

Examining and Prioritizing the Factors Affecting Tourist Absorption for Ecotourism Centers Utilizing MCDM Tools

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Abstract

Nowadays, the main attention and tendencies of tourists are towards ecotourism and its related activities. Ecotourism centers are an active business in the ecotourism industry that provides necessary services for tourists. Today, the number of ecotourism centers in some areas is increasing and it caused an intensive competitive environment between these centers to attract customers. In other words, the big concern of the manager and owners of these centers is knowing the variables which affect the decisions of tourists to choose an ecotourism center. From what we know, no research has been done on this subject. Therefore, these matters encouraged us to do essential investigation. In this paper, firstly, the factors affecting a tourist's decision to choose an ecotourism center are identified. Three types of customers (tourists) are considered for ecotourism centers and the weight of each of the considered factors is calculated using the fuzzy DEMATEL method based on the opinion of each customer group. Then, the factors are ranked using the TOPSIS method. The outcomes manifest that the personnel of the centers and the brand of each center have the most and the least impact on the selection process by the tourist, respectively.

Keywords: Ecotourism destination; Tourist absorption; Fuzzy DEMATEL; TOPSIS

1. Introduction

Ecotourism, a substantial type of tourism, emphasizes not only protecting environment and natural attractions but also contributing to the development of economic, social, and cultural aspects of a region (Phelan et al., 2020). Nowadays, the pattern of urbanization has increased and tourists have a strong desire to spend their leisure time in natural environments such as villages and natural areas. Therefore, the necessary conditions must be provided to smooth the presence of tourists in the region and develop its current situation from different perspectives (Danylyshyn et al., 2021). All of these indicate the importance of utilizing and developing the ecotourism concept and applications in a region (Puri et al., 2019). Ecotourism Centers (ECs) are one of the active entities of the ecotourism industry built in natural and rural environments to offer services to tourists. One of the main characteristics of them is being consistent with the local architecture and culture and the natural appearance of the region. In addition to accommodation services, ECs present some services such as food, local handicrafts, holding training courses like familiarity with native culture, holding recreational tours, and other ecotourism activities (Hosseini and Paydar, 2021). Currently, customer satisfaction is considered the essence of success in the competitive world of business (Saeidi et al., 2015). The main key to achieve the highest level of customer satisfaction is offering goods or services following customer expectations (Rahimi and Kozak, 2017). Given

the growing importance and share of the tourism sectors in the modern economy, the need for beneficial and helpful planning to boost its infrastructure and improve the quality of its services and facilities has become more necessary than any other time (Almeida et al., 2017). It is believed that the satisfaction of tourists has a great impact on their desire to return and continue traveling to each destination (Pan et al., 2020). Besides, the feelings of satisfaction provoke them to encourage others to visit the destination area. In this way, it will cause the constant improvement of tourism and economic prosperity in the region (Han and Hyun, 2018). In the field of natural tourism or ecotourism, recognizing and examining the motivations, inclinations, and desires of tourists to choose a destination is considerable and noteworthy. When discussing tourism and its related fields, the initial questions that come to the minds of planners, policy makers, researchers, experts, and activists in this industry are why do people travel to a specific destination? Which tourist destinations do people choose? And what is their motivations and reasons for this choice? (Pestana et al., 2020). Destination choice has always been one of the hottest issues of tourism management and considering the growth of this industry, the importance of studying this issue has increased (Mussalam and Tajeddini, 2016). Based on the remarkable increase in tourism demand and the number of ECs in Iran, one of the important and crucial issues for Managers and Owners (MAOs) of these centers is to identify the effective factors in the process of

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choosing an EC by tourists to spend their leisure time. Each EC offers different products and services to attract tourists and each tourist has the opportunity to choose from a set of different centers. Therefore, the reasons and preferences of tourists for choosing an EC as variables affecting the decision-making process to choose one among different destinations should be assessed. Identifying these factors provides an opportunity for MAOs of ECs to apply them and to enhance them in their centers to encourage tourists to visit and use the services presented by them. This not only attracts more customers but also improves the current conditions of ECs. In summary, the necessity and importance of this issue for MAOs of ECs and the lack of similar research in the literature for ECs accentuate the distinction and validity of our study. Mazandaran province is one of the potential ecotourism areas in Iran where a significant number of ECs are active there. Figure 1 shows the trend of changes in the number of ECs from 2015 to 2020 in the Mazandaran province and Iran. The number of ECs in the country until the year 2020 is about 2,000 and in Mazandaran province is about 300. This means that 15%

of the country's ECs are located in this province. The high and significant number of ECs in the province has created an intensive competitive environment among these centers in attracting customers. Therefore, today, the major and substantial concern of the MAOs of these centers is to find helpful solutions to attract more customers and surpass the competitors in the existing competitive environment. As a result, in the present study, the factors having great impacts on the choice of an EC by tourists have been studied and examined. To achieve this, the first 10 factors are identified and then they are ranked using the Fuzzy DEMATEL and the TOPSIS method. Finally, we discussed the findings and results and suggested beneficial insights for MAOs. Other parts of this paper contain: Section 2 provides a summary of some research conducted pertain to the present study. A detailed definition of the problem is presented in Section 3. Sections 4 and 5 provide the methodologies and the gained results from the implementations, respectively. Finally, Section 6 concludes the process and the findings of this paper.

