EXPLORING BRAIN TOURISM DISCOURSE IN THE TOURISM AND HOSPITALITY SECTOR: REAWAKENING RESEARCH IN NEUROTOURISM

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Abstract

Purpose – This study aims to conduct a thorough and systematic evaluation of the literature in tourism and hospitality to explore the latest advancements and innovative technologies that are reshaping personalized services within the realm of neurotourism.
Methodology/Design/Approach - Data for this research was mined, using www.dimensions.ai, and analyzed using computer software called Citespace.
Findings – The research established a paucity of neurotourism research in tourism and demonstrated that several challenges including cost and expertise make it difficult to address arising literature on mindfulness tourism.
Originality of the research – the integration of neuromarketing, brain research, and neuroscience has the potential to revolutionize tourism marketing by introducing personalized approaches to services and products, overcoming the limitations of traditional market research in understanding human decision-making within the tourism industry. The integration of neuroscientific methods provides a paradigm shift in tourism marketing, enabling marketers to create personalized and emotionally resonant experiences. This shift extends beyond traditional methods, offering a deeper understanding of tourist behavior and desires.
In conclusion, the ability to personalize experiences, leverage VR technologies, and adapt in real-time to changing preferences positions brain research is a key driver for the future of tourism marketing.
Keywords Brain research; Neurotourism; Neuroscience; Neuromarketing; Neuroscientific methods, Personalization; Tourism marketing

Original scientific paper
Received 26 December 2023
Revised 13 August 2024
10 September 2024
Accepted 11 September 2024
https://doi.org/10.20867/thm.31.2.3

INTRODUCTION

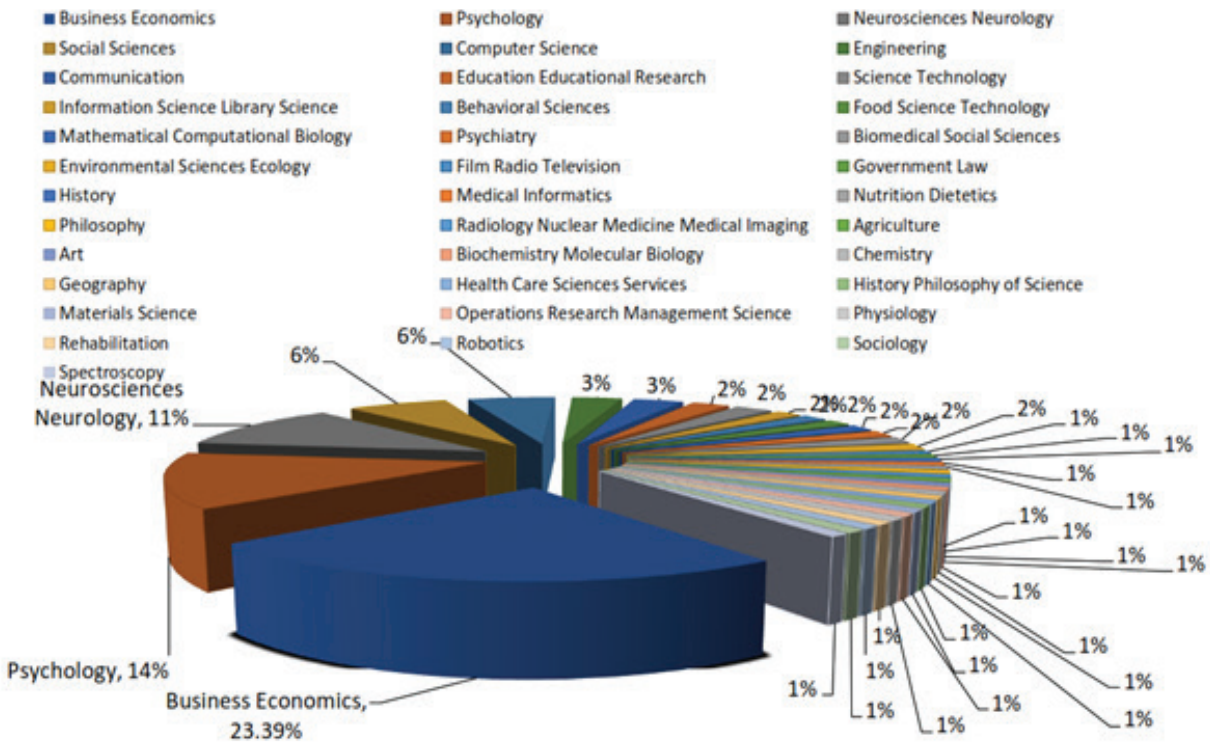
Brain tourism, or neurotourism, is an emerging field in tourism, dealing with the intersection of neuroscience and tourism, where scientific methodologies and insights from the field of neuroscience are applied to study and enhance the tourist experience. Brain tourism encompasses a wide array of activities designed to promote well-being, improve happiness, understand tourist experience, relaxation, marketing and promotion (Chang, 2019). By utilizing some physiological instrument adapted from neuroscience, neurotourism endeavors to understand how the brain responds to various aspects of travel, such as destinations, attractions, and overall tourism activities. Researchers in neurotourism use techniques like brain imaging (e.g., fMRI, EEG), and other neuroscientific methods to gain insights into the cognitive and emotional processes associated with tourism (Michael et al., 2019). Research on wellbeing, meditation retreat, mindfulness, happiness, nature therapy and fun are on the rise within tourism research, however, the application and/or use of various methods or techniques to improve cognitive functions such as memory, attention, creativity, and problem-solving is still nascent or lacking in tourism research (Özümerzifon et al., 2022). However, conventional methods in tourism research had less anticipated sophisticated instrumentalities for quantifying or assessing memory and the likes, as the methods within the field, crowded by interviews and surveys can hardly capture, or assess cognitive function, would it be able to assess product-purchase-stimulation in tourism research. For instance, it is common knowledge the heart precipitation has a linear and direct effect on danger/ bliss, yet the methods for data collection in tourism marketing, tourism economic, tourism management, and tourism psychology, do not offer any usefulness to address this concern. Hence, we look towards neuroscience and neuroscientific methods to distil such complex but common problems.

There are several physiological instruments that could measure heart rate and consumer preference, such as heart rate variability. Heart rate variability measures the variation in time between consecutive heartbeats and beat-to-beat variation has a positive relationship with admiration of a lifestyle, product or service (Özümerzifon et al., 2022). Also, positron emission tomography, electroencephalography, fMRI among others, perform different functions, which is an illusion to the traditional protocol for data research in tourism. For instance, electroencephalography enables researchers in tourism to measure electrical activity in the brain by recording the electrical impulses generated by neurons. The eye tracking technology that monitors and records the movement of a person's eyes would be able to give tourism practitioners and researchers information regarding what the tourists are more interested in, and what captures their interest less (Carter & Luke, 2020). This information in real time enables the tour guide, for instance, to know when tourists or guests are bored of a certain attraction and in time management. This is because what might be of interest to people mainly has to do with knowledge, culture, social standing, religion, occupation,

age, environment, and expectations. Thus, attractions that might be intriguing to people of 50 years and above would be quite different from those in their 20s. Moreover, another instrument for physiological measurement, the positron emission tomography involves injecting a radioactive tracer into the body to visualize metabolic activity. This is helpful for games that require adrenaline rush, for people suffering from diabetics and high blood pressure this instrument can be a game changer. However, none of these could be captured or analyzed using traditional methods in tourism research or the general management studies. Therefore, the need for market research to explore and encapsulate medium and models that foster an enabler for monitoring, recording, assessing, transmitting, and analyzing these data for consumer research is needful. Moreover, there is a general lack of research on neurotourism in tourism management journals. Despite, neurotourism having the capabilities to create a debate that may expand the field of tourism to include tourism psychology and provide for tourists emotional and physiological care, to manage tourists and enable them to have the best experience more effectively. This study addresses this gap, by contributing significantly to the ongoing academic discourse on neurotourism and the application of several of its instruments adapted from neuroscience, such as neuromarketing, neuroscientific methods, within the tourism context.

