



# Digital consumer behavior and medical tourism: A regional analysis in Mexico

*Comportamiento del consumidor digital y el turismo médico: análisis regional en México*

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## Abstract

Medical tourism has increasingly become an important alternative to receive healthcare services given medical systems' limitations such as: treatment availability, access, and price. The industry has significantly grown with the availability of internet services and digital platforms which enable consumers to connect with service providers as well as other stakeholders around the world. And, considering medical tourism profiles related to travel frequency, expenditure, place, and degree of digital platform use, the question is how does digital platform use impact medical tourism consumer behavior related to the type of destination? Cluster analysis and georeferencing analytics were utilized to study the correlation between digital platform use and the preferred type of destination for medical tourism. The study shows a clear positive correlation between the variables compared.

*JEL Code:* M10; M31; I11

*Keywords:* digital consumer; consumer behavior; regional analysis; medical tourism

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## **Resumen**

El turismo médico se ha convertido cada vez más en una alternativa importante para recibir servicios de salud dadas las limitaciones de los sistemas médicos tales como: disponibilidad, acceso y precio de tratamientos. La industria ha crecido significativamente con la disponibilidad de servicios de Internet y plataformas digitales que permiten a los consumidores conectarse con proveedores de servicios y otras partes interesadas en todo el mundo. Y, considerando los perfiles de turismo médico relacionados con frecuencia de viaje, el gasto, destino y grado de uso de las plataformas digitales, la pregunta es ¿cómo impacta el uso de plataformas digitales al comportamiento del consumidor de turismo médico con relación al tipo de destino? Análisis de conglomerados y de georreferenciación fueron utilizados para estudiar la correlación entre el uso plataformas digitales y el tipo de destino preferido para el turismo médico. El estudio muestra una clara correlación positiva entre las variables comparadas.

*Código JEL:* M10; M31; I11

*Palabras clave:* Consumidor digital; comportamiento del consumidor; análisis regional; turismo médico.

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## **Introduction**

Medical systems, which include patient care, administration, and infrastructure, amongst others (Nolan, 1998), and their policies are different in every country. Since such systems do not always fit the population's needs and/or match their affordability, medical tourism has increasingly become a popular means to obtain medical attention. Thus, medical tourism is not a new or modern practice; in fact, Connell (2013) has posited that the practice has been carried out for over 2000 years. Throughout such time, the industry has certainly evolved in terms of physician care, services, and consumer behavior; however, its growth has importantly been impacted by globalization and technological advancements and, particularly, with the increasing availability of internet services and digital platforms. Medical tourism can be analyzed from two different perspectives, that is, from the standpoint of travelers seeking medical attention, and physicians traveling to provide medical services (Reed, 2008); this study focuses on the consumer behavior of the former.

Medical tourism has been defined as the practice of individuals travelling to another country to obtain health care (Benowitz & Gaines, 2020), treatments, and health services. Therefore, countries' conditions may drive consumers to engage in medical tourism, in turn, impacting both the country of origin and destination. The economy of destination countries is not only impacted by the medical aspects of the travelers' visit, but also because many take the opportunity to make a trip of it, take a tour, go sightseeing, and take in the local culture. While a significant number of people would like to indulge in medical tourism, the reality is that the vast majority of the population cannot; thus, although growing, it continues to be a relatively small industry that is relatively unexplored.

There are many countries that are medical tourism destinations and Mexico is one of the most important due to affordable prices, availability of treatments, and types of destinations (Orozco Núñez et al., 2014). However, further research is required to comprehend the current consumer behavior dynamics, particularly regarding such emerging market. For instance, medical tourists' use of digital platforms and preferred type of destination remained unclear. Therefore, the general objective of this study was to analyze three consumer profiles related to the use of digital platforms and the preferred type of destination for medical tourism. In order to do so, a cluster segmentation analysis was performed using k-medoids, followed by a correlation analysis as well as a regional analysis to identify the relationship among the study's variables and groups of traveler profiles. The paper is sectioned as follows: section two includes the study's theoretical framework, section three encompasses the methodology, section four includes the study's results, and section five consists of the concluding remarks, limitations, and future research directions.

## **Theoretical framework**

### *Medical tourism*

One of the most common ways to analyze medical tourism is from the perspective of travelers seeking medical attention (Reed, 2008). From such standpoint, according to the Center for Disease Control and Prevention (CDC), medical tourism occurs when people seek medical attention out of the country in which they reside (Traveler's Health, 2021). The Organisation for Economic Co-operation and Development (OECD) has stated that medical tourism is described as people travelling to other countries, typically from developed to developing countries, to obtain healthcare services (Lunt et al., 2011). And Gupta & Das (2012) posit that medical tourism is an activity that occurs when healthcare treatments and/or services are unavailable and/or too expensive; in other words, it occurs when patients cannot access the treatments and services they need in their country of residence.

