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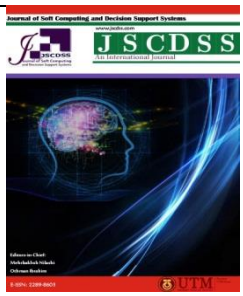

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Medical Tourism Destination Marketing in the Event of COVID-19 Outbreak through Neuromarketing Techniques: A Fuzzy DEMATEL Approach

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Abstract

In the last decade, medical tourism has increased tremendously. After assessing the alarming levels of spread and severity, the World Health Organization declared the new coronavirus (COVID-19) outbreak as a global pandemic. The COVID-19 outbreak has affected many of the major destinations and sources of medical tourism. Patients who have planned to travel abroad for affordable medical care are canceling or postponing trips due to this pandemic. During this pandemic, it is important to obtain new medical tourists through effective destination branding. Neuromarketing techniques and tools have been effective in studying the consumers' behaviors, particularly in the decision-making process. It is found that neuromarketing tools can assist the decision-makers to accurately measure the consumers' behaviors in relation to the conventional techniques. This paper investigates the role of neuromarketing techniques in the event of the COVID-19 outbreak for destination marketing. Accordingly, a decision-making model is developed for destination marketing in the event of the COVID-19 outbreak. The data is analyzed by a fuzzy multi-criteria decision-making model, Fuzzy Decision Making Trial and Evaluation Laboratory (DEMATEL). The results showed that accuracy and quality of information are the most important factors in implementing neuromarketing techniques for medical tourism destination marketing in the event of the COVID-19 outbreak.

Keywords: Neuromarketing, COVID-19 Outbreak, Medical Tourism, Destination Marketing, Fuzzy DEMATEL

1. Introduction

In the last decade, medical tourism (Kim et al., 2019; Nilashi et al., 2019b) has been advanced tremendously, in which health care systems have become an important part of this worldwide industry (Ahani et al., 2019a; Moghavvemi et al., 2017; Momeni et al., 2018). The market for medical tourism is developing increasingly, making it internationally very competitive (Ahani et al., 2019a; Ganguli and Ebrahim, 2017; Momeni et al., 2018; Rodrigues et al., 2017). Medical tourism also allows patients access to healthcare with high-quality services at lower costs and shorter treatment times. Therefore patients seeking healthcare are willing to travel as medical tourists to developing countries for various types of treatment of diseases and several wellness services (Ahani et al., 2019a; Yeoh et al., 2013; Zarei and Maleki, 2019). The world's annual medical tourism income has grown by around 20% (Yu and Ko, 2012). The global medical travel industry is expected to hit nearly 3 trillion USD by 2025, with a forecast growth of 25% per year. It was found that, in 2014, medical tourism income in the United States was approximately 55 billion dollars, where approximately 11 million patients of this country have received care in other developing and developed countries and each patient has spent an average of 3,500 to 5,000 dollars (John and Larke, 2016; Momeni et al., 2018).

Latin America is one of the most popular tourist destinations in the world. Every year millions of travelers are interested in destinations such as Mexico, Cuba, or the Dominican Republic. Medical care has emerged as one of the key reasons for visiting this region over the last decade, mainly because of the cheaper price of health procedures and also the high quality of the health services provided in many Latin American countries in terms of hospitals and clinics. According to (Statista, 2020a), in Latin America,

the medical tourism industry has been valued at approximately $8 billion in 2019, with a projection of more than $10 billion by 2021. Costa Rica was one of the main tourist destinations in 2017 with nearly 19 thousand health tourists among the countries with the highest number of tourists in the region. For this reason, Chile and Colombia were also among the most visited countries with around 18,000 travelers the same year.

These services have also been enthusiastically promoted in Asian countries, including Malaysia, India, Thailand, South Korea, and Singapore, in which significant competition has been introduced at the national, regional, and international levels to attract more international medical tourists. Thanks to its inexpensive costs, friendly visa procedures, and convenient transportation, Malaysia is considered one of the major medical tourism destinations. It has been one of the main competitors in the medical tourism industry. According to (Statista, 2020c), medical tourism revenue from 2011 to 2018 in Malaysia has reached approximately 1.5 billion ringgit. Since 2011, the medical tourism income has risen by almost one billion Malaysian ringgit (Statista, 2020c). This statistic showed that the number of people who have visited Malaysia from 2011 to 2018 for healthcare purposes was nearly 1.2 million (Statista, 2020b). After 2011, the medical tourism industry has seen immense growth in Malaysia, and the number of people who have been traveling to Malaysia since then has almost doubled (Statista, 2020b).

