants in neuromarketing research (Mean= 4.28, SD= .58), followed by the need for immovable devices in conducting neuromarketing research (Mean= 4.21, SD= .68), ethical concerns (Mean= 4.09, SD= .77), the high cost of neuromarketing research (Mean= 4.05, SD= 1.02), time-restricted experiments (Mean= 4.02, SD= 1.18), and finally, neuromarketing is a manipulative method to persuade people to buy needless goods and services (Mean= 2.03, SD= .79).
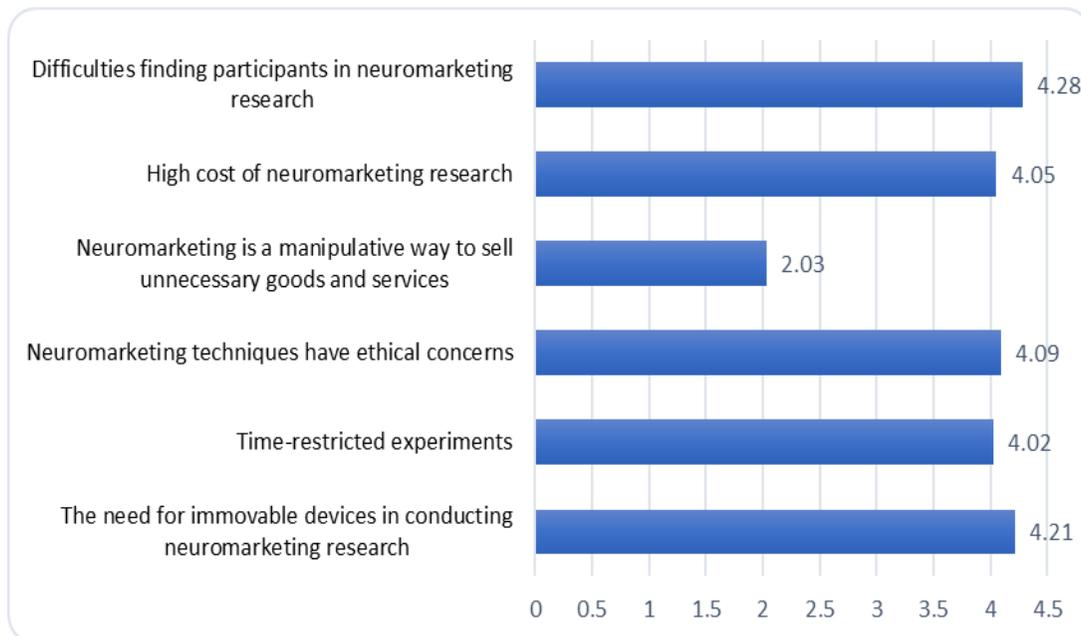

Fig.1. Challenges of neuromarketing

Testing hypotheses and discussion

Table (6) clarifies the model fit values of the effect of implementing neuromarketing method on tourist behavior, tourist preferences, tourist loyalty, decision-making, marketing effectiveness, product improvement, marketing strategies, and sustainable product marketing.

Table (6) depicts the suggested ranges of some model fit indicators. According to these ranges of model fit indicators, table (12) indicated that X^2/df = 1.582, GFI= .953, NFI= .974, CFI= .936, TLI= .959, TLI= .966 and RMSEA= .009. all these values fell within the recommended ranges in table (12).

Table 6

model fit

Indicators	X^2/df	GFI	NFI	CFI	IFI	TLI	RMSEA
Ranges	< 2	> .90	> .95	> .90	> .95	> .95	.05 - .08
Model	1.582	.953	.974	.936	.959	.966	.009

Table (7) demonstrates the results of the path analysis of the impact of using neuromarketing on tourist behavior, tourist preferences, tourist loyalty, decision-making, marketing effectiveness, product improvement, marketing strategies, and sustainable product marketing. The table shows the effect of employing neuromarketing on tourist preferences; The value of the standard estimate from neuromarketing to tourist preferences was 0.717, which is significant (p-value < .05), which means that neuromarketing positively affects 71.7% of tourist preferences. The standard error was 0.090. The C.R. value was 7.967. This result agrees with Singh (2021), and Mishra and Shukla (2020) who revealed that neuromarketing research affects assembling a picture of tourist preferences. Therefore, H1 is supported.

On the subject of the effect of applying neuromarketing on tourist behavior; the value of the standard estimate from neuromarketing to tourist behavior was 0.723, which is significant (p-value < .05), and this means that neuromarketing positively affects 72.3% of tourist behavior. The standard error was 0.117. The C.R. value was 6.179. This result is in line with Zahopoulos (2020) who stated that neuromarketing is an effective tool for enhancing consumer behavior. Thus, H2 is supported.