Medical tourism is, therefore, defined as a practice that occurs when a person travels out of the country of residence to receive health treatments and/or services (Smith et al., 2011) whether they are programmed, emergent, biological, dental, or cosmetic. Consumers commonly travel to developing countries and emerging markets (Reed, 2008; Horowitz et al., 2007), for treatments and services, because affordability is a primary factor associated with medical tourism. However, although medical tourism definitions emphasize that consumers travel abroad to access health treatments and services, Connell (2013) has argued that the practice is currently also "short distance, cross border and diasporic". Therefore, consumers, patients, may be traveling both long and short distances to receive healthcare.

### *Medical tourism in Mexico*

There are various countries around the world that are popular destinations for medical tourism, including but not limited to: Brazil, Costa Rica, Cuba, Dubai, India, Malaysia, Mexico, Singapore, South Africa, Thailand, as well as various countries in Europe (Lunt et al., 2011). Mexico is not only a popular destination for medical tourism, but it is also the largest destination in North America (Angeles Health International, 2022), and, according to Mexico's National Bank of Foreign Trade (Bancomext), it is the second most important destination for medical tourism worldwide (Bancomext, 2019).

Medical tourism, therefore, has an important impact on the country's economy. The latter occurs because medical tourism includes a series of services in addition to treatments such as, travel agencies, hospitals, laboratories, restaurants (Solis, 2019), as well as transportation, and digital platforms, amongst others. Tourism represents a contribution of about 8.4 percent of Mexico's National Gross Domestic Product (GDP) (Secretaria de Turismo, 2018). And, according to the National Institute of Statistics and Geography (INEGI), in 2018, international medical tourism represented about 7.1 percent of Mexico's total tourism revenue, equivalent to approximately \$1.6 billion dollars (INEGI, 2018). Thus, except for 2009, 2015, and 2016, medical tourism in Mexico has held sustained growth over the years (Euromonitor International, 2020).

Mexico receives approximately 1.2 million visitors per year and common countries of origin include China, France, Germany, Japan, and United States (Bancomext, 2019). Reasons include: types of destinations, availability and access to treatments, and prices, amongst others (Johnston et al., 2010). Within the country, there is a choice of city, boarder, and beach destinations mainly in the states: Baja California Norte, Baja California Sur, Chihuahua, Jalisco, Mexico City, Nayarit, Nuevo León, Puebla, Quintana Roo, San Luis Potosí, Sinaloa, and Tamaulipas (Montiel, 2015; Orozco Núñez et al., 2014).

The prices for medical tourism treatments in Mexico are in the low-end and mid-range among some of the most visited destinations. Table 1 includes a comparison between Mexico and the United States in relation to the prices of the twenty-one most sought out procedures in medical tourism. Furthermore, medical tourism in Mexico enables consumers to save between 35 and 85 percent in treatments, as well as significantly reduce waiting times for their procedures (Bancomext, 2019). Additionally, it is a popular destination due to diverse cultural attractions, landmarks, archeological treasures, culinary activities, amongst others.

Table 1  
 Medical tourism treatments' price in Mexico and the United States  
 [figures in US dollars]

Medical Tourism Treatments	México	USA
Dental implant	900	2 500
Lasik (both eyes)	1 900	4 000
Cataract surgery	2 100	3 500
Liposuction	3 000	5 500
Rhinoplasty	3 800	6 500
Tummy tuck	4 500	8 000
Hysterectomy	4 500	15 400
Breast implants	4 500	6 400
Face lift	4 900	11 000
IVF treatment	5 000	12 400
Lap band	6 500	14 000
Gastric sleeve	8 900	16 500
Gastric bypass	11 500	25 000
Angioplasty	10 400	28 200
Hip resurfacing	15 500	28 000
Knee Replacement	12 900	35 000
Hip Replacement	13 500	40 364
Spinal fusion	15 400	110 000
Heart Bypass	27 000	123 000
Valve Replacement	28 200	170 000
Cornea (per eye)	-	17 500

Source: Authors with data from Medical Tourism Association (2020)

### *Medical tourism and digital platforms*

Digital platforms have significantly impacted just about every industry and sector. As such, the internet is a key element in the growth of medical tourism because it provides fundamental information (Lunt et al., 2011) regarding treatments, medical professionals, destinations, hospitals, etcetera; furthermore, it enables communication amongst consumers and service providers worldwide (Reed & Dawood, 2008). Certain digital platforms facilitate consumer electronic word-of-mouth (Connell, 2013) (eWOM), through which current and potential consumers can exchange experiences, opinions and recommendations. For instance, social media, such as Facebook, has been associated with a positive effect on consumer purchase decision making related to medical tourism (Alghizzawi et al., 2020).

Regarding technology, digital consumers display a certain degree of readiness, meaning, an inclination towards the use of new technologies (Parasuraman, 2000). As such, said consumers tend to invest more in new technology and devices (Kierzkowski et al., 1996). The reality is that not all consumers

are so inclined to use digital platforms; that being said, critical events, such as COVID-19, have somewhat forced late majorities and laggards to the fold.

### *Medical tourism consumer behavior*

Each country's health care system's characteristics are well associated with consumer behavior related to medical tourism (Béland & Zarzeczny, 2018). Meaning that, medical tourist consumer behavior is influenced by various factors emanating from health institutions and their policies; in such way that the availability, quality, access, and price of treatments are some factors that drive consumers to partake in medical tourism. The destination itself also plays an important role in consumers' decision-making when they are inclined to take advantage of the trip to vacation.