As an emerging marketing field, neuromarketing combines perspectives of decision theory, economics, marketing, psychology, and neuroscience (Hsu and Chen, 2020; Smidts et al., 2014). Neuromarketing techniques and tools have been effective to study the consumers' behavior, particularly in the decision-making process (Hammou et al., 2013; Hsu and Chen, 2020; Stasi et al., 2018). Many scholars have studied consumer decision drivers from a multidisciplinary perspective in order to understand the consumers' behaviors in complex decision-making environments (Ahani et al., 2019a; Ahani et al., 2019b; Ahani et al., 2021; Hsu and Chen, 2020; Nilashi et al., 2019a; Nilashi et al., 2018; Nilashi et al., 2021c; Nilashi et al., 2020d; Stasi et al., 2018). To predict consumer decision making through neuromarketing tools and techniques, the underlying reasons for consumers' behavior are uncovered by using brain imaging technologies such as Magnetoencephalography (MEG), Galvanic Skin Response (GSR), Eye Tracking, Functional Magnetic Resonance Imaging (fMRI), and an electroencephalogram (EEG) (Nilashi et al., 2020d). There have been several advantages (e.g., accuracy, quality of information, probing memory, and emotions) for these techniques in relation to the conventional techniques to understand consumers' behavior, which motivates decision-makers to employ them as a marketing tool in their businesses. Neuroscience helps to interpret the consumers' perceptions and plays an essential role in strengthening consumer behavior predictions. Neuromarketing technology helps marketing companies and research companies to make use of personalized services that can build brand foundations and loyalty. They are widely used in advertising (Astolfi et al., 2008; Cook et al., 2011; Yoon et al., 2006), product development (Bastiaansen et al., 2018; Erk et al., 2002; Levy et al., 2011), pricing (Knutson et al., 2001; Plassmann et al., 2008), branding (Ambler et al., 2004; Santos et al., 2012), product design (Hubert et al., 2013; Santos et al., 2012) and decision-making (Cascio et al., 2015; Mesly, 2017).

As a consequence of this global pandemic (Rupani et al., 2020), thousands have been forced to postpone trips recently. The COVID-19 pandemic has caused major global changes in healthcare and economics (Ahani and Nilashi, 2020; Asadi et al., 2022; Nilashi et al., 2022a; Nilashi et al., 2022b; Nilashi et al., 2022c; Nilashi et al., 2020a; Nilashi et al., 2020b, c; Taheri et al., 2021; Zibarzani et al., 2022). This pandemic has led, mainly due to conditions related to confinement, to major consumer habits and behavior changes (Abumalloh et al., 2021; Asadi et al., 2021; Nilashi et al., 2021a; Nilashi et al., 2021b; Sheth, 2020). This paper investigates the role of neuromarketing techniques in the event of the COVID-19 outbreak for the effectiveness of destination marketing from the decision-makers' perspectives. Several factors are identified from the literature to find why neuromarketing techniques can be important for destination marketing. Accordingly, this study develops a decision-making model to investigate the effectiveness of neuromarketing techniques for destination marketing in the event of the COVID-19 outbreak.

2. The impact of COVID-19 on Medical Tourism

Loss of life due to a pandemic causes irreparable social damage. The coronavirus (COVID-19) pandemic, which has engulfed the whole globe within weeks (Ahani and Nilashi, 2020; Nilashi et al., 2020b), not only impacted public health but has impacted one of the key elements of the global economy; the tourism industry (Ahani and Nilashi, 2020). In fact, COVID-19 severely demobilized the global economy. Many of the affected countries have agreed to be locked down fully to reduce further disease transmission in the population. Despite curfews and transport bans introduced by several countries to monitor the transmission of the outbreak, worldwide transport ceased almost entirely in April 2020. The global COVID-19 pandemic has created uncertainty for many people as quarantines, hospitalizations, and tragically related deaths continue to increase. Travel limitations have reduced people's mobility worldwide, and their negative effects have spread to many industries. The COVID-19 outbreak has had a devastating impact on the world economy and employment. The transport sector has been particularly hit as air travel continues to decrease due to cancelations in flights and reductions in capacity. The aviation industry has seen a drop in major carriers. Although airlines have seen a historic decrease in travelers, there are significant declines for other tourism industry sectors, from food and drink closures to declining guest numbers in the hospitality sector. The pandemic and global effort to contain it could

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lead to a 45%-70% decline in the international tourism economy. The domestic tourism sector is also impacted by the control policies projected to be limited to around half of the world's population.