Traditionally, tourism and hospitality research has been confined to business disciplines, resulting in a narrow focus on conventional business concepts like customer satisfaction, purchase intention, and overall experience (Ji & King, 2018). Conventional research techniques, such as self-reported surveys and longitudinal studies, have limitations when it comes to capturing complex variables such as emotion and memory (Gangadharbatla et al., 2013). Therefore, incorporating neurological techniques like eye tracking and blood flow measurements is necessary for a comprehensive understanding of consumer behaviors (Bastiaansen et al., 2019). Previous research has discussed in segment some form of neurotourism. For instance, Chen. (1998) proposes a conceptual foundation for tourist choice, prioritizing activities directed at enhancing mental functioning, such as learning new languages or acquiring new skills. In contrast, Hudson, Matson-Barkat, Pallamin & Jegou (2019) advances the discourse for experiential tourism, emphasizing immersive and engaging experiences that stimulate the brain and promote cognitive well-being, including virtual reality simulations and interactive exhibits. Notably, neurotourism encompasses cognitive and experiential tourism. Furthermore, Nilashi et al.'s (2020) study delves into the implications of neuromarketing in marketing underscoring the interdisciplinary nature of neuromarketing research (refer to Figure 1). It demonstrates how neuromarketing philosophy permeates a wide range of disciplines, influencing aspects of human cognition spanning tourist/guest purchase behavior, graphic design, brain activity, facial expressions and emotions, visual representation (including TV commercials and promotional videos), decision-making processes, consumer behaviors, budgeting, and accountability. This broad influence of neuromarketing highlights its impact across various domains of human activity.

Figure 1: **Application of neuromarketing technique in different contexts**



Source: Nilashi et al. (2020)

The visual representation in Figure 1 adeptly captures the intricate and diverse characteristics inherent in neuromarketing techniques. Emphasizing the centrality of psychological publications, the figure also highlights that the primary focus of neuromarketing lies within the domain of business and economics with the highest number of publications at 23%, and psychology for about 14%. However, the framework does not provide a geographical distribution. Neurotourism, despite its promising potential, It remains a relatively understudied area (Li et al., 2023). While some studies have explored aspects such

as the positive effects of natural environments on cognitive function and the impact of international travel on creativity, there is a need for more comprehensive research to unravel the intricate relationship between tourism and the human brain (Maddux & Galinsky, 2009). Thus, the growing interest in neurotourism underscores the necessity for a holistic approach to understanding the impact of tourism on brain health, offering valuable insights for both academic inquiry and tourism practitioners. Incorporating neurological techniques, such as eye tracking and blood flow measurements, is integral for overcoming the limitations of traditional research methods in capturing complex variables like emotion and memory.

The significance of this research lies in its multifaceted contributions. This study provides an in-road for the exploration and adaptability of physiological methods in tourism research, and for improving the philosophy of consumerism, and consumer psychology. This study motivates increased research in neurotourism. Furthermore, the study introduces a branch of the experiential model known as "mindfulness tourism" in market research in tourism, while acknowledging the growing trend of mindfulness practices into tourism experiences. Virgili (2015) defines mindfulness tourism experiences as those that incorporate meditation, yoga, and other activities encouraging presence in the moment without judgment. Examples of mindfulness tourism experiences include wellness retreats like the Bali Silent Retreat and the Shambhala Mountain Centre. However, Grossman (2011; 2015) and Mercer (2011) raise concerns that the commercialization of mindfulness practices may reduce them to superficial relaxation tools, neglecting their potential for personal growth and self-awareness. Moreover, the manuscript introduces the emerging concept of neurotourism, which is a largely unexplored field that integrates neuroscience with tourism. This field aims to understand the cognitive and emotional responses of tourists through neuroscientific methods such as brain imaging and physiological measurements. By focusing on this innovative intersection, the paper contributes fresh perspectives to tourism research, expanding beyond traditional concepts like customer satisfaction and purchase intention. This is a novel approach added a layer of advancement in neurotourism research, and by addressing the growing need for interdisciplinary studies in the tourism sector. The subsequent literature review and methodology discussions further underscore the importance of exploring the intersection of neuromarketing and tourism.

1. LITERATURE REVIEW

Neurotourism as a field of research emanates from the discovery of the intersection between neuroscience and tourism, to foster an understanding that encapsulates consumer psychology and psychosocial behavioral patterns and consumption of guests and tourists (Li et al., 2023). Several instrumentalities exist for data collection for recording, analyzing and presentation of neurological feedback, which are not consistent with traditional media in social and management disciplines. One of the more common instruments in tourism and market research is the neuromarketing technique. Although neuromarketing has been touted towards advertising and the resultant effect of commercials on purchase, however, it goes beyond it.

Neuromarketing's roots trace back to the late 1990s, with pioneers like Gerald Zaltman and Gemma Calvert conducting early experiments (Underhill, 2009). The term "neuromarketing" gained prominence in 2002, marking the formal recognition of this interdisciplinary field. The involvement of companies like Innerscope Research and Nielsen Consumer Neuroscience further propelled its evolution (Sebastian, 2014; Carbone, 2004). Neuromarketing stands at the intersection of neuroscience and marketing, it has emerged as a revolutionary field in consumer psychology, behavioral science, neuroeconomics neuroethics and subliminal stimuli, providing insights into the intricacies of consumer behavior that traditional methods often miss (Georges et al., 2013.; Harrell, 2019). By employing techniques such as brainwave monitoring, eye tracking, and skin response measurement, neuromarketing delves into the subconscious, in order to predict and understand the decision-making processes that drive consumer choices (Karmarkar, 2011). Neuromarketing techniques have been applied in various domains, from product design testing and user experience evaluation to A/B testing for advertising effectiveness (Venkatraman et al., 2012). Its ability to optimize calls to action, assess the neural impact of images in advertisements, and contribute to rebranding campaigns showcases its versatility in guiding marketing strategies (Hamelin et al., 2017).

Studies have shown that higher memory encoding at key branding correlates with an 86% increase in sales. Brands using neuromarketing report an average 16.3% increase in revenue, attributing its effectiveness to predicting purchase intent accurately (Hamelin et al., 2020; Bojanowska, & Kulisz, 2023; Singh, & Shukla, 2024). The revelation of subconscious insights and cost-effectiveness further positions neuromarketing as a valuable tool for marketers seeking a deeper understanding of their audience. Despite its promises, neuromarketing faces skepticism and criticism. Concerns about manipulation, accusations of pseudoscience, and claims that it merely validates existing marketing knowledge are challenges the field confronts. The ethical dimensions of potentially manipulating consumer behavior raise questions about the responsible use of neuromarketing techniques. Pepsi Paradox, Hormone Manipulation and Sleep Nudging are primes instances of scholarship in neuromarketing. Therefore, understanding the dimensionalities using SWOT analysis would further deepen research on neuromarketing (see fig. 2).

Figure 2: **SWOT analysis of neuromarketing**

While neuromarketing is praised for its nuanced understanding of consumer behavior, leveraging subconscious responses, and providing moment-to-moment insights, its adoption is not without challenges. The initial expenses associated with neuro technologies can be a barrier, especially for smaller businesses, leading to reliance on consulting firms (SWOT Analysis: Neuromarketing Research Presents a Financial Hurdle). Critics view neuromarketing with skepticism, questioning its scientific credibility and raising concerns about potential manipulative uses (SWOT Analysis: Criticism and Ethical Concerns Surround Neuromarketing). Despite these challenges, advancements in neuromarketing technology may enhance accessibility and reduce costs, fostering broader adoption by companies of varying sizes (SWOT Analysis: Anticipated Integration of Neuromarketing with Virtual Reality and Increased Accessibility). However, the integration of medical technologies raises privacy concerns, potentially necessitating future regulatory scrutiny and ethical standards (SWOT Analysis: Privacy Concerns and Regulatory Scrutiny). In the face of skepticism from traditional marketers, convincing them to embrace neuromarketing and overcoming resistance is crucial for its widespread adoption (SWOT Analysis: Skepticism of Traditional Marketers). Despite these obstacles, the potential for a more profound understanding of consumer preferences and the positive impact on customer experience positions neuromarketing as a valuable tool, particularly when integrated with traditional methods (SWOT Analysis: Integration with Traditional Methods and Holistic Approach). Overall, neuromarketing, despite its controversies, is positioned to grow significantly in the coming years. It offers a unique perspective on consumer behavior, leveraging neuroscience to provide insights that traditional methods may overlook. The industry is evolving, and its impact on marketing strategies is expected to increase as technology advances. However, critics argue that neuromarketing does not offer substantially new information and that marketers can rely on intuition. However, neuromarketing goes beyond simple validation and provides insights that traditional methods may lack. Furthermore, issues of manipulations, ethical concerns, hype than genuine neuroscience, privacy issues among others are some of the distractions limiting the acceptability of use of this neuroscientific method, neuromarketing.

2. METHOD

The methodology through which data were gathered and analyzed herein, a greater detail of the protocol followed is reflected below.

2.1. Data Collection

Data Source Selection: In this study, scientometric analysis was used to assess the knowledge structure of neuromarketing in tourism research. The initial step involved synthesizing scholarly literature and findings related to “neuromarketing” within the context of “tourism journals.” Reducing the number of outliers emanating from other disciplines might result in some forms of misperception, misgivings or scholarly noise that may derail the aim of this research.