Regarding the effect of applying neuromarketing on decision-making; The value of the standard estimate from neuromarketing to decision-making was 0.711, which is significant (p-value < .05), and this means that neuromarketing positively affects 71.1% of decision-making. The standard error was 0.124. The C.R. value was 5.734. This result is consistent with Cerci and Koyluoglu (2020), Garzón-Paredes and Royo-Vela (2020), Gurbuz and Toga (2018), and Barbasso et al. (2018) who mentioned that companies can better understand the consumer's behavior as the mechanics of decision-making, and what processes in the brain are impacted on decision-making by applying neuromarketing techniques. Hence, H3 is supported.

Considering the effect of applying neuromarketing on tourist loyalty; The value of the standard estimate from neuromarketing to tourist loyalty was 0.552, which is significant (p-value < .05), and this means that neuromarketing positively affects 55.2% of tourist loyalty. The standard error was 0.058. The C.R. value was 9.517. This result is consistent with the study of Baghsheykhi and Arabiyeh (2019), which concluded that neuromarketing affects positively the improvement of tourist loyalty. Hence, H6 is supported.

Regarding the effect of carrying out neuromarketing on marketing effectiveness; The value of the standard estimate from neuromarketing to marketing effectiveness was 0.675, which is significant (p-value < .05), and this means that neuromarketing positively affects 67.5% of enhancing marketing effectiveness. The standard error was 0.078. The C.R. value was 8.654. This result is consistent with Kumar et al.

(2020) who argued that neuromarketing is an important tool for enhancing the effectiveness of tourism marketing. Therefore, H4 is supported.

Concerning the effect of using neuromarketing on product improvement; The value of the standard estimate from neuromarketing to product improvement was 0.599, which is significant (p-value < .05), which means that neuromarketing positively affects 59.9% of product improvement. The standard error was 0.044. The C.R. value was 13.614. This result is in line with the study of Dapkevičius and Melnikas (2009) that confirmed the positive effect of neuromarketing on improving the quality of products and services. So, H5 is supported.

Regarding the effect of adopting neuromarketing on marketing strategies; The value of the standard estimate from neuromarketing to marketing strategies was 0.630, which is significant (p-value < .05), which means that neuromarketing has a positive effect of 63% on enhancing marketing strategies. The standard error was 0.103. The C.R. value was 6.117. This result agrees with what was mentioned in Revilla-Camacho et al. (2018) that neuromarketing improved marketing strategies significantly. Thus, H7 is supported.

Considering the effect of using neuromarketing on sustainable product marketing; The value of the standard estimate from neuromarketing to sustainable product marketing was 0.493, which is significant (p-value < .05), and this means that neuromarketing positively affects 49.3% of sustainable product marketing. The standard error was 0.024. The C.R. value was 20.542. This result is in line with Nilashi et al. (2020) who indicated that neuromarketing enhances sustainable product marketing. He added that neuromarketing may significantly contribute to sustainability in a variety of ways, including sustainable usage, understanding of environmental management solutions, green technology implementation, and green product marketing. Hence, H8 is supported.

Table 7

Results of path analysis

Path	Estimate	S.E.	C.R	P Value	Result
Neuromarketing -->Tourist Preferences	.717	.090	7.967	.000	Supported
Neuromarketing -->Tourist Behavior	.723	.117	6.179	.000	Supported
Neuromarketing -->Decision Making	.711	.124	5.734	.000	Supported
Neuromarketing -->Tourist Loyalty	.552	.058	9.517	.000	Supported
Neuromarketing-->Product Improvement	.599	.044	13.614	.000	Supported
Neuromarketing-->Marketing Effectiveness	.675	.078	8.654	.000	Supported
Neuromarketing-->Marketing Strategies	.630	.103	6.117	.000	Supported
Neuromarketing-->Sustainable Product Marketing	.493	.024	20.542	.000	Supported

Practical implications

Tourism destinations endeavor to improve their performance to distinguish themselves from their competitors by doing their best to meet tourists' needs and wants, achieve their satisfaction, and loyalize them. In this regard, destination marketers should apply modern marketing methods and techniques in their marketing strategies, to increase their market share and competitiveness, and win over their competitors. This study sheds the light on neuromarketing, an innovative marketing approach that excels over traditional marketing in examining the process of tourists' purchasing decisions.