As consumer loyalty is well associated with their perception of brand value (Vera & Trujillo, 2017), consumers' opinions of their experiences are significant for potential medical tourism consumers. Meaning that individuals and groups can influence consumer behavior, such as reference groups (Piotrowska, 2017); while this is true for in-person word-of-mouth, considering that there may be greater impact and influence on decision-making when information is retrieved online from acquaintances and other trusted sources, is central to understanding consumer behavior during the fourth industrial revolution.

For instance, according to Benowitz & Gaines (2020), in addition to lower prices, some factors influencing medical tourism include a suggestion from family or friends, the opportunity to combine medical care with a vacation destination, a preference for care from providers who share the traveler's culture, or to receive a procedure or therapy not available in their country of residence. Those consumers that can be part of medical tourism are those that have a certain degree of disposable funds. While many consumers seek treatment and services in other countries because they are significantly less expensive (Çapar & Aslan, 2020), the practice is still prohibitive for most of the population globally.

Medical tourists may be classified in various manners depending on the approach of the analysis. For instance, according to Awadzi & Panda (2006), there are three main categories of medical tourism consumers, these include: consumers that do not have insurance, those that are underinsured, and consumers that cannot access insurance.

In terms of destinations, a study performed in Turkey found that the factors influencing consumer behavior in medical tourism included "accessibility of health care service, level of security and safety, quality of health care service, level of hygiene, potential of savings low cost, and tourism opportunities" (Çapar & Aslan, 2020, p.80). a previous study developed in Mexico found three main consumer profiles, these being: The "Frequent/Air/Modern Traveler, the Saver/Land/Modern Traveler,

and the Occasional/Air/Traditional Traveler” (Arrijoa-Castrejón & López-Fernández, 2021), which will be used for this study; Table 2 includes the classification of medical tourism consumers and their main characteristics.

Table 2  
 Medical tourism consumers’ characteristics

Consumer	Characteristics
Frequent digital traveler	Frequent traveler by plane High spender Books travels via digital platforms Prioritizes comfort
Thrifty digital traveler	Moderate traveler by land Moderate spender; seeks savings Books travels via digital platforms Typical globetrotter
Occasional traditional traveler	Infrequent travels by plane Average spender Books travels via travel agents Prioritizes easiness and convenience

Source: Arrijoa-Castrejón & López-Fernández (2021)

The consumers’ characteristics abovementioned depict frequency, willingness to spend, means to plan travels, and overall priorities, medical treatment and/or procedure notwithstanding; however, the proclivity for the types of destinations remains undefined. Hence, the following hypotheses have been framed:

H<sub>1</sub>: The greater the frequent digital traveler consumer behavior, the greater the preference for a city destination for medical tourism services.

H<sub>2</sub>: The greater the thrifty digital traveler consumer behavior, the greater the preference for a beach destination for medical tourism services.

H<sub>3</sub>: The greater the occasional traditional traveler consumer behavior, the greater the preference for a city destination for medical tourism services.

## Methodology

### *Procedure*

The general objective of this study was to analyze three consumer profiles related to the use of digital platforms and the preferred type of destination for medical tourism, in order to do so, this study used a clustering segmentation procedure, that refers to a broad set of techniques for finding groups, or

subgroups, within a data set. This grouping is carried out to divide the observations so that those belonging to the same group are fairly like each other, while those belonging to other groups are different. This study's model began with a correlation analysis to determine if the variables' relationships were significant. Subsequently, a cluster segmentation analysis was performed using k-medoids to identify the relationship among the study's variables and groups of traveler profiles, considering the study's sample and the effect of those profiles' reservation tool selection and preference for type of destination.

### *K-medoids*

K-medoids is a partition clustering technique where each cluster is represented by an element of the cluster (Kaufman & Rousseeuw, 1987), these are points known as the medoids; the latter refer to an object in a cluster where its average dissimilarity is minimal in relation to other members in the cluster (Loy-García et al., 2021). K-medoids is less sensitive to noise and outliers since, instead of centroids (used in k-means), it uses medoids as cluster centers. Medoids for each cluster are calculated by finding object  $i$  within the cluster that minimizes the equation (1), where  $C_i$  is the cluster containing object  $i$  and  $d(i, j)$  is the distance between objects  $i$  and  $j$  (Reynolds et al., 2004).

$$\sum_{j \in C_i}^k d(i, j)$$

(1)

Furthermore, this algorithm is an effective alternative to K-means to segment a dataset into groups. In this method, groups are represented by a particular object in the cluster; said objects, medoids, correspond to the cluster's most central points. The Partitioning Around Medoids (PAM) algorithm is the most common grouping method (Park & Jun, 2009). This method requires that the researcher know the data and select the appropriate data and number of clusters to be produced.