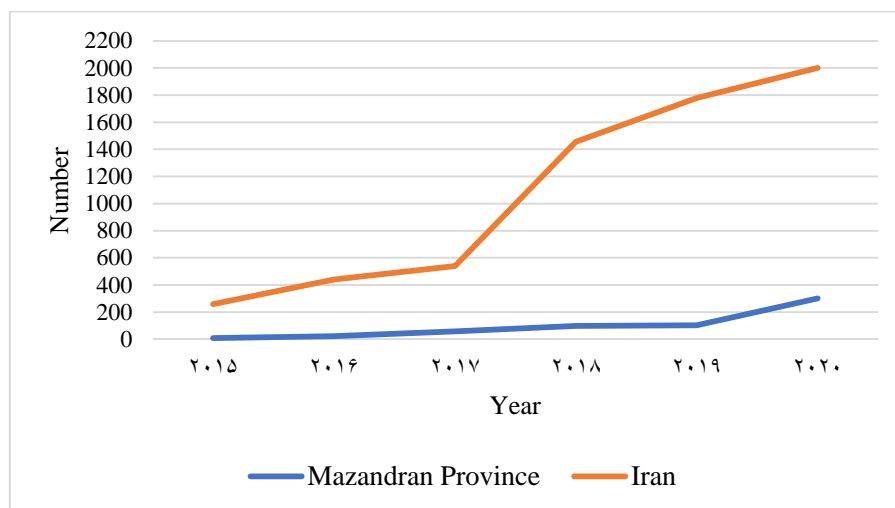


Fig.1. The trend of changes in the number of ECs in the Mazandaran province and Iran (www.meth.ir).

2. Literature Review

In this section, for further familiarity with the subject, some relevant and up-to-date papers are reviewed and a summary for each of them is provided.

Santana-Jiménez and Hernández, (2011) examined overcrowding as a factor influencing tourist attraction in an area. To measure the degree of this factor in each region, the density of the tourist population was used. They also presented a model for estimating demand in their research. Information about the tourist destination has a great impact on the process of selecting a destination and attracting them. So, Hsu et al., (2012) considered this issue and proposed an intelligent recommendation system for tourists. In order to check the system validity of the system, they implemented it in a

real case. Zgłobicki and Baran-Zgłobicka, (2013) introduced the geomorphological heritage as an effective factor in attracting tourists in some areas. To strengthen the findings of their research, they selected some popular and interesting tourist sites in Lubelskie province, Poland. Also, it is represented in their study that the aesthetics features of the sites are the main motivation for tourists to adopt one of them. Choosing the right pricing strategy is one of the most important and crucial issues in all businesses, including the tourism industry. Therefore, Wu et al., (2014) perused this issue in their study. They introduced a novel pricing approach and they claimed that this approach has some economic and environmental benefits. One of the hot and practical topics in the tourism

industry is being smart. Smart tourism is the outcome of combining and developing updated information and technologies. Being smart helps a destination to surpass its competitors in a competitive environment and it is introduced as an influential factor to attract tourism. In smart tourism, information technology has a very important role that integrates the services provided for tourists (Wang et al., 2016). Molinillo and Japutra, (2017) studied the variables that attract domestic tourists to cultural attractions. They also introduced cultural attractions as one of the important advantages of tourist destinations to attract tourists. To conduct their research, they identified 10 cultural attractions in Spain and then categorized them into three different groups. They advise tourist attraction managers to concentrate on some of their characteristics such as age and gender to absorb more tourists. Jensen et al., (2017) examined the role of on-site factors on tourist satisfaction and attraction. On-site factors refer to the necessary platforms to present services to tourists and support them after offering. They considered four tourist sites in Norway and examined the factors in these sites. The results of their research reveal that depending on the site and the type of visit, the tourist's perception of the mentioned factors is different. Travési, (2017) discussed the politics of knowledge and introduce it as a hot current issue in tourism research that has remarkable impacts on tourist attraction. She showed the importance of the topic in her research by revealing the need for further study on this issue in tourism industry and related branches. Tourist agencies are one of the most important players in the tourism industry that offer a variety of services to customers in the tourism sectors. These services include transportation plans, tour packages, insurance services, and accommodation. Also, it can be used that tourist agencies are most used in the tourism industry these days. The more a destination includes tourism agencies, the more it attracts tourists (Frenzel, 2017). Like some studies, Liu et al., (2017) emphasized on importance and efficiency of network analysis in the tourism industry and its development in a community. They also used a real study in Xinjiang, China to demonstrate its application in their research. Kim et al., (2018) highlighted the importance of branding a tourist destination in attracting tourists. Like many businesses, the brand is an important marketing tool in the tourism which persuades tourists to choose a tourist destination. They examined the impact of the brand in a local destination of Florid, USA. In their research, they used the opinions of experts, managers of tourism