The study results figured out several benefits of applying the neuromarketing approach in marketing tourism destinations. According to Isa and Mansor (2020), neuromarketing enables destination marketers to trace information and facts about the tourists, discover and forecast their purchasing behavior. Thus, the application of neuromarketing in Egyptian destination marketing enables marketers to understand tourists' purchase behavior, highlight the emotions that influence tourist decision-making, along with the possibility to detect tourists' subconscious needs and motivations, and learn how to use this information to improve marketing effectiveness.

In terms of neuromarketing techniques, Egyptian destination marketers can use the following techniques (ET), (fEMG), (EEG), (GSR), (MEG), and fMRI to explore deeply the tourists' subconscious minds to well understand their needs, preferences, emotions, and behavioral reactions. By obtaining this data marketers can create more desirable tourist products, display better promotions and advertising, and design more effective marketing strategies, which lead to an increase in the number of visits, and frequency of revisits.

The results show the important role of neuromarketing in decreasing the destination marketing costs, which are spent on ineffectual marketing campaigns (Barbasso et al., 2018), in addition to, its role in enhancing sustainable product marketing (Nilashi et al., 2020). Therefore, Egyptian destination marketers should embed neuromarketing in their marketing strategies, to save a significant amount of their budget and provide more effective marketing activities. Also, the study indicates that the application of neuromarketing contributes to sustainability in various ways, including sustainable usage, understanding environmental concerns, and promoting green products. For that reason, the Egyptian government should support the destination marketers to use neuromarketing techniques to guarantee the destination's sustainability.

The study revealed many challenges of neuromarketing, such as privacy, transparency, and participation in neuromarketing research. In this regard, the Egyptian destination marketers can take the following actions to overcome the challenges of using neuromarketing, they can decrease the tourists' fears through transparency of research; tourists need to understand why they participate in such research, and they must be informed that the data will only be used for the purposes for which it was obtained; explaining the importance of participating in such techniques in elaborating hidden information and data, which allows the marketers to

provide desirable products/ services, develop marketing strategies, which in turn, achieve tourists satisfaction and strengthen their loyalty.

Marketers consider the difficulties involved in neuromarketing are high cost and need for portable equipment. These difficulties can be overwhelmed with the collaboration with neuroscientists and medical centers. To conduct true and reliable neuromarketing results, many neuro-techniques can be merged to successfully achieve the marketers' goals and reach the desired results. Results discovered that marketers of the Egyptian destination have a relatively high level of awareness about the neuromarketing concept, and a moderate level of knowledge about the neuromarketing research, this may relate to their desire to achieve a competitive advantage and cope with changing conditions in the tourism business. Regarding ethical issues, Egyptian marketing designers must adopt ethical standards or Code of Ethics, and respect the regulations established by the Egyptian government concerning tourists' rights and safety.

Conclusion and future research

This study concluded the essential role of neuromarketing in filling the gaps dropped by conventional marketing research. Neuromarketing is considered an important method to explain and understand tourists' behavior, having the ability to imaging tourists' subconscious minds, which allows destination marketers to identify tourists' needs and factors that trigger their purchasing decision behavior, and in consequence, create more satisfying products/services, and design more efficient marketing strategies that improve destination competitiveness. Although the advantages of neuromarketing, it is in early stages in Egypt, currently traditional marketing tools are being applied extensively to design the destination marketing activities and strategies. It is proposed to destination policymakers and marketing professionals to use neuromarketing to influence tourist behavior and build up tourist loyalty. Concerning future research, it is recommended to study the impact of carrying out experiments by using neuromarketing techniques such as fMRI, Eye tracking, facial recognition, etc., to measure how well participants react to marketing stimuli. Future research should explain how neuromarketing techniques relate to destination brand positioning.

References

− Agarwal, S. (2015). Introduction to neuromarketing and consumer neuroscience. *Journal of Consumer Marketing*, *32*(4), 302-303.
− Agarwal, S., & Dutta, T. (2015). Neuromarketing and consumer neuroscience: Current understanding and the way forward. *Decision*, 42(4), 457–462.
− Akynova, A. (2018). Neuromarketing and its Development in Kazakhstan. *In VIII International Correspondence Scientific Specialized Conference" International Scientific Review of the Problems of Economics, Finance and Management"* (pp. 35-38).
− ALsharif, A., Salleh, N., Baharun, R., & Yusoff, M. (2021). Consumer behaviour through neuromarketing approach. *Journal of Contemporary Issues in Business and Government*, *27*(3), 344-354.
− Andrejevic, M. (2012). Brain whisperers: Cutting through the clutter with neuromarketing. *Somatechnics*, *2*(2), 198-215.
− Araújo, C., Kastenholz, E., & Santos, I. (2017). A relevance of neuromarketing in tourism: literature review. *Tourism & Development Magazine*, *1* (27/28), 745-759.