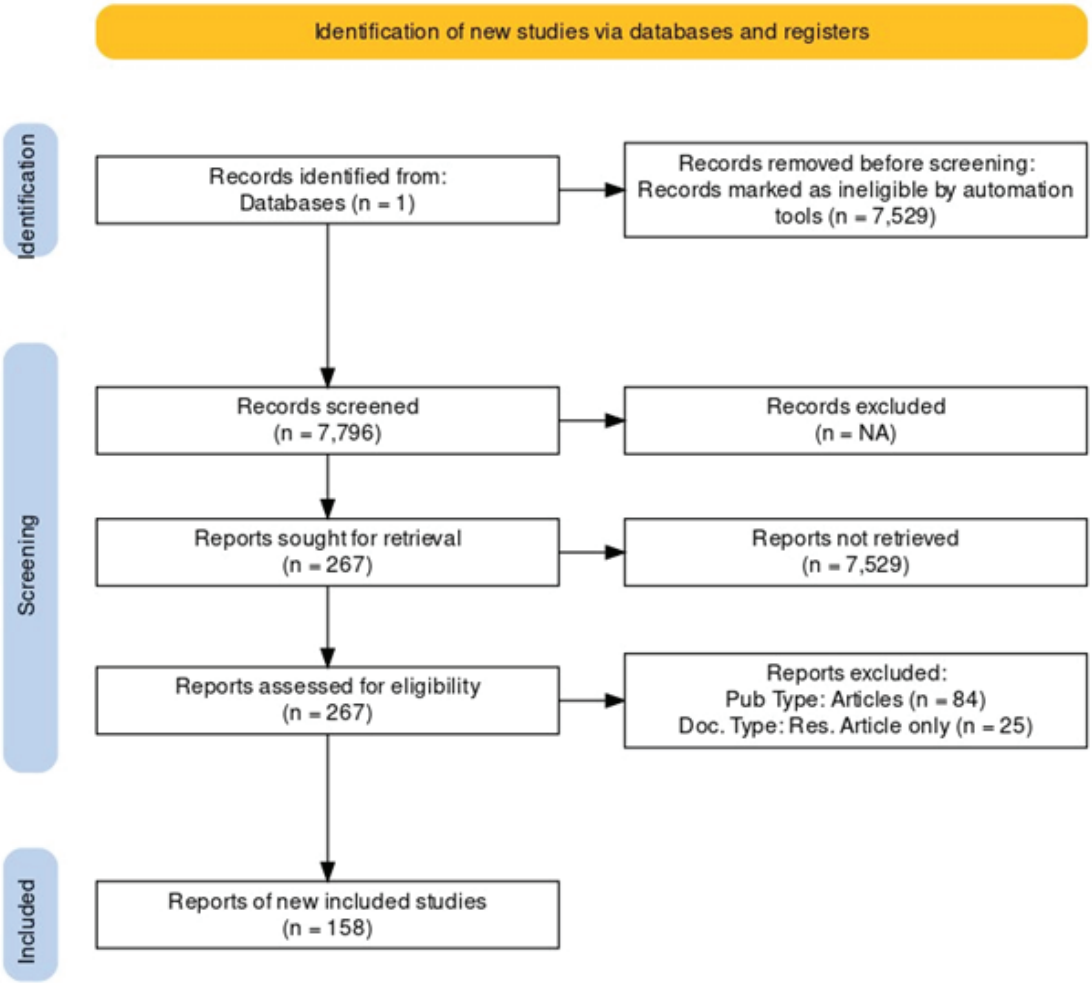
Choice of Database: Several databases, including Microsoft Academic, SciVaL, and Web of Science are commonly used for academic research data collection. However, we opted to use Dimensions AI platform due to its recognized reliability and accuracy among several databases (Digital Science & Research Solutions Inc, 2023). This choice was made to ensure the highest level of data quality.

Data Retrieval: The study collected research papers exclusively from Dimensions AI. A preliminary search on this platform revealed a total of 7,795 research papers related to neuromarketing from different fields of research. This large pool of data was the starting point for our discovery but was witted by applying the PRISMA protocol.

Data Selection Using PRISMA
Reason for PRISMA Protocol: To streamline and ensure transparency in the data selection process, the study adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, a well-established method for systematic reviews that provides a structured approach to data selection and reporting.

Step 1: Field of Study Reduction using Dimensions AI: Subsequently, the data was reduced because we specified our field of study as tourism. The data went from 7,796 to 267 (see fig. 2). This step resulted in a substantial reduction in the dataset. The purpose of selecting a specific research field was to streamline the research into relevant research studies within the boundaries of tourism.

Figure 3: **PRISMA Approach**



Step 2: Screening for Eligibility: Following the refinement of the Field of Research (FOR) classification, the subsequent phase involved a systematic screening of the research papers. This screening process entailed the segregation of monographs, edited books, regular books, and conference proceedings from articles. Further refinement was achieved by distinguishing between article reviews and original research articles based on document type. This curation of the dataset resulted in a significant reduction, whittling down the initial 267 entries to a more focused and relevant set of 158 research articles.

Step 3: Reporting Final Outcomes: The culmination of our rigorous data pruning process yielded a refined set of 158 research papers. These curated research articles served as the foundational corpus for the in-depth analysis conducted in the course of this study. This carefully curated selection of research papers formed the core dataset that underpinned our comprehensive research investigation.

Justification for Data Parameters
Database Choice: Dimensions AI was selected due to its reputation for reliability and accuracy in aggregating and linking data. This choice was made to ensure that the data collected would provide a high level of data quality for our scientometric analysis.

Field of Study: The field of study-based refinement is to ensure that only research materials that are directly relevant linked to neuromarketing in the context of tourism are selected. This Narrowing down of the dataset was essential to ensure that the collected data was highly aligned with the research objectives aim and could provide meaningful insights.

This study captures the most pertinent contributions from the last three decades of research neuromarketing. This approach provides valuable insights into current trends and potential future research directions within the neurotourism domain in market research. The primary aim was to minimize the inclusion of outliers from unrelated disciplines, as their presence could potentially lead to misinterpretations, uncertainties, or scholarly disruptions that might deviate from the core objectives of this research.

Data Analysis Using CiteSpace
CiteSpace Software: To analyze the collected data, we employed the CiteSpace software package version 5.8.R1. CiteSpace is a widely recognized tool for constructing scholarly network connections and evaluating variable association levels.

Justification for CiteSpace Use: CiteSpace is preferred for its ability to create scholarly network connections and evaluate variables' associations. It offers insights into the homogeneity, precision, and connectivity of clusters in the constructed scholarly networks. This software provides both conceptual and structural metrics, making it an appropriate choice for scientometric analysis (Chen, 2014).

Key Metrics: The study focused on several key metrics provided by CiteSpace, including betweenness centrality, modularity Q, and silhouette score. These metrics offer insights into network flow, cluster relevance, and the goodness of clusters.

Cluster Analysis: The dataset was analyzed to identify clusters or themes in neuromarketing research within tourism. By mapping keywords using Locally Linear Regression (LLR) and Term Frequency-Inverse Document Frequency (TFIDF), the study aimed helps to uncover build thematic trends framework from their literature.

Silhouette Score: The silhouette score was used to assess the goodness of clusters, with values ranging from -1 to 1. This helped determine the level of homogeneity within identified clusters.

By providing a comprehensive account of the data collection process, justifying data parameters, and explaining the use of CiteSpace and its associated metrics, this methodology section strives to enhance the clarity and transparency of the research process.