Identifying the factors affecting the demand for travel to any destination is always an important issue for scholars as well as MAOs of tourism destinations. It is clear that destinations with different characteristics attract more tourists. Therefore, the process of choosing a destination, on the one hand, depends on the demand and needs of tourists, and on the other hand, it depends on the various characteristics which the destination has. Paying attention

destination, relevant officials, tourists, and local people. Yang, (2018) emphasized the importance and necessity of web-based text data on attracting tourists to a community. He stated that if the necessary platform is formed for the exchange of information and experiences between tourists and the government, it can lead to the development of tourism in a community. Another important factor in attracting tourists for a destination is the analysis of tourist spatial behavior. Considering the spatial behavior analysis in the tourism planning is crucial because the demands and needs of tourists are diverse. By recognizing the characteristics and needs of tourists and analyzing and using them in tourism planning, more appropriate services can be provided for different groups of tourists (Kang et al., 2018). Masoud et al., (2019) disclosed that intangible cultural heritage captivates tourists for a destination like some other factors. Cultural heritage does not only include monuments and historical objects. It also includes customs, idioms, languages, dialects, games, music, ceremonies, celebrations, dances, and some other items. Although these items are tangible and may not be visible and do not have an external existence, they are a very important factor for destination to absorb tourists which are called intangible cultural heritage. Chen and Wu, (2021) presented a novel and modern approach entitled actor-network theory to study the development of tourism in a destination. They utilized the approach in Jimmy-related theme park, Taiwan and claimed that this approach. They claimed that the practical concepts of this approach along with social affordance are very effective and useful for studying tourism destinations.

In all reviewed papers, only the impacts of one factor on tourist attraction and tourism development are studied in an area. Also, considering the literature review, almost no research has been done to investigate the tourist attraction in ECs. What distinguishes our work from others in the field of tourism is that the ecotourism industry, especially the ECs have their unique features and structure where they must be examined specifically and carefully. Another important point about our research is that it considers some of influential and practical factors affecting tourist absorption in ECs are studied. Besides, the determined factors are prioritized for facilitating the Decision-Making (DM) process for MAOs of EC. Also, the efficiency and effectiveness of the present study for MAOs of ECs for solving the created challenges increase its credibility and importance.

3. Model Description

to the differences in the nature of tourist destinations (having unique features) as well as the existence of various groups of them makes them prioritized and classifiable from different aspects. The growing number of ECs in some communities has faced the MAOs of these centers with a serious challenge to compete with competitors in attracting more tourists. As a result, exploring the effective factors in the process of choosing

an EC by tourists is crucial and helpful for the MAOs of ECs. By identifying these factors, they can consider or boost these factors in their centers. In this study, to find the factors which attract tourists for ECs, firstly, some related factors were extracted from the investigation done on this topic. Then, some online sessions were held that the members of these sessions were included of tourism experts especially those who investigate on ecotourism field, the MAOs of ECs, and the ecotourism activist. Next, 20 factors were identified based on the viewpoints of the members. Eventually, through online polls on social networks such as Instagram and Telegram, 10 factors receiving the most votes by tourists are selected as the final and the most effective factors regarding the present topic. The final selected factors are as follows:

F1: Price: Price has a great impact on attracting customers and encouraging them to use the services or products of a company or a business and increases their profits. For most customers, price is the main determinant of their choice which is also very important for tourists to choose an EC. Therefore, proper pricing by MAOs of ECs has a major impact on the DM process of each tourist.

F2: Personnel: The success of any organization, institution, or business is the result of the right choice of hiring people to play a role. The key roles of human resources in advanced organizations cause that researchers attribute the effectiveness of all techniques and tactics to human resources. It is also quite clear that most sales are made by the best sellers. Therefore, ECs should employ skilled, experienced, and friendly workforces to present services to tourists, which will attract and retain customers for the center.

F3: Security: Security and tourism are interrelated and interdependent. Security and tourism have a bilateral interaction with each other and also increasing or decreasing the security level will cause tourism to prosper or stagnate. Therefore, one of the most important and significant criteria for tourists to choose a tourist destination is the security level of the destination.