### *Dunn index*

The Dunn index, shown in the equation (2) is an internal cluster validation measure that enables the calculation of the distance between each group's objects and those in other groups (Dunn, 1973). This index calculates the minimum of this pairwise distance as the separation between clusters and uses the maximum distance within the cluster as intracluster compactness.

$$D = \frac{\text{min. separation}}{\text{max. diameter}} \quad (2)$$

### *Silhouette coefficient*

The Silhouette coefficient, shown in the equation (3) below, was used as an optimization criteria to define the number of partitions in a cluster using a measure of the cluster classification's quality (Gentle et al., 1991).

$$\text{Silhouette} = \frac{1}{N} \sum_{i=1}^N \frac{d_i - s_i}{\max \{d_i - s_i\}} \quad (3)$$

### *Definition of variables*

This research first retrieved data from several sources of information including, Patients Beyond Borders, Medical Tourism Association, Medical & Dental Departures, and Health Tourism, considering the main medical treatments that are programmed under the medical tourism industry worldwide. Then, a structured survey was administered to a sample of 100 medical tourism tourists and consumers incorporating variables defined in a previous study carried out in Malaysia (Musa et al., 2012), in order to identify travel preferences to better establish the traveler profile.

The instrument included 8 questions that assessed the following variables: type of trip (business, pleasure, or both), gender (male or female), age, average expenses per trip in Mexican pesos, number of trips per year (1,2,3,4,5,6,7 or more), preferred place of travel (between beach and city), preferred type of transportation (air, land, or sea), and preferred reservation method (internet/mobile app, social media, or travel agency/phone). Data was collected over a period of three months with a hundred percent response rate; the sample included 49 women and 51 men.

The variables' definitions and descriptions are included in Table 3. The variables in the dataset were codified by assigning values 0 and 1 to convert them into dichotomic and trichotomic variables and determine which factors should be considered when designing a digital tool based on user preferences.

Table 3  
 Variable definition and description

Variables	Description of variables
EXP	Average travel expense
AGE	Traveler's age
GDR	Gender (1:male; 0:female)
TRF	Travel frequency - number of trips per year
ATT	Type of transportation - Air mean preference
TTT	Type of transportation- Land/Terrestrial mean preference
MTT	Type of transportation- Maritime mean preference
TDE	Type of destination -Travel place preference (city:1; beach: 0)
TTB	Type of trip- Greater business travel frequency
TTP	Type of trip- Greater pleasure travel frequency
TTM	Type of trip- Mixed(business and pleasure) travel frequency
ROB	Reservation mean: Online booking or App preference - Internet_App
RSN	Reservation mean: Social media booking preference - Social_Network
RAP	Reservation mean: Booking preference by agency / phone - Agency_Phone

Source: Authors with data from Arrijoa-Castrejón & López-Fernández (2021)

## Results

### *Correlation analysis*

A correlation analysis was performed to study the relationship between the set of variables associated with the traveler profile and the variables linked to the type of reservation and quantify the number of existing independent dimensions. The selected variables included three associated with the reservation medium, three variables associated with the type of transportation, four related to the traveler profile, and one variable associated with the destination.

The variables associated with the traveler's profile were Expenses, Age, Travel frequency (TRF), and Gender. The variables linked to the reservation type were Internet\_App (ROB), Social\_Network (RSN), and Agency\_Phone (RAP). Table 4 includes the descriptive analysis of the studied variables, where we can see that we have 3 quantitative (EXP, TRF, AGE) and 7 qualitative (GDR, ATT, TTT, MTT, ROB, RSN, RAP) variables.

Table 4  
 Descriptive statistics [n=100]

Descriptive	Min.	Q1	Mean	Q3	Max.
EXP	5 362	24 659	44 022	62 596	79 857
TRF	1	2	3.82	6	7
AGE	20	34.75	46.87	62.25	75
GDR	0	0	0.51	1	1
TDE	0	0	0.55	1	1
ATT	0	0	0.6	1	1
TTT	0	0	0.33	1	1
MTT	0	0	0.07	0	1
ROB	0	0	0.55	1	1
RSN	0	0	0.17	0	1
RAP	0	0	0.28	1	1

Note: Q1 and Q3 refer to first and third quarters of 2021

Source: Authors.

Table 5 includes the variables considered in this study for analysis, i.e. the reservation group (reservation type, composed of the variables: ROB, RSN, and RAP), and traveler information (traveler's profile, consisting of the variables: EXP, TRF, AGE, and GDR), to be able to determine if there is a correlation among these variables, and see if the use of digital tools such as the Internet, mobile applications, or social networks have a significant relationship with the type of user profile.

As can be seen in Table 5, there is a clear correlation between the age and the type of reservation; this correlation is positive within older age groups in relation to the telephone or travel agency reservation method, and negative in relation to the Internet and social networks. The latter is consistent with the notion that younger consumers are more comfortable with the use of digital platforms. There is also a positive correlation between average expenses and travel frequency.

Table 5  
 Correlation analysis [n= 100]

Correlation	EXP	TRF	AGE	GDR	ROB	RSN	RAP
EXP	1.00	0.01	0.03	-0.02	0.10	-0.05	-0.07
TRF	0.01	1.00	-0.01	0.02	0.35	-0.06	-0.34
AGE	0.03	-0.01	1.00	-0.10	-0.03	-0.36	0.33
GDR	-0.02	0.02	-0.10	1.00	0.00	0.12	-0.10
ROB	0.10	0.35	-0.03	0.00	1.00	-0.50	-0.69
RSN	-0.05	-0.06	-0.36	0.12	-0.50	1.00	-0.28
RAP	-0.07	-0.34	0.33	-0.10	-0.69	-0.28	1.00

Source: Authors.