- Ariely, D., & Berns, G. (2010). Neuromarketing: the hope and hype of neuroimaging in business. *Nature reviews neuroscience*, *11*(4), 284-292.
- Arlauskaitė, E., Sferle, A., Arlauskaite, E., & Sferle, A. (2013). Ethical issues in neuro-marketing. *Science*, *311*(2), 7-52.
- Awang, Z. (2012). A handbook on structural equation modeling using AMOS. *Universiti Technologi MARA Press, Malaysia*.
- Baghsheykhi, H., & Arabiyeh, F. (2019). Investigating and evaluating the effect of neuro marketing on consumer behavior with emphasis on consumer loyalty (case study of samsung products). *Humanities & Innovation, 6*(2), 224-234.
- Banks, S., Bellerose, J., Douglas, D., & Jones-Gotman, M. (2012). Bilateral skin conductance responses to emotional faces. *Applied Psychophysiology and Biofeedback*, *37*(3), 145-152.
- Barbasso, L., Tardivo, G., Viassone, M., & Serravalle, F. (2018). Neuromarketing in customer behaviour—customers' diencephalic and Mid-Brain implications in purchase dynamics. In *Innovation and Capacity Building* (pp. 11-29). Palgrave Macmillan, Cham.
- Bastiaansen, M., Straatman, S., Driessen, E., Mitas, O., Stekelenburg, J., & Wang, L. (2018). My destination in your brain: A novel neuromarketing approach for evaluating the effectiveness of destination marketing. *Journal of destination marketing & management*, *7*, 76-88.
- Bhandari, A. (2020). Neuromarketing Trends and Opportunities for Companies. In *Analyzing the Strategic Role of Neuromarketing and Consumer Neuroscience* (pp. 82-103). IGI Global.
- Blum, B. (2016). *Consumer Neuroscience: A Multi-Disciplinary Approach to Marketing Leveraging Advances in Neuroscience, Psychology and Economics*. Claremont McKenna College.
- Boksem, M., & Smidts, A. (2015). Brain responses to movie trailers predict individual preferences for movies and their population-wide commercial success. *Journal of Marketing Research*, *52*, 482.
- Boz, H., Arslan, A., & Koc, E. (2017). Neuromarketing aspect of tourism pricing psychology. *Tourism Management Perspectives*, *23*, 119-128.
- Brainfluence, D. (2012). 100 ways to persuade and convince consumers with Neuromarketing. John Wiley & Sons.
- Butler, M. (2008). Neuromarketing and the perception of knowledge. *Journal of Consumer Behaviour: An International Research Review*, *7*(4-5), 415-419.
- Cerci, H., & Koyluoglu, A. (2020). Understanding consumer behavior through eye-tracking. In *Analyzing the Strategic Role of Neuromarketing and Consumer Neuroscience* (pp. 65-81). IGI Global.
- Constantinescu, M., Orindaru, A., Pachitanu, A., Rosca, L., Caescu, S., & Orzan, M. (2019). Attitude evaluation on using the neuromarketing approach in social media: matching company's purposes and consumer's benefits for sustainable business growth. *Sustainability*, *11*(24), 7094.
- Dapkevičius, A., & Melnikas, B. (2009). Influence of price and quality to customer satisfaction: neuromarketing approach. *Science–Future of Lithuania*, *1*(3), 17-20.
- Eser, Z., Isin, F., & Tolon, M. (2011). Perceptions of marketing academics, neurologists and marketing professionals about neuromarketing. *Journal of Marketing Management*, 27(7-8), 854-868.