F4: Customer Relationship System (CRS): Development of communication and interaction with the customer is one of the important functions and applications of the appropriate CRS. Social media is one of the CRS for tourism purposes which can be examined from two perspectives. The first perspective is the development of connections between tourism centers. This facilitates the interaction and exchange of experiences of tourism businesses between ECs and enables them to improve the performance of their services. The Second one is the development of communication between ECs and tourists that allows ECs to benefit from the feedback of tourists about their performance in presenting services. Also, it helps them to

assess the quality level of services offered to tourists and to correct deficiencies and shortcomings if they receive negative feedback.

F5: Geographical Environment (GE): The GE is the basis of various activities especially tourism. The environment, as the main pillar of the tourism flow, plays an important role in the process of attracting tourists and provides a variety of opportunities. Therefore, tourism and the environment (in human and natural dimensions) are interrelated and the GE includes many attractions. The development of tourism flows also depends on the quality of the GE. The most important or strongest element in the tourism era is the natural attractions existing in the environment where the ECs are built. Proper environmental conditions consisting of natural attractions have two important functions for tourist centers. The first advantage is to encourage and attract tourists and the second one is acquiring and increasing their satisfaction.

F6: Variety of services: These days, tourists are aware of the products and services available in the market and want to achieve more valuable ones. As a result, it leads to serious pressures on ECs to offer new and special services at every moment. By developing the tourism industry and increasing the awareness of tourists, diverse and special services must be provided to meet the needs of tourists. Also, most tourists tend to visit the EC which has a variety of services and meets most of their needs.

F7: Quality of services: Increased competition, changing business environment and globalization are some of the major changes that have materialized in the service industry. Demand for each service is changing rapidly and it affects the customer buying behavior. In the past, for various reasons such as exceeded demand over supply and limited competition in various fields, the demands and needs of customers were not given much attention and people had to receive the goods or services they needed in any quality. In recent years, due to high supply rate and competition, manufacturing and service centers are forced to provide services at better quality and tailored to the desires of customers to maintain their customers and increase profitability and market share. On the other hand, customers' awareness and the number of competitors also increased and they cause that the customers do not accept any kind of goods or services. Nowadays, customers are looking for a product or service which are produced at the best possible quality level. Therefore, one of the effective factors in the success of each organization (production/service) particularly ECs is offering services at an acceptable quality level.

F8: Native people and originality: Due to the changes in the inclinations and lifestyles of tourists and being saturated with the most visited and manmade attractions, tourists tend to travel to natural environments and pristine

areas and be familiar with local and traditional cultures and values. Therefore, another important factor for tourists to select an EC is that the ECs signify the customs, cultures, and unique architecture of the region. Also, one of the factors that can be effective in the development of ecotourism and improving the conditions of ECs is the local residents of the region. Basically, the behavior of the locals living in the destination where ECs are built has a significant impact on the choice or non-choice of a center by tourists.

F9: Brand: Nowadays, the brand has become an essential part of the life of any business and it plays an important role in customer' DM process. Many theorists, managers, and researchers have named the future marketing world, the world of brand management and activities focusing on the brand. No investment can be more efficient for organizations than a powerful, reputable, and value-added brand. Building a strong brand in the market is the goal of each organization. Brand identity is an asset that creates value for the organization and its products. For this reason, in today's world, thousands of different brands have existed. So, creating a strategic infrastructure for the brand is an important principle to occupy a place in the mind of the customer.

From the consumer's point of view, the brand is the basis of a safe and desirable choice and has a positive impact on the selection process.

F10: Infrastructure: What offered to tourists in the tourism industry includes a wide range of services such as transportation, accommodation, food, etc. these services can be classified into two categories of tourism infrastructure and superstructures where each of them has its special importance. Infrastructure serves as the driving force of the tourism industry and plays an important role in the development of tourism destinations. Having a proper transportation system to the place of attractions, easy and convenient access to the center, drinking water, proper telecommunication system, being close to medical centers are examples of good infrastructure. If they are at a good quality level, they will encourage tourists to choose an EC. On the other hand, direct or indirect use of facilities by tourists has undeniable effects on their satisfaction. It is clear that if there is no proper infrastructure in the tourist destination, it is expected that the conditions of that destination will be very prosperous and developed. Figure 2 indicates an outline of factors that are determined in this paper.



Fig. 2. An outline of the considered factors.