### Cluster with mixed data using *K-medoids*

In order for an algorithm to group observations, a notion of (dis)similarity between observations must be defined first. There are a variety of metrics in cluster analysis to help choose the number of clusters to extract. The silhouette width, which is an internal validation metric that determines an observation's similarity to a cluster in comparison to that of the nearest neighbor cluster, was used for the analysis. The metric can range from -1 to 1, where the highest values are better. After calculating the Silhouette width for clusters ranging from 2 to 10 for the PAM algorithm (which uses a partition around medoids) for the analyzed data, three clusters show the first change in the initial value (see Figure 1).

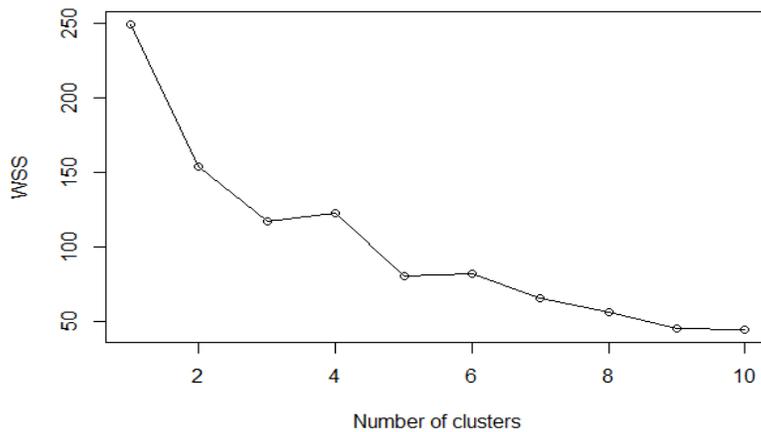


Figure 1. Silhouette coefficient graph to validate the clusters optimal number  
Source: Authors.

Figure 2 shows a cluster dendrogram generated with the R tool using the survey data, to confirm and illustrate how the whole sample fits in the 3 groups defined by the cluster segmentation.

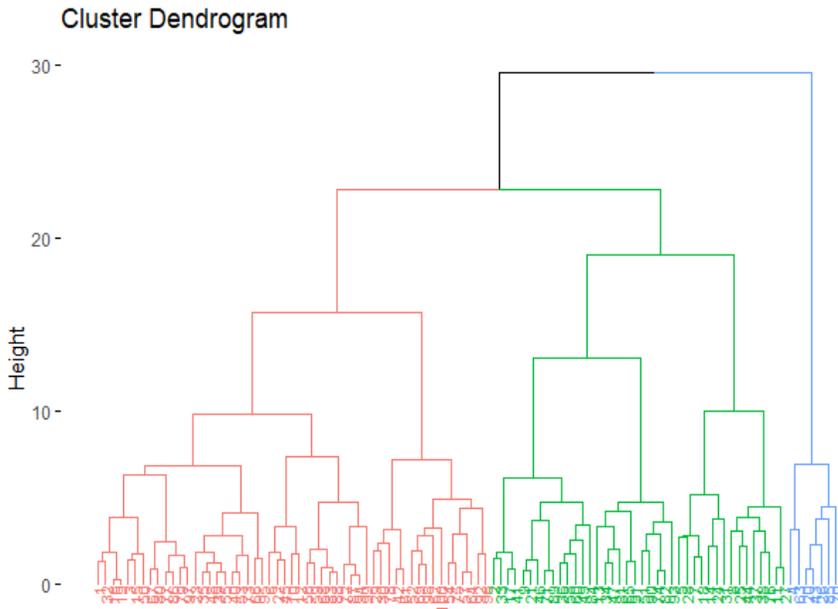


Figure 2. Cluster dendrogram obtained using the R tool [n=100]  
 Source: Authors.

### Cluster validation using Silhouette width

The Silhouette width coefficient was used to validate the quality of the cluster and determine how well the observations were classified (see Table 6); higher values imply a good classification, negative values mean poorly classified observations, and values of 0 mean that there is a possible overlap.

Table 6  
 Cluster widths using Silhouette coefficient

Cluster	Size	Average Silhouette width
1	41	0.42
2	34	0.3
3	25	0.21

Source: Authors.

After running the algorithm and selecting three clusters, we can interpret the clusters by running a summary on each one (see Table 2), based on the following results:

- (i) Cluster 1: Frequent digital traveler
- (ii) Cluster 2: Thrifty digital traveler
- (iii) Cluster 3: Occasional traditional traveler

### Regional analysis

Figure 3 shows the map of medical tourism clusters in Mexico considering the supply of clinics, hospitals and other services affiliated with the Mexican Council of the Medical Tourism Industry (CMITM), and/or with the international associations: Patients Beyond Borders, Medical & Dental Departures, and Health Tourism and Medical Tourism Association. This map was created using the GeoDa tool, considering a cluster segmentation analysis for mixed data using K-medoids. In this study, the Z standardization was used with 150 repetitions and a random seed, with a maximum of 1000 iterations, using the Manhattan distance function.