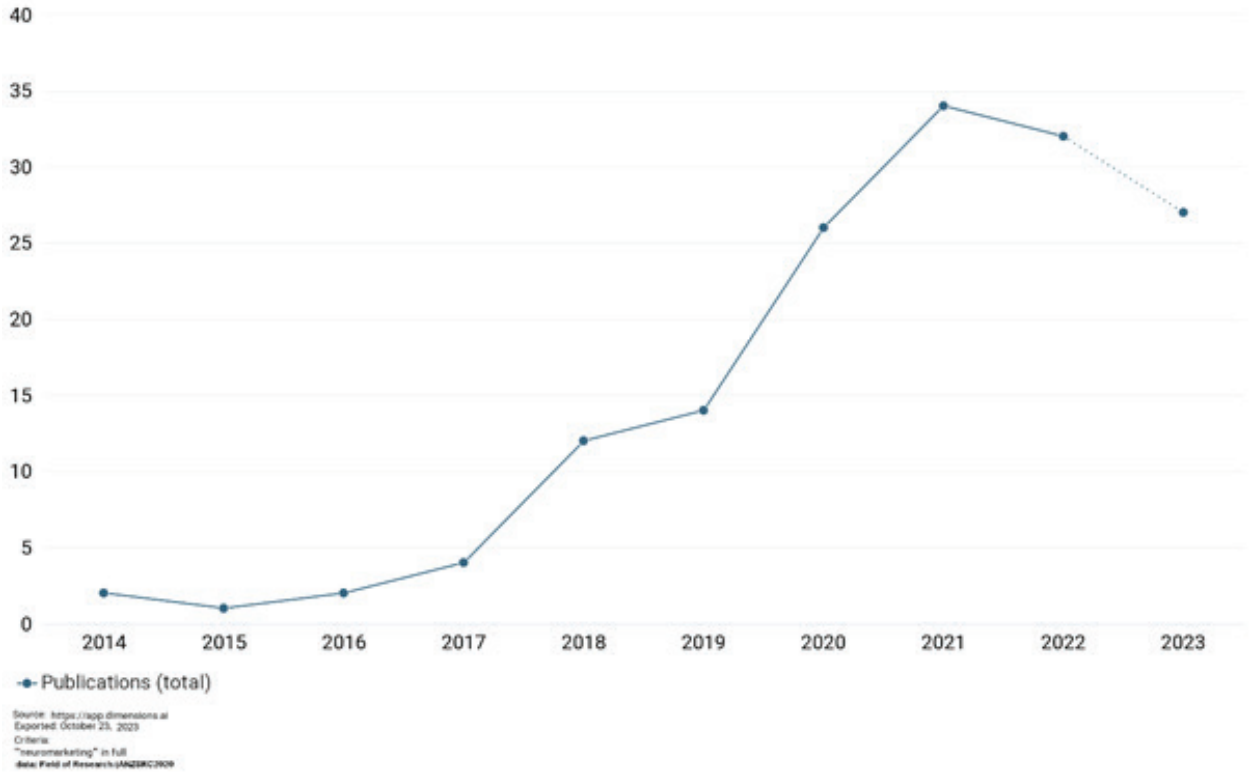
3. RESULTS

This results section serves the crucial purpose of presenting the findings and outcomes of the research study. In this section, we provided a clear and organized summary of the data they collected and analyzed. The following would be explored herein, presentation of data and graphical elements, organization, statistical analysis, interpretation, discussion of outliers or anomalies and limitations.

3.1. Descriptive analysis

Citation Trends
Figure 4 serves as an illustrative representation of the citation trends observed in the realm of neuromarketing research within tourism, commencing from the year 2014, which signifies the birth of this particular research niche. The analysis was carried out on a dataset consisting of 158 research papers utilized in the study. By employing the advanced capabilities of Dimensions AI and VOS viewers, as depicted in Figure 4, an analysis of citation patterns discusses a visible and progressive upsurge in the acknowledgement and application of neuromarketing principles within tourism research.

Figure 4: **Citation trend in neuromarketing in tourism research**



The data presented reveals a rather humble beginning, characterized by a meagre count of citations amounting to less than five in the year 2014. Nevertheless, it is worth noting that a discernible upward trend transpired in the subsequent years (2017), culminating in a zenith of 34 citations in the year 2021. Unfortunately, this pinnacle was subsequently accompanied by a decline in the subsequent years. The observed trajectory of citations indicates that, although the significance of neuromarketing in the fields of business, economics, and management is apparent, there has been a noticeable decline in research attention towards this amalgamation of neuroscience and marketing, specifically in tourism, in recent years.

Collaborative Networks

Figures 5 and 6 illustrate the co-authorship analysis by institution and citation analysis by journal for neuromarketing in tourism research. Co-authorship analysis by institution is a method used to examine the collaboration between different academic or research institutions in academic publications (Ponomariov & Boardman, 2016). This analysis provides insights into how often institutions collaborate on research projects and the strength of their collaborative ties (Cainelli et al., 2015). The basic equation for co-authorship analysis by institutions involves calculating a collaborative index that quantifies the degree of collaboration between institutions. The equation is as follows:

$$Collaborative\ Index\ (CI) = \frac{(Number\ of\ co-authored\ publications\ between\ two\ institutions)}{(Total\ publications\ of\ both\ institutions)}$$

In this equation:

Number of co-authored publications between two institutions: This is the total number of research papers, articles, or publications where authors from two different institutions have collaborated. Each co-authored publication contributes to the collaborative index.

Total publications of both institutions: This is the sum of all research publications produced by both institutions individually.
The Collaborative Index (CI) is a measure of the collaborative intensity between two institutions. A higher CI indicates a stronger collaborative relationship, while a lower CI suggests less frequent collaboration.

Co-authorship analysis by institutions was applied to various fields of research to understand the network of collaborations among institutions and to identify key partners in research endeavors. This analysis helps researchers, institutions, and policymakers make informed decisions about collaborative research opportunities and resource allocation. Figure 5 helps us with co-author-institutional mapping, it will be irrelevant to also provide the co-author-institutional matrix. Therefore, using the visualization, we discovered among other things that Auckland University of Technology appears to be the most collaborative institution based on numbers of co-authorship and institutional calculations by VOS viewers, on issues relating to neuromarketing in tourism research.

Institutional Collaboration

The analysis of co-authorship by the institution offers a fascinating glimpse into the global landscape of collaborative research. Figure 5 provides a snapshot of institutions from various corners of the world, showcasing their collective impact on academic scholarships on neuromarketing in tourism research.

In this output, Griffith University in Australia stands out with six publications and an impressive total of 200 citations. This translates to a substantial mean of 33.33 citations per publication, indicating a strong research influence. Similarly, the Hong Kong Polytechnic University (HKPU) in China demonstrates a robust impact, boasting a mean of 51.17 citations. These findings underscore the global reach and substantial contributions of these institutions to co-authored research.

Conversely, institutions like Sun Yat-sen University in China show lower publication and citation counts, resulting in a comparatively lower mean. However, it's crucial to consider the diverse research focuses and the level of engagement in co-authored projects.

In examining the data, Bournemouth University (BU) in the United Kingdom emerges as a standout institution, with a mean of 143.33 citations. This signifies not only a dedication to collaborative research but also the significant influence of their contributions. It's important to recognize that this impact extends beyond the institution itself, benefiting the broader academic community.

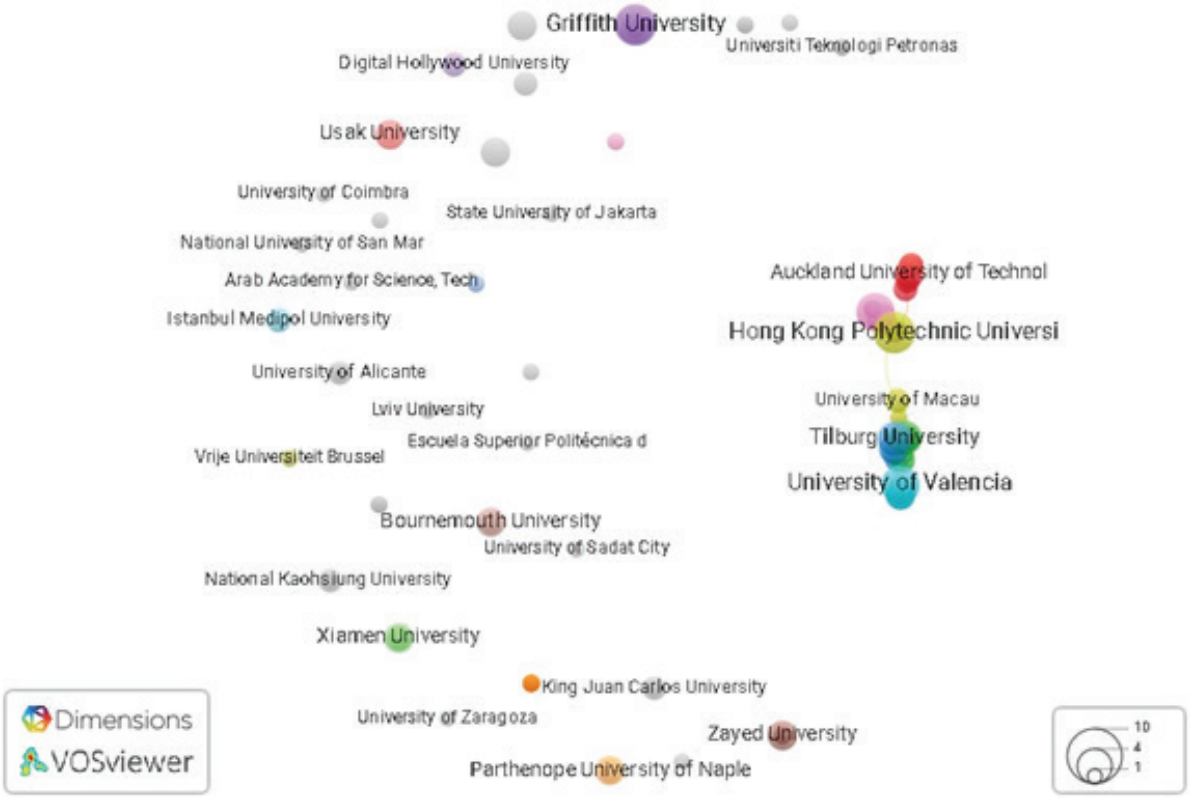
Overall, co-authorship by an institution unveils the dynamic and diverse nature of collaborative research. Each institution brings a unique perspective and expertise, contributing to the global dissemination of knowledge. This collective effort propels academic research forward, leading to innovative discoveries and advancements across disciplines.