3.1. Case study

Having some advantages such as special GE, suitable climate, pristine and beautiful nature, abundant natural attractions and hospitable and warm-hearted native people cause Mazandaran province has become one of the ecotourism hubs in Iran. A special point about Mazandaran province is the diversity of natural attractions such as mountains, sea, waterfall forests, lakes, citrus orchards, and agricultural farms that distinguish this province from other provinces. Therefore, these unique features and potentials of this province have encouraged investors to activate in the field of ecotourism through the establishment of ECs. The consequence is the establishment of 300 ECs in this province, which is a considerable number (www.mcth.ir). Furthermore,

customers of ECs existing in this province are mainly categorized into three groups including 1) Native or Local tourists: comprising all people of the Mazandaran province, 2) Non-local tourists: including people from other provinces who travel to Mazandaran province for spending their leisure times and use the services of ECs belong to this province, 3) International tourists: containing all foreign people interested in ecotourism and travel to Iran. Figure 3 shows the geographical map of Mazandaran province. According to this map, this province is one of the northern provinces of Iran and it has 22 counties. Besides, Figure 4 shows some of the fascinating attractions of this province, including the sea, waterfalls, mountains, jungles, citrus gardens, and farms especially rice farms.

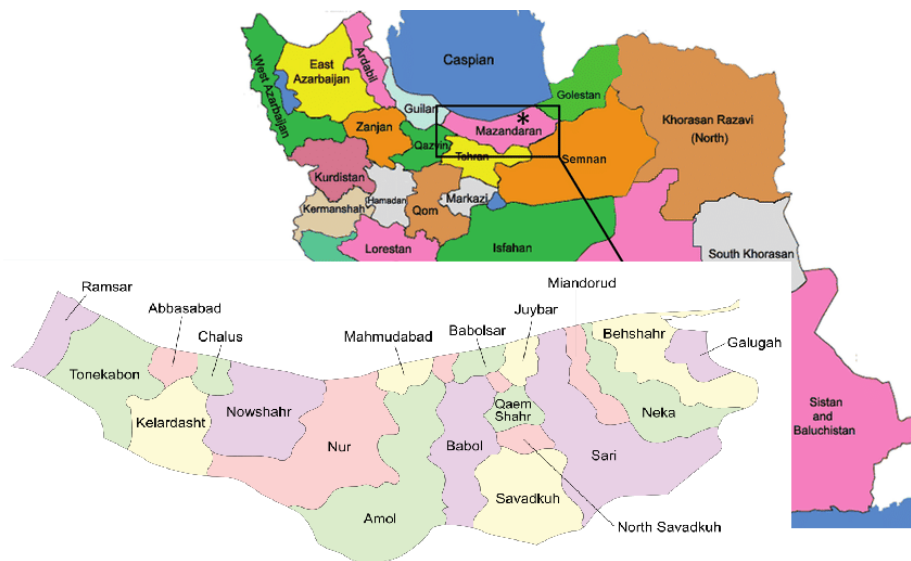


Fig.3. The geographical map of the study area.



Fig.4. Some natural attractions of the Mazandaran province.

4. Methodology

The approaches applied in this research are divided into two groups: the approaches used for the questionnaires and the approaches used to obtain the final results of the research. The approaches of the first group include methods Cochran's Sample Size Formula, face validity and Cronbach's alpha technique. To determine the final results, the fuzzy DEMATEL and the TOPSIS methods are used. All of them are described in detail in the following.

4.1. The approaches used for questionnaires

When using a questionnaire in research, two important subjects should be considered: 1) determining the appropriate number of questionnaires and 2) controlling the quality of the obtained results. Quality control of the results obtained from a questionnaire covers a wide range of different topics where the two of the most important subjects of it are validity and reliability of the questionnaire. Cochran's Sample Size Formula is used to determine the number of questionnaires in this study. Also, to evaluate the validity and reliability of the questionnaires, the face validity approach and Cronbach's alpha technique are utilized, respectively.

4.1.1. Cochran's Sample Size (CSS) Formula:

The CSS formula is one of the most widely used methods for calculating statistical sample size. Therefore, the CSS formula which is shown in Equation 1 is used to determine the appropriate number of questionnaires.

$$n = \frac{NZ^2pq}{Nd^2Z^2pq} \quad (1)$$

In the formula presented in Equation 1, N, n, Z, d, p and q illustrates the Population Size (PS), the CSS, the amount of the standard normal distribution, Permissible error value or error percentage, the proportion of the population which has the attribute in question and $q=1-p$, respectively. In most studies, the amount of d and p are considered equal to 0.05 and 0.5, respectively (Sanei et al., 2021). But, when the PS (N) is a small number, a modification for the CSS formula is proposed which is represented in Equation 2, where n is the new CSS and n0 is the CSS value suggested by the CSS formula (Kotrlík and Higgins, 2001).

$$n = \frac{n_0}{1 + \left(\frac{n_0 - 1}{N}\right)} \quad (2)$$

4.1.2. Face validity of questionnaire

The validity of a questionnaire is one of the most frequently discussed topics that is very important when the questionnaire is applied to collect data to do an

investigation. it has different forms that one of them is Face Validity (FV) used in the current study. The FV usually is not expressed numerically and questions and options are designed and modified based on view points of experts. it indicates that each element measured should encompass the purpose of the research. If all the experts agree that the designed questionnaire adequately reflects the goals of the research, then, it is concluded that the questionnaire is valid. Also, it emphasizes that the questions should be logical and appropriate to the characteristics of the respondents (Broder et al., 2007).