Figure 3. Georeferenced map of clusters of medical tourism services in Mexico  
Source: Authors.

- (i) The states in dark blue do not have a defined cluster for the medical tourism market; however, they have tourist and medical services that are isolated or not registered by any of the associations previously mentioned.
- (ii) The states in light blue do have medical tourism services, but not a cluster formed under this concept.

(iii) The states in green have well-defined clusters with well-formed communication, certifications, and supply chains, which allow them to generate a more competitive market for all its stakeholders.

Medical tourism travelers' preferences regarding destinations were evaluated after running the clustering segmentation (see Table 7) by counting the number of travelers in each group and reviewing the data obtained in the survey related to their preferences to visit a city or a beach destination. The results confirm that user profiles have some relationship with the consumer preferences for the destination for consuming medical tourism services in Mexico. As such, the three hypotheses proposed in this research, according to the data analyzed, were accepted; however, the data shown in Table 7 is not clear-cut in two of the profiles, these being: Frequent digital traveler and Thrifty digital traveler.

Table 7  
Medical tourism travelers' preferences about the destination

Travelers' Profile:	Frequent digital traveler	Thrifty digital traveler	Occasional traditional traveler
# of Travelers	40	27	33
City Preference	23	12	20
Beach Preference	17	15	13
City Frequency	0.58	0.44	0.61
Beach Frequency	0.42	0.56	0.39

Source: Authors.

## Conclusions

The medical tourism industry is small yet fast growing as the number of people travelling to other countries to receive medical attention continues to increase. Tourism and medical services in Mexico represent the main source of direct jobs and social welfare in the country (Secretaria de Turismo, 2018); therefore, it is necessary to strengthen both industries particularly in an uncertain environment where the fear of the contagion of COVID-19 and other diseases prevails in the minds of consumers (Garcia-Muñoz et al., 2020). Understanding consumer behavior in relation to digital technology is key to making sound strategic decisions to foster growth within the industry.

A key factor today to increase the competitiveness of medical tourism providers is taking advantage of the increase in the use of digital platforms to purchase products and services, which has been further enhanced by the COVID-19 pandemic (Esposti et al., 2021). The use of social networks as a means of reference and knowledge of recommendations based on the experience of other users, as well as the use of mobile applications, have contributed to exponentially exploding e-commerce and making it increasingly profitable for companies all around the world (Gasser et al., 2020). Therefore, it is crucial for medical tourism service providers to take advantage of these digital tools, particularly for younger

consumers, and to identify user profiles clearly to reach them and offer more accurate services adapted to the needs of specific types of consumers.

Based on the results obtained from the cluster segmentation analysis, we conclude that consumers of medical tourism services in Mexico, previously categorized into three different profiles based on their preferences and consumption habits, also have an effect on the consumer preferences related to the destination; however, the differences between one type of preference and another are limited. Likewise, these results confirm that having clearly identified profiles of medical tourists will help service providers identify and offer a better user experience to improve the consumption of medical tourism services in Mexico, which confirms the results reached by other researchers (i.e. Montiel, 2015; Christensen et al., 2016; Garcia-Muñoz et al., 2020).

The study's main limitation was the sample; that is, given the size, characteristics and context, the results may not be generalizable. In such way that future research could extend this study with a larger sample, a broader consumer base, by collecting data from various locations within the medical tourism network; further, future research could also study the impact of different types of transportation on medical tourism consumers' preferences. Finally, future research could develop a cross-cultural study to assess whether medical tourism consumer profiles as well as their behavior significantly varies in different countries, as well as the effect on destination preferences.

## References

- Alghizzawi, M., Habes, M., & Salloum, S. A. (2020). The relationship between digital media and marketing medical tourism destinations in Jordan: Facebook perspective. *Advances in Intelligent Systems and Computing*, 1058, 438–448. [https://doi.org/10.1007/978-3-030-31129-2\\_40](https://doi.org/10.1007/978-3-030-31129-2_40)
- Angeles Health International. (2022). Medical tourism in Mexico. Hospital Angeles. Disponible en: <https://www.angeleshealth.com/medical-tourism-mexico/> y Consultado: 15/01/2023
- Arrijoa-Castrejón, E., & López-Fernández, A. M. (2021). Analysis of medical tourism and the Effect of using digital tools to profile travelers in Mexico. *Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST*, 393 LNICST, 143–161. [https://doi.org/10.1007/978-3-030-87495-7\\_10/COVER/](https://doi.org/10.1007/978-3-030-87495-7_10/COVER/)
- Awadzi, W., & Panda, D. (2006). Medical tourism: Globalization and the marketing of medical services. *Consortium Journal of Hospitality & Tourism*, 11(1), 75–82. Disponible en: <https://web.p.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=15350568&AN=21955786&h=5DJWAoJ%2FcFB2vedEZJIDZ%2FLK4D9JMA5AQ>