- Fisher, C., Chin, L., & Klitzman, R. (2010). Defining neuromarketing: Practices and professional challenges. *Harvard Review of Psychiatry*, 18(4), 230–237.
- Fornell, C., & Larcker, D. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50
- Fortunato, V., Giraldi, J., & Oliveira, J. (2014). A review of studies on neuromarketing: Practical results, techniques, contributions and limitations. *Journal of Management Research*, 6(2), 201-220.
- Fugate, D. (2007). Neuromarketing: A layman's look at neuroscience and its potential application to marketing practice. *Journal of Consumer Marketing*, 24(7), 385-394.
- Fugate, D. (2008). Marketing services more effectively with neuromarketing research: A look into the future. *Journal of Services Marketing*, 22(2), 170-173.
- Garzón-Paredes, A., & Royo-Vela, M. (2020). Experimenting Through Neuromarketing to Measure the Impact of Spanish Cultural Heritage. In *International Conference on Tourism, Technology and Systems*, 380-400. Springer, Singapore.
- Geordes, P., Bayle-Tourtoulou, A., & Badoc, M. (2013). *Neuromarketing in action: how to talk and sell to the brain*. kogan page publishers, london, UK.
- Ghorpade, R. (2017). Neuromarketing: New science of consumer behavior. AADYA-*National Journal of Management and Technology (NJMT),* 7, 199–206.
- Gidlöf, K., Wallin, A., Dewhurst, R., & Holmqvist, K. (2013). Using eye tracking to trace a cognitive process: Gaze behaviour during decision making in a natural environment. *Journal of Eye Movement Research*, *6*(1), 1–14.
- Gurbuz, F. & Toga, G. (2018). Usage of the facial action coding system to predict customer gender profile: a neuro marketing application in Turkey. In *2018 2nd International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT)* (pp. 1-4). IEEE.
- Hafez, M. (2019). Neuromarketing: a new avatar in branding and advertisement. *Pacific Business Review International*, *12*(4), 58-64.
- Hammou, K., Galib, M., & Melloul, J. (2013). The Contributions of Neuromarketing in Marketing Research. *Journal of Management Research*, *5*(4), 20-30.
- Hazeldine, S. (2014). *Neuro-sell: How neuroscience can power your sales success*. Croydon: Kogan Page Limited
- Hetland, A., Vittersø, J., Fagermo, K., Øvervoll, M., & Dahl, T. (2016). Visual excitement: Analyzing the effects of three Norwegian tourism films on emotions and behavioral intentions. *Scandinavian Journal of Hospitality & Tourism*, *16*(4), 528-547.
- Hsu, L., & Chen, Y. (2020). Neuromarketing, subliminal advertising, and hotel selection: An EEG study. *Australasian marketing journal*, *28*(4), 200-208.
- Hubert, M. (2010). Does neuroeconomics give new impetus to economic and consumer research? *Journal of Economic Psychology*, *31*(5), 812-817.
- Hubert, M., & Kenning, P. (2008). A current overview of consumer neuroscience. *Journal of Consumer Behaviour*, *7*(4-5), 272-292.
- Isa, S., & Mansor, A. (2020). Rejuvenating the marketing mix through neuromarketing to cultivate the green consumer. *International Journal of Industrial Management*, *5*, 66-75.

- Javor, A., Koller, M., Lee, N., Chamberlain, L., & Ransmayr, G. (2013). Neuromarketing and consumer neuroscience: Contributions to neurology. *BMC Neurology*, *13*(1), 1-12.
- Kampakoglou, K. (2012). *Neuromarketing: Validity and Morality* (Master's thesis, University of Boras).
- Kenning, P., Plassmann, H., & Ahlert, D. (2007). Applications of functional magnetic resonance imaging for market research. *Qualitative Market Research: An International Journal*, *10*(2),135-152.
- Kiseleva, E. (2020). The Problem of Tracking the Center of Attention in Eye Tracking Systems. In *Intelligent Human Systems Integration 2020: Proceedings of the 3rd International Conference on Intelligent Human Systems Integration (IHSI 2020): Integrating People and Intelligent Systems, February 19-21, 2020, Modena, Italy*, 1131, 365. Springer Nature.
- Klinčeková, S. (2016). Neuromarketing–research and prediction of the future. *International Journal of Management Science and Business Administration*, *2*(2), 53-57.
- Kline, J. (2004). Frontal EEG asymmetry, emotion, and psychotherapy: The first, and thenext 25 years. *Biological Psychology*, *67*(1-2), 1-5.
- Kumar, A., Gawande, A., & Brar, V. (2020). Neuro-Marketing: Opportunities and Challenges in India. *International Interdisciplinary Research Journal*, *10*(02), 214-217.
- Kumlehn, M. (2011). *Consumer Neuroscience: Pricing research to gain and sustain a cutting-edge competitive advantage by improving customer value and profitability* (PhD's thesis, Umeå School of Business Umeå University, Sweden).
- Lee, N., Broderick, A., & Chamberlain, L. (2007). What is 'neuromarketing'? A discussion and agenda for future research. *International Journal of Psychophysiology*, *63*(2), 199-204.
- Lewis, D., & Bridger, D. (2005). Market Researchers make Increasing use of Brain Imaging. *Advances in Clinical Neuroscience and Rehabilitation*, *5*(3), 36–37.
- Li, S., Lyu, T., Chen, M., & Zhang, P. (2021). The Prospects of Using EEG in Tourism and Hospitality Research. *Journal of Hospitality & Tourism Research*, *46*(1), 189-211.
- Lim, W. (2018). Demystifying neuromarketing. *Journal of business research*, *91*, 205-220.
- Mansor, A., & Isa, S. (2020). Fundamentals of neuromarketing: What is it all about? *Neuroscience Research Notes*, *3*(4), 22-28.
- Markgraf, I., Scheffer, D., & Pulkenat, J. (2012). The needs of package tourists and travel agents–Neuromarketing in the tourism sector. In *Trends and issues in global tourism,* 79-91. Springer, Berlin, Heidelberg.
- McDowell, W., & Dick, S. (2013). The marketing of neuromarketing: Brand differentiation strategies employed by prominent neuromarketing firms to attract media clients. *Journal of Media Business Studies*, *10*(1), 25–40.
- Meyerding, S., & Mehlhose, C. (2020). Can neuromarketing add value to the traditional marketing research? An exemplary experiment with functional near-infrared spectroscopy (fNIRS). *Journal of Business Research*, *107*, 72-185.
- Mishra, G., & Shukla, M. (2020). Neuromarketing: a tool to understand consumer psychology. *International Journal of Technical Research & Science*, 5(6), 8-10.