4.1.3. Cronbach's alpha Coefficient (CAC)

The CAS (α) is a test that measures the internal consistency of attitudes, judgments, and criteria in a questionnaire. It examines the reliability of the questionnaire and its result is the essential condition to confirm each questionnaire. The formula given in Equation 3 calculates the CAC, where S_i^2 , S^2 , k and \bar{v} represents the variance of each item, the total variance of each questionnaire, and the number of items, respectively (Sijtsma, 2009).

$$\alpha = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum_{i=1}^k S_i^2}{S^2}\right) \quad (3)$$

In this study, the test is done and the obtained value for each alpha belongs to each questionnaire, including the questionnaire answered by local, non-local and international customers are equal to 0.78, 0.81 and 0.76, respectively. Also, the value of alpha for the questionnaire designed to determine the importance degree of each type of customer is equal to 0.74. All gained values confirm the reliability of the designed questionnaires.

4.2. Fuzzy DEMATEL method

Decision Making Trial and Evaluation Laboratory (DEMATEL) technique is used to solve problems in different scientific fields considering opinions of experts (Mahmoudi et al., 2019). This method is based on pairwise comparisons and determines the impact and importance of each criterion as a numerical score through examining the interrelationships between them (Wu and Chang, 2015). In general, it is very difficult to estimate the opinion of experts with accurate numerical values, especially in conditions of uncertainty, because the results of decisions are highly dependent on inaccurate and vague subjective judgments. Therefore, to solve this problem, the DEMATEL method is combined with the fuzzy logic and introduces as the fuzzy DEMATEL method (Ocampo et al., 2018). Figure 5 shows the essential steps of the fuzzy DEMATEL method. Also, more detailed information about each step in the research of Li et al., (2020) is provided.

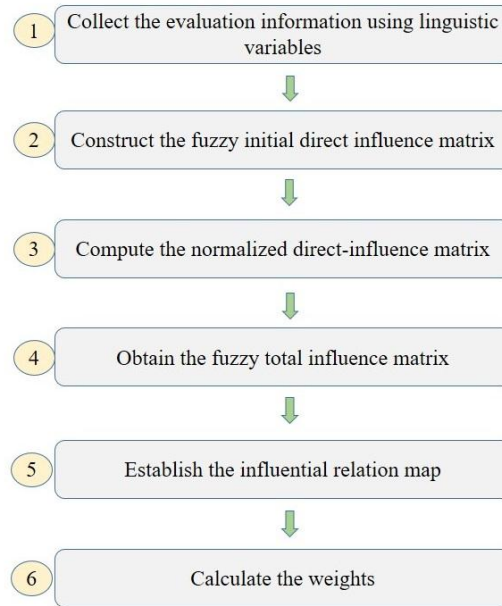


Fig.5. Steps of the Fuzzy DEMATEL method.

4.3. TOPSIS method

The word TOPSIS is an abbreviation of the phrase of The Technique for Order of Preference by Similarity to Ideal Solution. The method is an Multi Criteria Decision Making (MCDM) approach that is used to adopt an alternative among some alternatives (Vahdani et al., 2016). It is based on the two concepts includes "Positive Ideal Solution (PIS) and Negative

Ideal Solution (NIS)" and "similarity to PIS" (Makui et al., 2016). The selected alternative must have the shortest distance to PIS and the longest distance to NIS (Zhou et al., 2021). More and thorough information about this method has been provided in the research of Sobhanallahi et al., (2019). Besides, the steps of the TOPSIS method are shown in Figure 6.

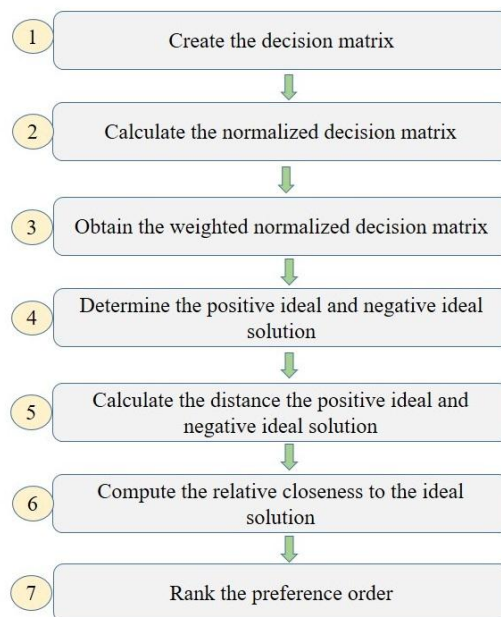


Fig.6. Steps of the TOPSIS method.