Figure 5: Co-authorship analysis by institution

Journal Impact Figure 6 provides a comprehensive analysis of scholarly impact and citation performance within neuromarketing among journals. The number of publications, total citations, and mean citations per publication are key indicators of the influence and reach of these journals.

From the analysis in tourism research, Tourism Management and the Journal of Destination Marketing & Management emerge as leaders with ten publications each. What sets them apart is their remarkably high mean citations per publication, at 52.70 and 54.20, respectively. This highlights their exceptional research quality and their ability to consistently attract scholarly attention.

Figure 6: **Citation analysis by journal**



Sustainability, with eight publications, maintains a mean citation rate of 10.13, signifying its pivotal role in promoting sustainable tourism and environmental awareness within academic circles. Nonetheless, the International Journal of Contemporary Hospitality Management, with seven publications and 221 citations, is a strong contender. The mean citation rate of 31.57 underscores its significance, indicating its consistent ability to publish research that garners substantial attention.

The Tourism Review, although having only four publications, stands out with a remarkable mean citation rate of 114.00. Other noteworthy journals include Journal of Travel Research and Tourism Recreation Research, each with four publications and mean citation rates of 29.50 and 31.75, respectively, demonstrating a harmonious balance of quality and quantity.

In contrast, journals such as Cuadernos de Turismo and Journal of Hospitality and Tourism Insights have limited or no citations, indicating specialized focuses or the need for greater visibility.

Overall, this citation analysis emphasizes the vital role these journals play in disseminating and advancing knowledge within the field of tourism research. The metrics provide valuable insights into the journals' research focus and academic impact.

3.2. Citation analysis

Citation analysis is a fundamental tool in the realm of bibliometrics and scientometrics, and it plays a pivotal role in evaluating the scholarly impact and relevance of academic journals (Mejia et al., 2021). By scrutinizing the number of citations, a journal's articles receive, researchers and institutions gain valuable insights into the prominence and influence of journals within their respective fields. There are several metrics and methodologies involved in citation analysis by journal, some of them would include:

- Impact Factor (IF): The impact factor is perhaps the most widely recognized metric in the world of scholarly publishing. It is calculated by dividing the number of citations a journal's articles receive in a specific year by the total number of articles published in the preceding two years. For instance, if a journal has an impact factor of 3.0 for the year 2022, it means that, on average, articles published in that journal in 2020 and 2021 were cited three times in 2022.
- Citations per Document (CpD): While the impact factor provides a journal-level perspective, the citations per document metric offers a more granular view. It calculates the average number of citations received by documents published in a particular journal. This metric is particularly useful for understanding the citation impact of individual articles.
- Hirsch Index (h-index): The h-index is a composite measure that assesses both the quantity and impact of a journal's publications. A journal's h-index of, say, 10 indicates that it has published at least ten articles that each garnered ten or more citations.
- Citation Count: This metric is straightforward—it represents the total number of citations that all documents published in a journal have received. It's an absolute measure of a journal's citation impact.
- Eigenfactor Score and Article Influence Score: Eigenfactor scoring accounts for the influence not only of direct citations but also of citations from highly influential journals. The Article Influence Score divides the Eigenfactor score by the number of articles published, providing a measure of a journal's average article influence (Mejia et al., 2021; Skorochod et al., 2023; Ali et al., 2023).

Citation analysis by journal is not limited to these metrics; it also encompasses the examination of trends in a journal's citation impact over time, comparisons across different fields or categories, and even journal rankings based on various metrics. Understanding these metrics and their implications is indispensable for making informed decisions in academic publishing and research evaluation.

3.3. Co-authorship by Scholars

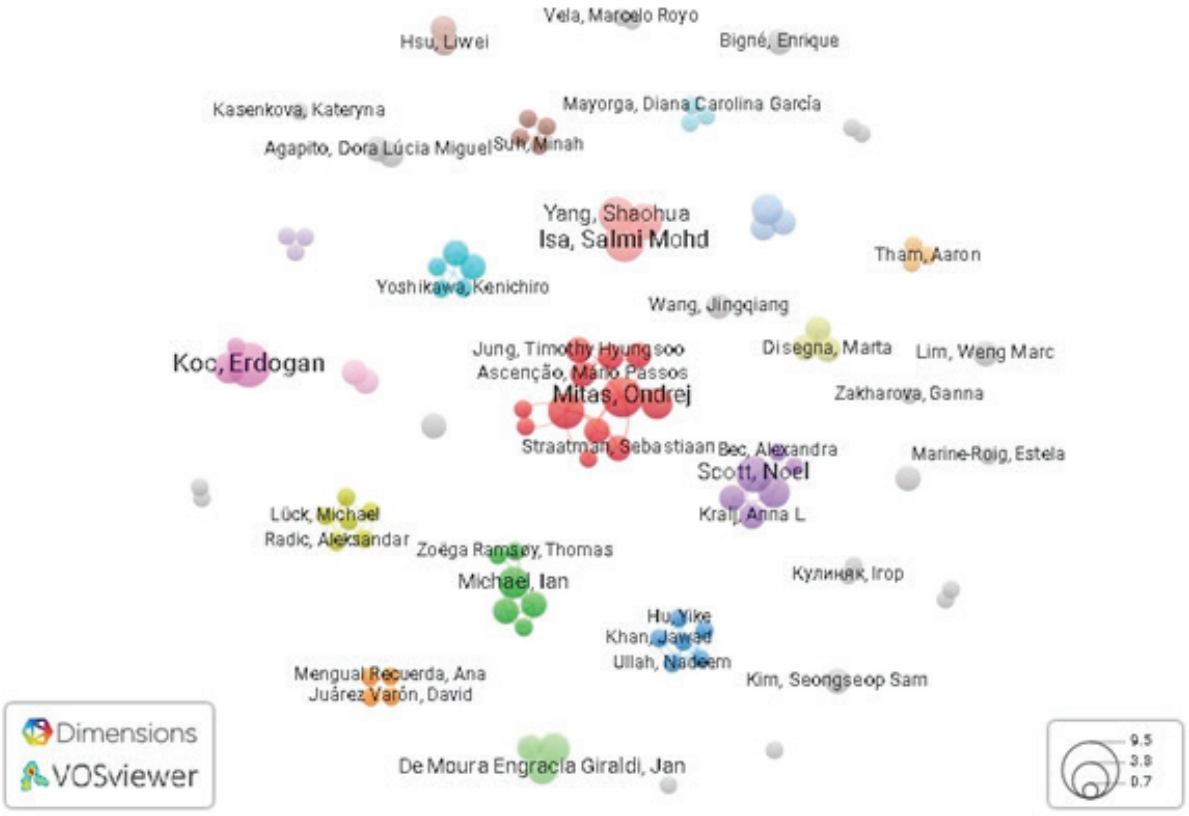
This analysis delves into the collaborative efforts of prominent scholars in the field of tourism research. Figure 7 presents key information about their affiliations, publications, total citations, and mean citations per publication. This data provides insights into the impact and collaborative spirit of these researchers.

At the forefront is Erdogan Koc from Bahçeşehir University in Turkey. He has contributed significantly with six publications and an impressive total of 169 citations. His mean citation rate of 28.17 underscores the quality and relevance of his work in the field. Second to Koc research outcomes, Ondrej Mitas of Utrecht University in the Netherlands standout with five publications and 244 citations, and citation rate of 48.80.

Other scholars such as Scholars from Universiti Sains Malaysia, Salmi Mohd Isa, and Thurasamyh Ramayah, have produced five publications each. They both secured 128 citations, resulting in a mean citation rate of 25.60. While Marcel and Bastiaansen from Tilburg University in the Netherlands maintains a notable presence. He has four publications with a total of 217 citations, yielding a high mean citation rate of 54.25.

These researchers, along with others in the figure, play pivotal roles in advancing tourism research. Their collaboration and impactful work contribute to academic discourse and enrich the field of neuromarketing with valuable insights and knowledge in tourism research.