The COVID-19 outbreak has also been a major constraint to health industry growth between 2020 and 2021. A report from the World Health Organization indicates that 213 countries affected by the outbreak of COVID-19, including the United States, China, Japan, and South Korea, are impacting a large number of medical tourists. The governments of different countries prohibit travelers from affected countries, prevent flights to some countries, and have changed the requirements of visas. The Centers for Disease Control and Prevention (CDC) of the United States projected that the situation could continue until 2021 and that the medical industry will have a huge impact. Therefore, the outbreak of coronavirus and travel restrictions are anticipated in the near future to limit the development of the medical tourism industry. Many treatments have been deferred as a result. It is found that the COVID outbreak will have an impact on the whole health care industry, and Malaysia is no exception, its medical tourism industry will be impacted too.

3. Model and Data Analysis

3.1. Proposed Model

This study focuses on the use of neuromarketing techniques for destination marketing. Specifically, this study tries to reveal the importance level of factors for the adoption of neuromarketing techniques in medical tourism in the event of the COVID-19 outbreak. The main framework of the proposed model for medical tourism destination marketing and neuromarketing techniques is shown in Fig. 1. The proposed model includes five important factors for medical tourism destination marketing through neuromarketing techniques in the event of the COVID-19 outbreak. They are quality of information (Malhotra et al., 2003; Nilashi et al., 2020d), time-saving (Fortunato et al., 2014; Nilashi et al., 2020d), Usefulness (Malhotra et al., 2003; Nilashi et al., 2020d), cost (Malhotra et al., 2003; Nilashi et al., 2020d) and accuracy (Malhotra et al., 2003; Nilashi et al., 2020d).

3.2. Data Analysis

For data collection in fuzzy DEMATEL, five fuzzy scales (No influence, Very low influence, Low influence, High influence, and Very high influence) were used as presented in Table 1. The scale ranges are respectively in:

i. No influence [L,M,U]=[0,0,0.25]
ii. Very low influence [L,M,U]=[0,0.25,0.25]
iii. Low influence [L,M,U]=[0.25,0.50,0.75]
iv. High influence [L,M,U]=[0.5,0.75,1]
v. Very high influence [L,M,U]=[0.75,1,1]

The data collection was performed from professionals who had experience in the hospitality industry. The collected data from all experts formed the direct relation matrix, which is the pairwise comparison matrix of the experts as shown in Table 2. Then, we computed the normalized fuzzy direct-relation matrix through the equations in Step 2. This result is shown in Table 3. In Step 3, the fuzzy total-relation matrix was computed. Table 4 shows the fuzzy direct-relation matrix. In the next step, the fuzzy total-relation matrix is transformed into a crisp total-relation matrix as shown in Table 5. From Table 5, important information can be obtained for the factors. They are D-R and D+R which can be calculated by D and R, where D-R indicates net effects that a factor contributes to the system and D+R indicates the degree of importance of a factor in the entire system. The results are shown in Table 6. In addition, from the crisp total-relation matrix and based on a threshold ($\alpha = 0.172$) we can reveal the most important impacts among the factors. This result is shown in Table 7.