5. Implementations and Findings

This section presents the results of implementing the fuzzy DEMATEL and TOPSIS methods. First, the weight of each factor is obtained based on the opinions of tourists belong to each customer group by utilizing the fuzzy DEMATEL method. Then, the considered factors are ranked by applying the TOPSIS method.

5.1. Implementations of the fuzzy DEMATEL

According to statistics from the General Office of Cultural Heritage of Handicrafts and Tourism of Mazandaran, about 1.2 million tourists visit ECs of the province and use their services every year. Also, based on historical data, 65% (780,000), 30% (360,000) and 5% (60,000) of the tourists are local, non-local and international, respectively. Initial required data to implement the fuzzy DEMATEL are collected through an online questionnaire that was completed by some tourists belong to each group of customers. the CSS for the local, the non-local, and the international tourists are equal to 384, 384, and 382 people, respectively. Tables 1-3 demonstrate the Fuzzy Initial Direct-Influence (FIDI) matrix related to local, non-local, and international customers. For more information, each value presented in these three tables is the average amount of the CSS belonging to each group of customers. Also, the final calculation for each group of customers is provided in Table 4. It is noteworthy that to obtain the defuzzification values of $\tilde{D} + \tilde{R}$ and $\tilde{D} - \tilde{R}$, the Graded Mean Integration Representation (GMIR) technique is applied. Also, the relevant formulation of the GMIR technique is shown in Equation 4. If an \tilde{F} is a triangular fuzzy number, therefore, it is demonstrated as: $\tilde{F} = (F^l, F^m, F^u)$. \tilde{F}^{def} is the defuzzy form of \tilde{F} .

$$\tilde{F}^{def} = \frac{F^l + 4F^m + F^u}{6} \quad (4)$$

In order to obtain the weight of i th criterion W_i , Equation 5 is used:

$$w_i = \frac{\left[\left((\tilde{D}_i + \tilde{R}_i)^{def} \right)^2 + \left((\tilde{D}_i - \tilde{R}_i)^{def} \right)^2 \right]^{1/2}}{\sum_{i=1}^n \left[\left((\tilde{D}_i + \tilde{R}_i)^{def} \right)^2 + \left((\tilde{D}_i - \tilde{R}_i)^{def} \right)^2 \right]^{1/2}} \quad (5)$$

5.2. Implementations of TOPSIS method

As we know, to start implementing the TOPSIS method, a matrix called the decision matrix provided in Table 5 is needed. The data of this matrix are the obtained weights of each factor based on different customer groups. In the decision matrix, the 10 identified are the alternatives and the three groups of customers are the criteria. As mentioned before, there are 300 ECs in the province, so to determine the importance degree (weight) of each group of customers, 168 ECs must be surveyed considering the CSS formula. But given that the PS is small ($N=300$), according to Equation 2, the final CSS value is equal to 107. The average of the MAOs' opinions is considered as the weight of each group of customers including local, non-local, and international which are 0.36, 0.33, and 0.31, respectively. Table 6 represents the Weighted Normalized Decision (WND) matrix. The final results of implementing the TOPSIS method is provided in Table 7. This table contains information such as PIS, NIS, the Closeness Coefficient (CC), and the ranking of factors. Figure 7 indicates the final ranking under different modes including based on the opinion of the Local customers (Local based), non-Local customers (Non-local based), International customers (International based), and collective result (considering the opinions of three types of customers together).

Table 1

The FIDI matrix for the local customer group.