Figure 7: **Co-authorship analysis by authorship**



Erdogan Koc's (2021) study, "Intercultural competence in tourism and hospitality: Self-efficacy beliefs and the Dunning-Kruger Effect," provides a significant departure from, and enhancement to, existing research in several key areas within neuromarketing and tourism. Firstly, Koc's work challenges the predominant focus in neuromarketing on emotional and cognitive responses to marketing stimuli by introducing the Dunning-Kruger Effect into the discourse. Existing research, such as that by Kahneman (2011) and Cialdini (2009), often concentrates on how emotional responses and cognitive biases, like availability heuristic or confirmation bias, affect consumer behavior. Koc's application of the Dunning-Kruger Effect, which examines the discrepancy between perceived and actual competence, broadens the scope by incorporating self-perception dynamics into the analysis. This addition disrupts the conventional emphasis on internal cognitive and emotional processes alone, proposing that tourists' self-assessment inaccuracies also play a crucial role in their engagement with personalized marketing strategies. The study further elaborates on the role of cultural competence in neuromarketing, which states that traditional neuromarketing research has predominantly overlooked cultural factors in favor of universal psychological principles (e.g., Berlyne, 1960; Dolan & Dalgleish, 2009). Koc's emphasis on intercultural competence and self-efficacy beliefs introduces a nuanced understanding of how cultural self-perceptions impact marketing effectiveness. This shift highlights the limitations of applying one-size-fits-all approaches to diverse cultural contexts, as seen in studies like those by Hofstede (2001) and Schwartz (2006), which generally do not integrate self-efficacy as a variable influencing marketing response. In addition, Koc's research further disrupts conventional methodologies by incorporating measures of cultural self-efficacy and perceptions, which are not commonly addressed in traditional neuromarketing studies. For instance, studies by Plous (1985; 1993) and Tversky and Kahneman (1974) have not fully explored how cultural self-perception influences neuromarketing outcomes. Koc's methodological innovation challenges these traditional approaches and advocates for a more comprehensive assessment of how tourists' beliefs about their own cultural competence impact their interaction with marketing strategies. Koc's works offer a broader perspective that encompasses self-perception and cultural factors. In order to further comprehend the import of these explorations, it is imperative to take note of figure 7 where we would apply content analysis in order to demystify the complexities and themes generated using Citespace software.

3.4. Content analysis

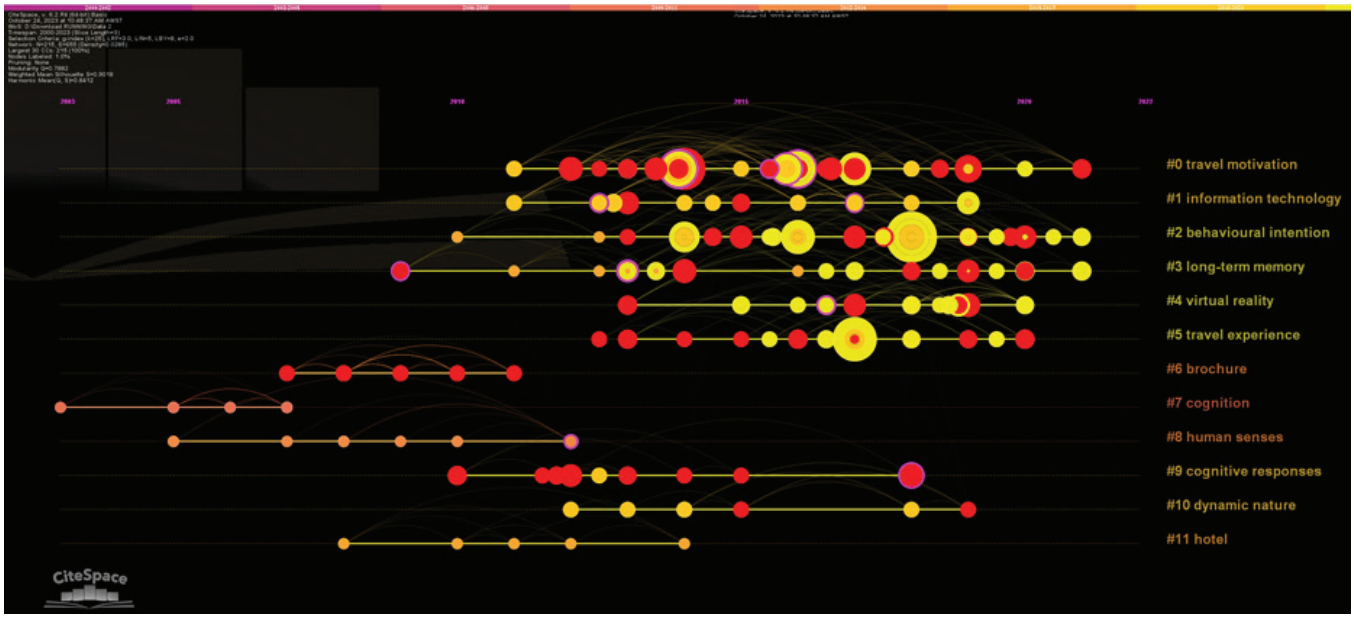
Figure 8 visual representation from CiteSpace software produced twelve themes, which includes tourism motivation, information technology, behavioral intention, long-term memory, virtual reality, travel experience, brochure, cognition, human senses, cognitive responses, dynamic nature, and hotel. These twelve factors align towards two cerebral arguments in this research, with the first dealing with the personalization of service or product and the second on methodological transformation (see Table 1).

Table 1: **Personalization of tourism elements and methodological significance**

Term	Personalization of Product or Service	Methodological Significance or Transformation	Scholars
Information Technology	Enables personalized content delivery, user profiling for tailored experiences	Transformative in data collection, analysis, and delivery of personalized content through advanced technologies	Knani, akoui, S., & Ladhari, (2022), Xiang et al. (2015)
Behavioural Intention	Influences personalized offerings based on predicted user preferences	Analysed to understand user preferences and enhance personalization strategies	Ajzen (1991), Fishbein. & Ajzen (1975), Venkatesh et al. (2003)
Long-Term Memory	Used to create personalized experiences by catering to individual preferences	Studied to understand how memories influence travel choices and improve personalization	Meng & Choi, (2019), , Chung & Buhalis (2008), Park, & Tussyadiah (2017)
Virtual Reality	Facilitates immersive and personalized virtual travel experiences	Transforms the way destinations are showcased, providing personalized virtual tours	Yung & Khoo-Lattimore (2019), Beck et al. (2019)
Travel Experience	The core of personalization, as services are tailored to enhance user experience	Analysed to identify patterns, preferences, and optimize personalization algorithms	Neuhofer & Buhalis. (2021), Buhalis & Gretzel (2015)
Brochure	Traditional method for delivering static information; evolving for personalization	Transformed into dynamic, personalized content delivery through interactive and tailored brochures	Kim & Fesenmaier (2017), **Xiang**, et al. (2015), Xiang & Fesenmaier (2017)
Cognition	Understanding tourist decision-making processes for personalized recommendations	Methodologically significant in studying cognitive responses for more effective personalization strategies	Kahneman (2011), Tversky, & Kahneman (1974), Cialdini (2009)
Human Senses	Personalization involves catering to sensory preferences for a richer experience	Studied to enhance virtual and physical experiences by appealing to individual senses	Bastiaansenet al. (2019), Poels & Dewitte (2008), Shukla (2019)
Cognitive Responses	Analysed to tailor services that align with individual cognitive preferences	Significance lies in understanding cognitive reactions and optimizing offerings	Wang et al. (2018), Mattila et al. (2014), Tanford et al. (2012)
Dynamic Nature	Reflects the adaptability of services to changing preferences and needs	Methodologically, requires continuous data collection and adaptive algorithms for real-time personalization	Buhalis & Law (2008), Gretzel et al. (2015)
Hotel	Personalization in hospitality involves tailored services and room preferences	Methodologically, involves data-driven insights for optimizing hotel offerings based on individual preferences	Kandampully et al. (2018), Su, Swanson & Chen, (2016).

Table 1 shows that in the realm of tourism, the personalization of products and services has become an integral facet of enhancing the overall traveler experience. Leveraging Information Technology (IT), destinations and service providers can now deliver personalized content and tailor experiences based on user profiles, aligning with the evolving landscape of e-tourism and digital transformation in the hospitality sector (Buhalis & Law, 2008). Behavioral intention, a crucial determinant in this landscape, influences the creation of personalized offerings by predicting and responding to user preferences, drawing from insights into consumer behavior within the context of tourism (Guttentag, 2016). Further, long-term memory plays a pivotal role, as it is strategically utilized to fashion personalized experiences that resonate with individual preferences, contributing to a nuanced understanding of how memories shape travel choices (Knani, Echchakoui & Ladhari (2022).