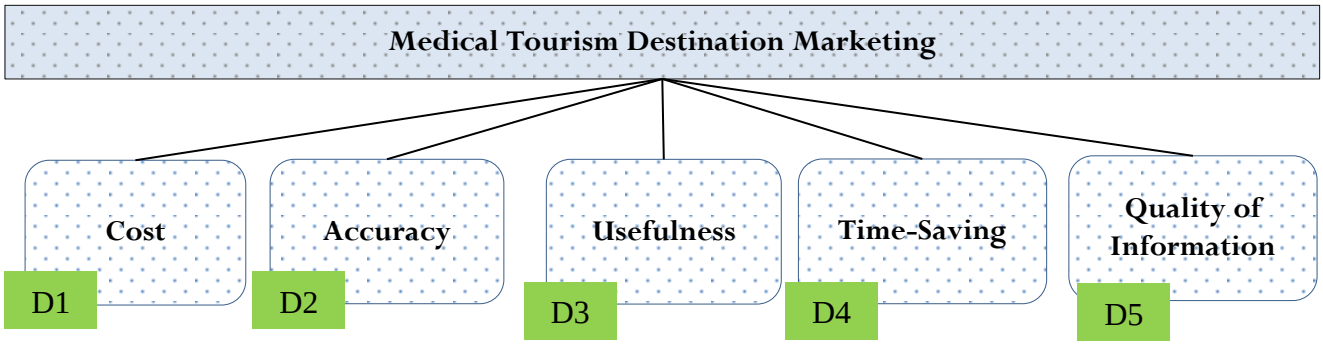

Fig. 1. Medical Tourism Destination Marketing and Neuromarketing Techniques

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Table 1
Fuzzy scales

Code	Linguistic terms	L	M	U
1	No influence	0	0	0.25
2	Very low influence	0	0.25	0.5
3	Low influence	0.25	0.5	0.75
4	High influence	0.5	0.75	1
5	Very high influence	0.75	1	1

Table 2
The direct relation matrix

	Quality of Information	Time-Saving	Usefulness	Cost	Accuracy
Quality of Information	(0.000,0.000,0.000)	(0.156,0.375,0.625)	(0.219,0.469,0.719)	(0.188,0.438,0.688)	(0.219,0.469,0.688)
Time-Saving	(0.031,0.188,0.438)	(0.000,0.000,0.000)	(0.188,0.438,0.688)	(0.188,0.438,0.688)	(0.281,0.531,0.781)
Usefulness	(0.000,0.031,0.281)	(0.000,0.063,0.313)	(0.000,0.000,0.000)	(0.156,0.344,0.594)	(0.188,0.375,0.625)
Cost	(0.000,0.094,0.344)	(0.000,0.156,0.406)	(0.000,0.094,0.344)	(0.000,0.000,0.000)	(0.094,0.281,0.531)
Accuracy	(0.000,0.000,0.250)	(0.000,0.156,0.406)	(0.000,0.156,0.406)	(0.000,0.063,0.313)	(0.000,0.000,0.000)

Table 3
The normalized fuzzy direct-relation matrix

	Quality of Information	Time-Saving	Usefulness	Cost	Accuracy
Quality of Information	(0.000,0.000,0.000)	(0.057,0.138,0.230)	(0.081,0.172,0.264)	(0.069,0.161,0.253)	(0.081,0.172,0.253)
Time-Saving	(0.011,0.069,0.161)	(0.000,0.000,0.000)	(0.069,0.161,0.253)	(0.069,0.161,0.253)	(0.103,0.195,0.287)
Usefulness	(0.000,0.011,0.103)	(0.000,0.023,0.115)	(0.000,0.000,0.000)	(0.057,0.126,0.218)	(0.069,0.138,0.230)
Cost	(0.000,0.035,0.126)	(0.000,0.057,0.149)	(0.000,0.035,0.126)	(0.000,0.000,0.000)	(0.035,0.103,0.195)
Accuracy	(0.000,0.000,0.092)	(0.000,0.057,0.149)	(0.000,0.057,0.149)	(0.000,0.023,0.115)	(0.000,0.000,0.000)

Table 4
The fuzzy total-relation matrix

	Quality of Information	Time-Saving	Usefulness	Cost	Accuracy
Quality of Information	(0.001,0.023,0.353)	(0.057,0.175,0.636)	(0.085,0.227,0.741)	(0.078,0.228,0.762)	(0.095,0.265,0.844)
Time-Saving	(0.011,0.082,0.469)	(0.001,0.044,0.420)	(0.070,0.205,0.699)	(0.074,0.213,0.726)	(0.112,0.268,0.828)
Usefulness	(0.000,0.020,0.333)	(0.000,0.044,0.408)	(0.000,0.025,0.354)	(0.057,0.144,0.554)	(0.071,0.168,0.620)
Cost	(0.000,0.041,0.338)	(0.000,0.074,0.418)	(0.000,0.062,0.452)	(0.000,0.030,0.356)	(0.035,0.137,0.574)
Accuracy	(0.000,0.007,0.283)	(0.000,0.064,0.379)	(0.000,0.072,0.426)	(0.000,0.044,0.417)	(0.000,0.028,0.360)