− Morin, C. (2011). Neuromarketing: the new science of consumer behavior. *Society*, *48*(2), 131-135.
− Murphy, E., Illes, J., & Reiner, P. (2008). Neuro ethics of neuromarketing. *Journal of Consumer Behaviour*, *7*(4-5), 293-302.
− Nadanyiova, M. (2017). Neuromarketing-An Opportunity or a Threat? Neuromarketing-An Opportunity or a Threat? *Communications-Scientific letters of the University of Zilina*, *19*(4), 90-94.
− Nenad, D. (2011). Emotional marketing: Eye-tracking and brain measuring: Using Neuromarketing to sell newspapers. *Editor & Publisher*, *144*(1), 7-8.
− Nilashi, M., Yadegaridehkordi, E., Samad, S., Mardani, A., Ahani, A., Aljojo, N. & Tajuddin, T. (2020). Decision to adopt neuromarketing techniques for sustainable product marketing: a fuzzy decision-making approach. *Symmetry*, *12*(2), 305.
− Ntapiapis, N., & Özkardeşler, Ç. (2020). A Neuromarketing Perspective for Assessing the Role and Impact of Typefaces on Consumer Purchase Decision. In *Analyzing the Strategic Role of Neuromarketing and Consumer Neuroscience* (pp. 208-228). IGI Global.
− Nunnally, J. (1978). *Psychometric Theory*. McGraw-Hill, New York.
− Nyoni, T., & Bonga, W. (2017). Neuromarketing: The journey to better consumer understanding. *Journal of Economics and Finance*, *2*, 1–10.
− Ohme, R., & Matukin, M. (2012). A small frog that makes a big difference: Brain wave testing of TV advertisement. IEEE Pulse, *3*(3), 28–33.
− Oliveira, J., Giraldi, J., & Santos, R. (2014). Opening the "black box" in the consumer' mind: understanding what is neuromarketing. *International Journal of Business and Management*, 9(9), 96-107.
− Orzan, G., Zara, I., & Purcarea, V. (2012). Neuromarketing techniques in pharmaceutical drugs advertising. A discussion and agenda for future research. *Journal of medicine and life*, 5(4): 428-432.
− Palokangas, L. (2010). *Measuring the willingness to Purchase using methods of neuromarketin*g (Master's thesis, Laurea University of Applied Sciences).
− Perrachione, T., & Perrachione, J. (2008). Brains and brands: Developing mutually informative research in neuroscience and marketing. *Journal of Consumer Behaviour*, *7*(4-5), 303-318.
− Plassmann, H., Venkatraman, V., Huettel, S., & Yoon, C. (2015). Consumer neuroscience: Applications, challenges, and possible solutions. *Journal of Marketing Research*, 52, 427.
− Pop, N., Dabija, D., & Iorga, A. (2017). Ethical Considerations regarding Stakeholders in Neuromarketing Research. Empirical Insights from NMSBA Corporate Members, TAAN Advertising Agencies and Romanian Companies. In *Ethics and Neuromarketing* (pp. 123-146). Springer, Cham.
− Reimann, M., Schilke, O., Weber, B., Neuhaus, C., & Zaichkowsky, J. (2011). Functional magnetic resonance imaging in consumer research: a review and application. *Psychology & Marketing*, 28 (6), 608-637.
− Reutov, V., Mitina, E., & Kalkova, N. (2020). Formation and Promotion of the Territory Brand of the Neuromarketing Tools. In *International Scientific Conference" Far East Conference"(ISCFEC 2020)*, 1375-1383. Atlantis Press.