Figure 8: **Visualization of the document co-citation network publication timelines and spotlight (Modularity Q=0.7565; Average silhouette score = 0.9283 (Q, S=0.8336). N**



Methodologically, this shift towards personalization is underpinned by the transformative capabilities of IT in data collection, analysis, and the delivery of personalized content. This transformation is consistent with the broader concept of digital transformation within tourism research, emphasizing the pivotal role of advanced technologies in reshaping, the industry (Gretzel et al., 2015; Gretzel, Sigala, Xiang & Koo, 2015). Analyzing behavioral intention becomes methodologically significant as it provides valuable insights into user preferences, thus informing and optimizing personalization strategies—a phenomenon increasingly explored through the lens of behavioral analytics in tourism research (Sigala, 2017). Moreover, the methodological significance of studying long-term memory is underscored by its potential to unravel the intricate interplay between memories and travel choices, aligning with cognitive psychology theories applied to tourism (Pearce, 2020). The amalgamation of these factors not only reflects the current state of personalization in the tourism landscape but also emphasizes the methodological transformations required for a more nuanced understanding, as gleaned from established literature, concepts, and theories in the field.

To delve deeper into this study's exploration, the categorization of the twelve themes was based on their inherent similarities and relationships within the context of the two emergent themes in neuromarketing in tourism research, which are personalization and methodological advancement in tourism research.

3.5. Emergent Themes: Personalization and Methodological Advancements in Tourism Research

The intersection of personalization and methodological advancements in tourism research heralds a paradigm shift, fundamentally transforming how travel experiences are curated and analyzed. This shift aligns with the growing demand for tailored, immersive experiences that resonate deeply with individual preferences and cognitive responses. As tourism research evolves, these themes are increasingly recognized as pivotal in enhancing the overall traveler experience.

3.6. Personalization in Tourism

Personalization in tourism involves customizing travel experiences to meet the unique needs and preferences of individual travelers. This approach is grounded in the understanding that modern tourists seek more than generic offerings; they desire experiences that reflect their personal interests, values, and expectations. The advent of digital technologies has significantly facilitated this trend. For instance, personalized recommendations driven by artificial intelligence (AI) and machine learning algorithms analyze user data to suggest tailored travel itineraries, accommodations, and activities (Gretzel et al., 2020; Knani, Echchakoui & Ladhari 2022). Recent studies have highlighted the role of big data in personalization. By leveraging data from social media, booking patterns, and online reviews, tourism businesses can gain insights into customer behavior and preferences (Huang et al., 2017). This data-driven approach enables the creation of highly personalized marketing campaigns and service offerings, enhancing customer satisfaction and loyalty (Li et al., 2018). Virtual reality (VR) and augmented reality (AR) technologies also play a crucial role in personalization. These technologies offer immersive pre-travel experiences, allowing potential tourists to explore destinations virtually before making a decision (Yung & Khoo-Lattimore, 2019). Such experiences not only help in setting realistic expectations but also in tailoring the actual travel experience to align with the virtual explorations.

3.7. Methodological Advancements

The methodological advancements in tourism research are equally transformative. Traditional research methods, such as surveys and interviews, are being complemented and, in some cases, replaced by more sophisticated techniques. Neuromarketing, for example, utilizes tools like functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) to understand the subconscious reactions of tourists to different stimuli (Bastiaansen et al., 2019). These insights are invaluable in designing experiences that cater to the cognitive and emotional needs of travelers. Moreover, eye-tracking technology and facial expression analysis provide real-time data on how tourists interact with their surroundings, offering deeper insights into their preferences and behaviors (Wang et al., 2018). Such data is instrumental in refining the design and delivery of tourism services. The integration of Geographic Information Systems (GIS) with big data analytics represents another significant advancement. GIS allows researchers to analyze spatial and temporal patterns in tourism activities, providing a granular understanding of tourist movements and behaviors (Park et al., 2020; Xu et al., 2021). This information is critical for destination management organizations (DMOs) in optimizing resource allocation and enhancing visitor experiences.

3.8. Paradigm Shift in Tourism Research

The convergence of personalization and methodological advancements signifies a paradigm shift in tourism research. This shift moves away from a one-size-fits-all approach towards a more nuanced understanding of the diverse needs and preferences of tourists. It underscores the importance of leveraging advanced technologies and data analytics to create personalized, immersive experiences that resonate on a deeper, cognitive level (Knani, Echchakoui & Ladhari 2022). Such a shift has profound implications for the tourism industry. By embracing personalization and methodological advancements, tourism businesses can enhance their competitive edge, foster greater customer satisfaction, and drive repeat visitation. Furthermore, it promotes a more sustainable form of tourism, where resources are optimally utilized, and tourist experiences are enhanced through thoughtful, data-driven planning and execution (Gretzel et al., 2020). Overall, the emergent themes of personalization and methodological advancements are reshaping the landscape of tourism research. They highlight the importance of creating tailored, immersive experiences that align with the evolving expectations of modern travelers. As the industry continues to innovate, these themes will undoubtedly play a critical role in driving future developments and ensuring the sustained growth and relevance of tourism research.

4. FINDINGS

The findings of this research are balkanized into two sections in tandem with the aim of evaluating literature in tourism and hospitality to explore and understand the latest advancements and innovative technologies that are reshaping personalized services within the realm of neurotourism. The first reflects the descriptive findings from the research based on numbers, while the second would tend to reflect the conceptual findings:

Descriptive Findings

- Citation Trends: Neuromarketing in tourism research saw a progressive increase in citations from 2014, peaking at 34 citations in 2021, but experiencing a decline thereafter.
- Institutional Collaboration: Co-authorship analysis by institutions shows that universities such as Griffith University and Auckland University of Technology are highly collaborative, indicating strong interdisciplinary and inter-institutional research efforts in neuromarketing within tourism.
- Prominent Journals: Tourism Management and the Journal of Destination Marketing & Management are leading journals in this field, evidenced by their high mean citations per publication.
- Influential Scholars: Erdogan Koc and Ondrej Mitas are prominent contributors to the field, with high citation rates for their publications, suggesting their research is highly regarded and widely applied.
- Themes Identified: Content analysis identified twelve key themes in neuromarketing research, including tourism motivation, information technology, behavioral intention, long-term memory, virtual reality, travel experience, brochures, cognition, human senses, cognitive responses, dynamic nature, and hotels.

Conceptual Findings

By analyzing emerging trends, methodologies, and applications of neuromarketing, the research uncovers that neuromarketing enhance the creation of tailored, immersive travel experiences.

- Contribution of Key Scholars: The significant contributions of scholars like Erdogan Koc and Ondrej Mitas demonstrate the importance of individual research efforts in driving forward the understanding and application of neuromarketing in tourism.
- Emphasis on Personalization: The themes identified through content analysis highlight the importance of personalization in creating tailored and immersive tourist experiences, suggesting that future research should focus on developing and applying these personalized strategies.
- Methodological Advancements: Advances in information technology and cognitive psychology are crucial for developing more precise and effective neuromarketing strategies, indicating that future studies should leverage these advancements to enhance their research methodologies.

- Enhanced Tourist Experiences: Integrating neuromarketing principles can significantly improve tourist experiences by understanding cognitive and emotional responses, thus enhancing satisfaction and loyalty, which aligns with the broader goals of brain tourism.
- Impact on Marketing Campaigns: Findings from neuromarketing research can be used to develop more effective marketing campaigns that capture and retain tourist attention, influence decision-making, and enhance overall travel experiences, leading to increased visitor numbers, satisfaction, and revenue for tourism destinations.

DICUSSION AND CONCLUSION

The intersection of neuromarketing, brain research, and neuroscience holds immense potential in revolutionizing tourism marketing by introducing a personalized approach to services and products. Traditional market research, while informative, often falls short in capturing the intricate nuances of human decision-making processes within the tourism industry. The integration of neuromarketing principles allows marketers to transcend the limitations of self-reported data and behavioral observations. The methodological significance of this lies in the utilization of advanced neuroscientific techniques such as fMRI, EEG, facial expression analysis, and eye movement analysis.

Neuromarketing's revolutionary potential becomes evident as it peeks inside the black box of human cognition. By employing neuroscientific techniques, researchers can unravel the subconscious processes guiding tourists' choices (Reimann et al., 2012). This goes beyond traditional methods, such as surveys and interviews, offering unparalleled precision and depth. The application of facial expression analysis provides a nuanced understanding of tourists' emotional states, extending to physiological signals and social interactions (Fasel & Luettin, 2003). Moreover, neuroscientific methods like EEG offer real-time insights into brain activity, predicting the success of products or services based on consumer impulses.

It is essential to note the growing demand for mindfulness-based experiences in tourism, as indicated by research from Hanley et al. (2017) and the Global Wellness Institute (2018). Here, personalization extends beyond physical experiences to cater to tourists' desires for relaxation, stress relief, and personal growth. The incorporation of mindfulness practices, exemplified by luxury hotels like Four Seasons and wellness resorts like Chiva-Som, showcases the practical integration of personalized services in response to market research findings.