Table 5
The crisp total-relation matrix

	Quality of Information	Time-Saving	Usefulness	Cost	Accuracy
Quality of Information	0.08	0.242	0.3	0.303	0.345
Time-Saving	0.144	0.109	0.278	0.289	0.347
Usefulness	0.074	0.108	0.081	0.213	0.244
Cost	0.093	0.132	0.13	0.085	0.21
Accuracy	0.054	0.118	0.132	0.109	0.083

Table 6
The final output

	R	D	D+R	D-R
Quality of Information	0.446	1.271	1.717	0.826
Time-Saving	0.71	1.167	1.877	0.458
Usefulness	0.921	0.72	1.64	-0.201
Cost	0.998	0.65	1.648	-0.349
Accuracy	1.23	0.496	1.726	-0.734

Table 7
The crisp total- relationships matrix by considering the threshold value

	Quality of Information	Time-Saving	Usefulness	Cost	Accuracy
Quality of Information	0	0.242	0.3	0.303	0.345
Time-Saving	0	0	0.278	0.289	0.347
Usefulness	0	0	0	0.213	0.244
Cost	0	0	0	0	0.21
Accuracy	0	0	0	0	0

It can be concluded that Quality of Information has a major impact on all other factors for medical tourism destination marketing through neuromarketing. Its impacts on Time-Saving, Usefulness, Cost and Accuracy are

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respectively T=0.242, T=0.3, T=0.303, and T=0.345. In addition, Time-Saving itself impacts the Usefulness, Cost, and Accuracy, respectively with T values 0.278, 0.289, and 0.347. Furthermore, Usefulness impacts Cost and Accuracy, respectively with T values 0.213 and 0.244. Finally, concerning medical tourism destination marketing through neuromarketing, Cost has impacted Accuracy with a T value of 0.21. The results further revealed that Accuracy has no impact on the other factors. This factor has received impacts from Time-Saving, Usefulness, Cost, and Quality of Information. Overall, the results showed that Quality of Information and Time-Saving are net cause factors, and Usefulness, Cost, and Accuracy are net receiver factors.

4. Discussions and Conclusion

The COVID-19 epidemic will have a major influence on the world's future. Human interaction and mobility are discouraged during this outbreak, thereby impacting the tourist industry. Major international flights and all kinds of transportation between various countries have been postponed. Due to lock-down rules, all domestic flights are closed with special exemptions for rail services and vehicles transports relating to essential goods. All educational, economic, sport, and spiritual institutions were closed in nearly all the COVID-19 impacted countries. In general, industries have been impacted dramatically, including the basic utilities, which have been closed in many countries for a long time. People in the tourism and transport industries also have faced severe difficulties. Many tourist destinations have been affected by COVID-19. They suffer from major economic loss due to drastic declines in the number of tourists. Tourism authorities and businesses should undertake strategic measures to reduce the impacts and restore the demand for tourism. The uncertainty, additional imposed restrictions, and announcements about the international tourism destinations have dramatic impacts and this can be also expanded for the health tourism destinations. This is because many medical tourism businesses are under permanent risk of closure if governments do not provide support such as bailouts. The brand image of the medical destination may suffer irreversibly as a result of the response to the COVID-19 outbreak within particular countries. When a country has failed and has reacted slowly to the outbreak, medical tourists may feel negative about a specific target and have doubts about visits after the pandemic is monitored. Both medical and business tourism authorities need to encourage and assure medical tourists that the destination is safe to attract medical tourists in the Post-Covid situation.

During this pandemic, it is important to obtain new medical tourists through effective destination branding. Neuromarketing techniques and tools have shown to be effective to assess the consumers' behavior in the decision-making process. It is found that neuromarketing tools can assist the decision-makers to accurately measure the consumers' behavior about the conventional techniques. Therefore, during the COVID-19 pandemic, this technique for decision-making would be better for the analysis of medical tourist preferences. The model proposed by this study has incorporated the important factors for neuromarketing tools adoption in destination marketing during the COVID-19 pandemic. The results showed that Quality of Information and Time-Saving was the most important factors for the use of neuromarketing tools for medical tourism destination marketing in the event of the COVID-19 outbreak. Although this study is the first attempt in investigating the adoption of neuromarketing tools for medical tourism destination marketing during the COVID-19 pandemic, the method of data analysis may be extended for other MCDM and hybrid techniques. In addition, the investigation can be further performed for the hotels which provide medical and wellness tourism. Furthermore, this study solely relied on the adoption factors, which suggests other factors such as barrier and readiness factors in future studies.

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