- QaAYWH7SPnKX8fF4L0P%2FIZ5vWeIWZJqj6bQiy9L1yBlvRhlditYg%3D%3D&cr=c&resultNs=AdminWebAuth&resultLoc y Consultado: 09/01/2023
- Bancomext. (2019). México es el segundo consumidor de tequila a nivel mundial. Gobierno de México. Disponible en: <https://www.bancomext.com/blog-bancomext/mejora-tu-hotel/mexico-es-el-segundo-destino-de-turismo-de-salud-a-nivel-mundial/> y Consultado: 12/01/2023
- Béland, D., & Zarzeczny, A. (2018). Medical tourism and national health care systems: An institutionalist research agenda. *Globalization and Health*, 14(1), 1–7. <https://doi.org/10.1186/S12992-018-0387-0/METRICS>
- Benowitz, I., & Gaines, J. (2020). Chapter 9 - Travel for work & other reasons. Yellow book. Centers for Disease Control and Prevention. Disponible en: <https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-for-work-other-reasons/medical-tourism> y Consultado: 08/01/2023
- Çapar, H., & Aslan, Ö. (2020). Factors affecting destination choice in medical tourism. *International Journal of Travel Medicine and Global Health*, 8(2), 80–88. <https://doi.org/10.34172/ijtmgh.2020.13>
- Christensen, I., Schiaffino, S., & Armentano, M. (2016). Social group recommendation in the tourism domain. *Journal of Intelligent Information Systems*, 47(2), 209–231. <https://doi.org/10.1007/s10844-016-0400-0>
- Connell, J. (2013). Contemporary medical tourism: Conceptualisation, culture and commodification. *Tourism Management* February(34), 1–13. <https://doi.org/10.1016/j.tourman.2012.05.009>
- Dunn, J. C. (1973). A fuzzy relative of the ISODATA process and its use in detecting compact well-separated clusters. *Journal of Cybernetics*, 3(3), 32–57. <https://doi.org/10.1080/01969727308546046>
- Esposti, P. D., Mortara, A., & Roberti, G. (2021). Sharing and sustainable consumption in the era of covid-19. *Sustainability (Switzerland)*, 13(4), 1–15. <https://doi.org/10.3390/su13041903>
- Euromonitor International. (2020). Medical tourism report. Disponible en: <https://www-portal-euromonitor-com.upmx.idm.oclc.org/portal/statisticsevolution/index> y Consultado: 15/01/2023
- García-Muñoz, C., Pérez Sánchez, B., & Navarrete Torres, M. (2020). Las empresas ante el COVID-19. *Revista de Investigación en Gestión Industrial, Ambiental, Seguridad y Salud En El Trabajo-GISST*, 2934, 85–101. <https://doi.org/10.34893/gisst.v2i2>
- Gasser, U., Ienca, M., Scheibner, J., Sleigh, J., & Vayena, E. (2020). Digital tools against COVID-19: Taxonomy, ethical challenges, and navigation aid. *The Lancet Digital Health*, 2(8), e425–e434. [https://doi.org/10.1016/S2589-7500\(20\)30137-0](https://doi.org/10.1016/S2589-7500(20)30137-0)
- Gentle, J. E., Kaufman, L., & Rousseuw, P. J. (1991). Finding groups in data: An introduction to cluster

- analysis. *Biometrics*, 47(2), 788. <https://doi.org/10.2307/2532178>
- Gupta, V., & Das, P. (2012). Medical Tourism in India. In *Clinics in Laboratory Medicine* 32(2), 321–325. <https://doi.org/10.1016/j.cll.2012.04.007>
- Horowitz, M. D., Rosensweig, J. A., & Jones, C. A. (2007). Medical tourism: Globalization of the healthcare marketplace. *MedGenMed Medscape General Medicine*, 9(4), 33. Disponible en: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2234298/> y Consultado: 08/01/2023
- INEGI. (2018). Encuesta de Turismo de Internación. In Instituto Nacional de Estadística y Geografía. Disponible en: <https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=702825104368> y Consultado: 11/01/2023
- Johnston, R., Crooks, V. A., Snyder, J., & Kingsbury, P. (2010). What is known about the effects of medical tourism in destination and departure countries? A scoping review. *International Journal for Equity in Health*, 9(24), 1-13. <https://doi.org/10.1186/1475-9276-9-24>
- Kaufman, L., & Rousseeuw, P. J. (1987). Clustering by means of Medoids. In N.-H. Y. Dodge (Ed.), *Statistical Data Analysis Based on the L1 - Norm and Related Methods* (pp. 405–416).
- Kierzkowski, A., McQuade, S., Waltman, R., & Zeisser, M. (1996). Marketing to the digital customer. *The McKinsey Quarterly*, summer(3), 4–5. Disponible en: <https://www.proquest.com/docview/224548027?pq-origsite=gscholar&fromopenview=true> y Consultado: 06/01/2023
- Loy-García, G., Rodríguez-Aguilar, R., & Marmolejo-Saucedo, J.-A. (2021). An analytical intelligence model to discontinue products in a transnational company. In I. C. and Optimization (Ed.), *Advances in Intelligent Systems and Computing* (pp. 812–822). Springer, Cham. [https://doi.org/10.1007/978-3-030-68154-8\\_70](https://doi.org/10.1007/978-3-030-68154-8_70)
- Lunt, N., Smith, R., Exworthy, M., Stephen, T., Horsfall, D., & Mannion, R. (2011). Medical tourism : Treatments, markets and health system implications: Scoping review. Directorate for Employment, Labour and Social Affairs, 1–55. Disponible en: <https://www.oecd.org/els/health-systems/48723982.pdf> y Consultado: 08/01/2023
- Medical Tourism Association. (2020). Medical Tourism. com Treatments. Disponible en: <https://www.medicaltourism.com/treatments> y Consultado: 14/01/2023
- Montiel, J.C.F. (2015). Estrategias publicitarias en línea utilizadas por la oferta de turismo médico plástico y estético: El caso de Tijuana, Baja California, México. *International Journal of Marketing, Communication and New Media*, 3(4), 106–117, ISSN: 2182-9306
- Musa, G., Thirumoorthi, T., & Doshi, D. (2012). Travel behaviour among inbound medical tourists in Kuala Lumpur. *Current Issues in Tourism*, 15(6), 525–543. <https://doi.org/10.1080/13683500.2011.626847>