- Revilla-Camacho, M., Cossío-Silva, F., & Mercado-Idoeta, C. (2018). Neuromarketing as a Subject of Legitimacy. In *Organizational Legitimacy*, 105-119. Springer, Cham.
- Roth, V. (2014). *The potential of neuromarketing as a marketing tool* (Bachelor's thesis, University of Twente).
- Rypakova, M., Moravcikova, K., & Krizanova, A. (2015). Online Customer Behaviour. *Proceeding of International Scientific Conference Marketing identity: digital life: conference, part II, Slovak republic*, 233-245.
- Santos, R., Oliveira, J., Rocha, J. & Giraldi, J. (2015). Eye Tracking in Neuromarketing: A Research Agenda for Marketing Studies. *International Journal of Psychological Studies, 7*(1), 32–42.
- Sebastian, V. (2014). Neuromarketing and evaluation of cognitive and emotional responses of consumers to marketing stimuli. *Procedia-Social and Behavioral Sciences*, *127*, 753-757.
- Senior, C., & Lee, N. (2008). Editorial: A manifesto for neuromarketing science. *Journal of Consumer Behaviour, 7*(4-5), 263–271
- Sharma, N., Koc, M., & Kishor, J. (2014). Neuro-marketing a step ahead of traditional marketing tools. *Third International Conference on Management Innovations (ICMI)*.
- Sharma, R., & Sinha, A. (2020). Neuromarketing and understanding antecedents of consumer switching intensions—a systematic review of literature. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *17*(6), 14660-14675.
- Singh, R. (2021). Challenges of Marketing in COVID-19 Scenario: A Neuro-marketing Approach. *Turkish Journal of Computer and Mathematics Education*, *12*(12), 4192-4199.
- Slanzi, G., Balazs, J., & Velásquez, J. (2017). Combining eye tracking, pupil dilation and EEG analysis for predicting web users click intention. *Information Fusion*, *35*, 51–57.
- Smidts, A., Hsu, M., Sanfey, A., Boksem, M., Ebstein, R., Huettel, S., & Yoon, C. (2014). Advancing consumer neuroscience. *Marketing Letters*, *25*(3), 257-267.
- Smykova, M., Kazybaeva, A., &Tkhorikov, B. (2020). Neuromarketing Approach to Assessing Tourism Products. In *8th International Conference on Contemporary Problems in the Development of Economic, Financial and Credit Systems (DEFCS 2020)* (pp. 243-246). Atlantis Press.
- Sop, S. (2021). Neuroscientific Tourism Research: Current State and Perspectives. *New Trends in Leisure Experience around the Persona,*103-121. LAP Lambert Academic Publishing.
- Spanjaard, D., Young, L., & Freeman, L. (2014). Emotions in supermarket brand choice. *Qualitative Market Research:An International Journal*, *17*(3), 209–224.
- Sreedevi, V., Jayashree, K., & Aguskani, P. (2013). Neuro-marketing – An Effective Marketing Strategy. *International Journal of Marketing and Technology*, *3*(6), 63-70.
- Stanton, S., Sinnott-Armstrong, W., & Huettel, S. (2017). Neuromarketing: Ethical implications of its use and potential misuse. *Journal of Business Ethics*, *144*(4), 799–811.