Looking forward, the future of tourism marketing lies in the seamless integration of information technology, neuroscience, and brain research. Virtual reality (VR), a powerful tool in the digital age, allows marketers to immerse travelers in destinations before their physical visit. To enhance this, the integration of neuroimaging technologies such as fMRI and EEG into VR tourism has become crucial for personalization and engagement. The synergy between information technology and neuroscience becomes evident in the ability to offer deeply engaging, emotionally resonant, and educational VR tourism experiences.

This future landscape does not propose replacing real-world experiences with virtual ones but rather complementing them. A personalized VR experience, shaped by neuroscientific insights, provides a preview that sparks interest and motivates travelers to explore further. The integration of fMRI and EEG into VR tourism opens new horizons, enabling personalization based on travelers' cognitive and emotional responses. This represents a paradigm shift, redefining how travelers explore destinations and enhancing their overall journey.

Moreover, as the tourism industry grapples with the dynamic nature of evolving trends and traveler preferences, the real-time monitoring capabilities of neuromarketing and neuroscience become indispensable. Critics may argue that the industry has always been adaptable, but the proposed new level of adaptability, guided by live neuroscientific data, ensures that marketing strategies remain effective and aligned with travelers' ever-evolving desires. The future of tourism marketing, guided by brain research, offers the exciting frontier of providing travelers with experiences that go beyond conscious desires, creating profound connections between the traveler and the destination. The subtleties within the human brain, illuminated by neuroscientific methods, become the guiding cues for this exciting journey into the future of tourism marketing (Buckley, 2022; Cheung et al., 2021).

Implications of Findings for the Broader Discourse of Brain Tourism

The progressive increase in citations until 2021 underscores the burgeoning recognition of neuromarketing's transformative potential within the tourism sector, signifying its emergent value in deciphering and swaying tourist behavior (see fig. 4). Nevertheless, the subsequent decline in citations necessitates a strategic reinvigoration and innovative approaches to sustain scholarly and practical interest in this domain. The co-authorship analysis underscores that institutions like Griffith University and Auckland University of Technology are at the forefront, prioritizing collaboration in this niche (see fig. 5). Their robust influence reflects the interdisciplinary and inter-institutional synergy fostered by advancements in neuroscientific methods applied to tourism, suggesting a maturation of brain tourism research bolstered by cutting-edge scientific methodologies.

Prominent journals such as *Tourism Management* and the *Journal of Destination Marketing & Management*, which boast the highest mean citations, play a pivotal role in this scholarly ecosystem (see fig. 6). These journals, which rigorously select

only 1% of the over 1500 research manuscripts submitted annually, act as critical gatekeepers in tourism and hospitality research. Notably, the contributions of scholars like Erdogan Koc and Ondrej Mitas are particularly influential, with their highly cited works catalyzing a deeper engagement in developing sophisticated marketing strategies (see fig. 7). Their research, widely regarded and applied, significantly advances the discourse on brain tourism, highlighting the importance of innovative, neuromarketing-driven approaches to understanding and enhancing tourist experiences.

The themes identified through content analysis reveal a dual focus on the personalization of services and methodological advancements (see both table 1 and fig. 8). This indicates a paradigm shift towards crafting more tailored and immersive tourist experiences through neuromarketing techniques, as compared to existing protocols (Guttentag, 2016). Methodological progress, particularly those leveraging information technology and cognitive psychology is imperative for developing more precise and effective neuromarketing strategies (Meng & Choi, 2019). This study critically demonstrates the limitations of traditional tourism research methodologies, such as surveys and self-reports, in capturing complex variables like memory, emotion, and cognitive functions. It advocates for the use of neuroscientific tools like EEG, eye tracking, and fMRI to gain more accurate insights into tourists' decision-making processes. This fills a methodological gap in tourism research, encouraging the adoption of more scientifically grounded methods to better understand consumer behavior. By integrating these principles more personalized and engaging tourist experiences. By understanding the cognitive and emotional responses of tourists, destinations can design experiences that resonate deeply with visitors, enhancing satisfaction and loyalty (Pearce, 2020). By highlighting the integration of neuromarketing into tourism, the manuscript advances the discourse on personalized marketing strategies. It argues that neuroscientific methods can revolutionize tourism marketing by allowing service providers to create personalized, emotionally resonant experiences tailored to individual preferences. This is particularly significant in the context of modern consumer demands for personalized services and experiences, positioning the journal at the forefront of research on the future of tourism marketing. This aligns with the broader insinuations for creating a more, meaningful and impactful travel experiences as enunciated in figure 8. Tourism marketers must harness these findings to craft more effective marketing campaigns, as Singh et al. (2021) showcases that by capturing and retaining tourist attention, host can influence tourist decision-making, and enhance the overall travel experiences of the tourist, thereby driving increased visitor numbers, satisfaction, and revenue for tourism destinations.

Future Directions

To advance the study of neuromarketing and neurotourism, researchers should consider several key areas of exploration. First, it is essential to investigate emerging technologies and their implications for personalized travel experiences. This includes examining the role of virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) in shaping how destinations and services cater to individual preferences. Future research must be carried out to focus on assessing the practicality of these technologies through case studies. By analyzing successful implementations of neuromarketing techniques within the tourism industry, scholars can evaluate their real-world impact on customer satisfaction and engagement.

Identifying gaps in the current literature is another critical step. Researchers should seek out areas that are underexplored or lacking comprehensive study, such as demographic variations in responses to personalized experiences or the need for longitudinal research to track long-term effects. Furthermore, new research questions should be developed based on existing findings. For example, exploring how different demographic groups react to personalized travel experiences driven by neuromarketing and evaluating the sustained impact of VR and AR on tourist behavior can provide valuable insights. Moreover, issues of ethical considerations and privacy needs significant revisitation. Also, there is a need to scrutinize privacy concerns, data security, and the effects of these practices on consumer autonomy, ensuring that advancements in technology do not compromise ethical standards.

Finally, it is important to provide practical recommendations for tourism businesses and policymakers. This includes developing guidelines for the effective integration of neuromarketing insights into marketing strategies and evaluating their success in enhancing the travel experience. By focusing on these areas, researchers can contribute significantly to the field of neurotourism, address existing research gaps, and drive innovation within the industry.

Limitations

The analysis of neuromarketing in tourism research, while offering valuable insights, comes with certain limitations that must be acknowledged to ensure a nuanced interpretation of the findings. These limitations encompass a range of factors affecting the data collection and analysis process:

The study heavily relies on data from Dimensions.ai, though a reliable source excluded several research from grey literature, conference papers, and research review, while concentrating on only tourism papers. Even though tourism papers may be found in other disciplines. This is being done to reduce the outliers and noise that could emanate from the principle of disciplinarity.

Relying on scientometric and bibliometric metrics such as citation counts, and impact factors has inherent limitations and bias. These metrics may not comprehensively assess research quality or impact. Given that neuromarketing in tourism is inherently interdisciplinary, traversing various academic boundaries. Effectively capturing all relevant literature from diverse disciplines was a challenge as stated ab initio. Furthermore, the reliance or software-dependent limitations on VOS viewer, Dimensions AI, and CiteSpace software, been that different software may yield slightly different results, requiring validation. The findings of this study might not be universally applicable. The diverse research landscape in neuromarketing in tourism varies across regions, institutions, and disciplines, affecting generalizability.

Recognizing these limitations is crucial for a nuanced interpretation of the study's findings. They provide valuable insights into areas for potential refinement and future research, contributing to a more comprehensive understanding of neuromarketing in tourism. In conclusion, these findings have significant implications for the broader discourse of brain tourism. They highlight the importance of continued research and collaboration, the value of high-impact publications, and the potential for neuromarketing to transform tourist experiences through personalization and advanced methodologies.

In conclusion, the study enhances discussion in tourism and hospitality by introducing the underexplored area of neurotourism, advocating for the use of advanced neuroscientific methods in tourism research, and addressing critical gaps in both methodology and literature. Its interdisciplinary approach and focus on future innovations provide valuable insights for researchers and practitioners in the field. This study tends to bridge the gap by providing a comprehensive review of how neuroscientific methods can be applied to tourism research, making it a significant contribution to the existing body of knowledge. It therefore calls for more research into the physiological and cognitive responses of tourists, thus creating a foundation for future studies.

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Please cite this article as:
Ndaguba, E. & Van Zyl, C. (2025). Exploring Brain Tourism Discourse in the Tourism and Hospitality Sector: Reawakening research in Neurotourism. Tourism and Hospitality Management, 31(2), 197-214, https://doi.org/10.20867/thm.31.2.3