- Nolan, T. W. (1998). Understanding medical systems. In *Annals of Internal Medicine*, 128(4), 293–298.  
<https://doi.org/10.7326/0003-4819-128-4-199802150-00009>
- Orozco Núñez, E., Bejarano Arias, R. M., Martínez Aguilar, M. E., Ruiz Larios, J. A., Crooks, V. A., Labonté, R., Snyder, J., & Nigenda, G. (2014). An overview of Mexico's medical tourism industry – The cases of Mexico City and Monterrey. Disponible en: [https://www.researchgate.net/publication/278683121\\_An\\_Overview\\_of\\_Mexico's\\_Medical\\_Tourism\\_Industry\\_-\\_The\\_Cases\\_of\\_Mexico\\_City\\_and\\_Monterrey\\_-\\_Version\\_10](https://www.researchgate.net/publication/278683121_An_Overview_of_Mexico's_Medical_Tourism_Industry_-_The_Cases_of_Mexico_City_and_Monterrey_-_Version_10) y Consultado: 06/01/2023
- Parasuraman, A. (2000). Technology readiness index (Tri): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4), 307–320.  
<https://doi.org/10.1177/109467050024001>
- Park, H. S., & Jun, C. H. (2009). A simple and fast algorithm for K-medoids clustering. *Expert Systems with Applications*, 36(2), 3336–3341. <https://doi.org/10.1016/J.ESWA.2008.01.039>
- Piotrowska, M. (2017). The impact of consumer behavior on financial security of households in Poland. *Contaduría y Administración*, 62(2), 461–504. <https://doi.org/10.1016/j.cya.2017.02.001>
- Reed, C. M. (2008). Medical tourism. In *Medical Clinics of North America*, 92(6), 1433-1446.  
<https://doi.org/10.1016/j.mcna.2008.08.001>
- Reed, C. M., & Dawood, R. (2008). The health-seeking traveler. In *Travel Medicine* (pp. 343–349). Mosby. <https://doi.org/10.1016/B978-0-323-03453-1.10033-1>
- Reynolds, A. P., Richards, G., & Rayward-Smith, V. J. (2004). The application of K-medoids and PAM to the clustering of rules. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 3177, 173–178.  
[https://doi.org/10.1007/978-3-540-28651-6\\_25](https://doi.org/10.1007/978-3-540-28651-6_25)
- Secretaría de Turismo. (2018). El gran motor de la economía nacional. Disponible en: [https://www.gob.mx/cms/uploads/attachment/file/412719/Turismo\\_2040\\_Poli\\_tica\\_Turi\\_stica\\_de\\_Estado.pdf](https://www.gob.mx/cms/uploads/attachment/file/412719/Turismo_2040_Poli_tica_Turi_stica_de_Estado.pdf) y Consultado: 13/01/2023
- Smith, R., Martínez Álvarez, M., & Chanda, R. (2011). Medical tourism: A review of the literature and analysis of a role for bi-lateral trade. *Health Policy*, 103(2–3), 276–282.  
<https://doi.org/10.1016/j.healthpol.2011.06.009>
- Solis, T. (2019). Turismo médico en México. Deloitte Mexico. Disponible en: <https://www2.deloitte.com/mx/es/pages/dnoticias/articulos/oportunidades-turismo-medico-en-mexico.html> y Consultado: 14/01/2023
- Traveler's Health. (2021). Medical tourism: Travel to another country for medical care. Centers for Disease Control and Prevention. Disponible en: <https://wwwnc.cdc.gov/travel/page/medical->

tourism y Consultado: 15/01/2023

Vera, J., & Trujillo, A. (2017). Searching most influential variables to brand loyalty measurements: An exploratory study. *Contaduría y Administración*, 62(2), 600–624. <https://doi.org/10.1016/j.cya.2016.04.007>