- Stasi, A., Songa, G., Mauri, M., Ciceri, A., Diotallevi, F., Nardone, G., & Russo, V. (2018). Neuromarketing empirical approaches and food choice: A systematic review. *Food Research International, 108*, 650–664.
- Suomala, J., Palokangas, L., Leminen, S., Westerlund, M., Heinonen, J., & Numminen, J. (2012). Neuromarketing: Understanding customers' subconscious responses to marketing. *Technology Innovation Management Review*, 2(12), 12–21.
- Thomas, A., Pop, N., Iorga, A., & Ducu, C. (Eds.). (2017). *Ethics and neuromarketing: implications for market research and business practice*. Cham: Springer International Publishing.
- Touchette, B., & Lee, S. (2017). Measuring neural responses to apparel product attractiveness: An application of frontal asymmetry theory. *Clothing and Textiles Research Journal*, 35(1), 3-15.
- Ulman, Y., Cakar, T., & Yildiz, G. (2015). Ethical Issues in Neuromarketing: I consume, therefore I am. *Science and Engineering Ethics*, *21*(5): 1271-1284.
- Vaiciukynaite, E. (2019). Men or Women? Neuro-Marketing Study of Social Media Influencers. In *ECSM 2019 6th European Conference on social media* (p. 280). Academic Conferences and publishing limited.
- Varga, Á., Griszbacher, N., & Kemeny, I. (2021). Playing mind games to improve the sport event experience Exploring the applicability of neuromarketing in services marketing. *New perspectives in serving customers, patients, and organizations: A Festschrift for Judit Simon*, 202-215.
- Vecchiato, G., Cherubino, P., Trettel, A., & Babiloni, F. (2013). *Neuro-electrical brain imaging tools for the study of the efficacy of TV advertising stimuli and their application to neuromarketing*. Springer.
- Vences, N., Díaz-Campo, J., & Rosales, D. (2020). Neuromarketing as an emotional connection tool between organizations and audiences in social networks. A theoretical review. *Frontiers in psychology*, *11*, 1787.
- Venkatraman, V., Dimoka, A., Pavlou, P., Vo, K., Hampton, W., Bollinger, B., & Winer, R. (2015). Predicting advertising success beyond traditional measures: New insights from neurophysiological methods and market response modeling. *Journal of Marketing Research*, *52*(4): 436-452.
- Voorhees Jr., T., Spiegel, D., & Cooper, D. (2011). *Neuromarketing: Legal and Policy Issues a Covington White Paper*. Covington and Burling LLP, Washington, DC, USA.
- Vrtana, D., Krizanova, A., & Gajanova, L. (2019). Importance of Neuro-marketing in Company's Marketing Campaign. *48th International Scientific Conference on Economic and Social Development – "Managerial Issues in Modern Business" - Warsaw*, 25-26 November 2019.
- Yoon, C., Gonzalez, R., Bechara, A., Berns, G., Dagher, A., Dubé, L., Huettel, S., Kable, J., Liberzon, I., Plassmann, H., Smidts, A., & Spence, C. (2012). Decision neuroscience and consumer decision making. *Marketing letters*, *23*(2), 473-485.
- Zahopoulos, V. (2020). Understanding neuromarketing techniques and their use in localization. In *Digital and Social Media Marketing* (pp. 299-304). Springer, Cham.
- Zaltman, G. (2003). *How customers think: Essential insights into the mind of the market*. Harvard Business Press.

التسويق العصبي كطريقة جديدة لتسويق المقاصد السياحية: دليل من مصر

هبه الله على سيد محمد جعفر   بسام سمير الرميدى

استاذ مساعد بقسم الدراسات السياحية، كلية السياحة والفنادق، جامعة مدينة السادات

الملخص	معلومات المقالة
تتمثل الأهداف الرئيسية لهذا البحث في تحديد مفهوم التسويق العصبي، وعرض أهمية ومزايا تطبيق تقنيات التسويق العصبي وتميزه على طرق التسويق السياحي التقليدية، بجانب التعرف على العوامل التي تؤثر على سلوك قرار شراء السائحين، تحديد مستويات الوعي والمعرفة بالتسويق العصبي لدى مسوقي المقصد السياحي المصري، واكتشاف العوامل التي يمكن أن تتأثر بتطبيق تقنيات التسويق العصبي. لتحقيق أهداف الدراسة تم استخدام التحليل الكمي من خلال توزيع استمارات استقصاء على عينتي الدراسة، حيث تم الحصول على 472 مفردة من السائحين و82 مفردة من مسئولي تسويق المقصد السياحي المصري. أظهرت النتائج أن التسويق العصبي يؤثر إيجاباً على كل من سلوك السائح، اتخاذ القرار بالشراء، تفضيلات السائحين، ولاء السائحين، تطوير وتحسين المنتجات السياحية، فعالية الحملات التسويقية، إستراتيجيات التسويق السياحي، وتسويق المنتجات السياحية المستدامة. كما أوضحت النتائج أن استخدام التسويق العصبي في المقصد السياحي المصري في مهده، على الرغم من الارتفاع النسبي لمستوى وعي المسوقين بالتسويق العصبي. وتساهم الدراسة في تزويد صانعي سياسات المقصد السياحي المصري برؤى كاملة حول التسويق العصبي، ويوضح ما هي أطر تطوير المنتجات السياحية، ومدى الحاجة إلى إنتاج منتجات سياحية جديدة. يحتاج مصممو تسويق المقصد السياحي المصري إلى دمج تقنيات التسويق العصبي مع أدوات التسويق التقليدي لبناء إستراتيجيات تسويقية أكثر ذكاءً، والتي من شأنها زيادة فعالية جهودهم التسويقية.	**الكلمات المفتاحية** التسويق العصبي؛ تقنيات التسويق العصبي؛ المسوقين، السائحين؛ المقصد السياحي؛ سلوك اتخاذ قرار الشراء.