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	(0.0,0.25)	(0.25,0.5,0.75)	(0.053,0.237,0.487)	(0.437,0.687,0.937)	(0.055,0.11,0.36)	(0.125,0.375,0.625)	(0.312,0.562,0.812)	(0.004,0.009,0.259)	(0.291,0.541,0.791)	(0.053,0.302,0.552)
F2	(0.5,0.75,0.999)	(0.0,0.25)	(0.437,0.687,0.937)	(0.448,0.698,0.947)	(0.053,0.294,0.544)	(0.039,0.282,0.532)	(0.208,0.458,0.708)	(0.013,0.251,0.501)	(0.484,0.734,0.983)	(0.065,0.266,0.516)
F3	(0.546,0.796,0.996)	(0.166,0.416,0.666)	(0.0,0.25)	(0.375,0.625,0.875)	(0.013,0.221,0.471)	(0.247,0.297,0.747)	(0.178,0.428,0.678)	(0.006,0.254,0.504)	(0.695,0.945,1)	(0.083,0.333,0.538)
F4	(0.402,0.652,0.9)	(0.041,0.291,0.541)	(0.177,0.427,0.677)	(0.0,0.25)	(0.015,0.219,0.469)	(0.473,0.723,0.972)	(0.5,0.75,0.999)	(0.179,0.429,0.679)	(0.748,0.998,1)	(0.447,0.697,0.945)
F5	(0.173,0.423,0.673)	(0.019,0.199,0.449)	(0.447,0.697,0.946)	(0.303,0.553,0.803)	(0.0,0.25)	(0.389,0.639,0.887)	(0.408,0.658,0.907)	(0.435,0.685,0.934)	(0.557,0.707,0.951)	(0.457,0.707,0.951)
F6	(0.499,0.749,0.999)	(0.029,0.218,0.468)	(0.335,0.585,0.835)	(0.445,0.695,0.945)	(0.075,0.325,0.575)	(0.0,0.25)	(0.454,0.704,0.949)	(0.14,0.39,0.64)	(0.687,0.937,1)	(0.29,0.54,0.79)
F7	(0.695,0.945,1)	(0.305,0.555,0.805)	(0.006,0.208,0.458)	(0.458,0.708,0.951)	(0.188,0.438,0.688)	(0.462,0.712,0.953)	(0.0,0.25)	(0.025,0.246,0.496)	(0.482,0.732,0.973)	(0.199,0.449,0.699)
F8	(0.253,0.503,0.753)	(0.019,0.267,0.517)	(0.501,0.75,0.993)	(0.019,0.234,0.484)	(0.508,0.758,1)	(0.552,0.772,0.994)	(0.5,0.75,0.9972)	(0.0,0.25)	(0.509,0.759,0.965)	(0.208,0.458,0.708)
F9	(0.715,0.965,1)	(0.509,0.759,0.947)	(0.307,0.557,0.807)	(0.256,0.506,0.756)	(0.001,0.199,0.499)	(0.505,0.755,0.999)	(0.49,0.74,0.99)	(0.001,0.173,0.423)	(0.0,0.25)	(0.243,0.493,0.743)
F10	(0.717,0.967,1)	(0.015,0.199,0.449)	(0.14,0.39,0.64)	(0.497,0.747,0.997)	(0.283,0.533,0.783)	(0.507,0.757,0.997)	(0.458,0.708,0.952)	(0.251,0.501,0.751)	(0.712,0.962,1)	(0.0,0.25)

Table 2

The FIDI matrix for the Non-local customers group.

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	(0.0,0.25)	(0.294,0.544,0.794)	(0.053,0.257,0.507)	(0.248,0.498,0.748)	(0.055,0.011,0.36)	(0.255,0.505,0.755)	(0.273,0.523,0.773)	(0.061,0.123,0.373)	(0.281,0.531,0.781)	(0.042,0.288,0.538)
F2	(0.475,0.725,0.975)	(0.0,0.25)	(0.259,0.509,0.759)	(0.438,0.733,0.977)	(0.042,0.223,0.473)	(0.007,0.24,0.49)	(0.194,0.444,0.694)	(0.007,0.2,0.45)	(0.501,0.751,0.944)	(0.025,0.239,0.489)
F3	(0.457,0.707,0.951)	(0.247,0.497,0.747)	(0.0,0.25)	(0.26,0.51,0.76)	(0.025,0.273,0.523)	(0.279,0.529,0.779)	(0.218,0.468,0.714)	(0.006,0.251,0.501)	(0.711,0.961,1)	(0.214,0.468,0.714)
F4	(0.479,0.729,0.973)	(0.24,0.49,0.74)	(0.224,0.474,0.724)	(0.0,0.25)	(0.0,0.25)	(0.496,0.746,0.996)	(0.525,0.775,0.996)	(0.237,0.487,0.737)	(0.738,0.988,1)	(0.25,0.5,0.75)
F5	(0.255,0.505,0.755)	(0.023,0.488)	(0.531,0.781,0.981)	(0.225,0.475,0.725)	(0.0,0.25)	(0.561,0.811,0.996)	(0.509,0.759,0.97)	(0.472,0.722,0.951)	(0.486,0.736,0.966)	(0.491,0.744,0.973)
F6	(0.42,0.67,0.9)	(0.029,0.267,0.517)	(0.228,0.478,0.728)	(0.485,0.735,0.965)	(0.261,0.511,0.761)	(0.0,0.25)	(0.47,0.72,0.957)	(0.195,0.445,0.695)	(0.723,0.973,1)	(0.21,0.46,0.71)
F7	(0.703,0.953,1)	(0.239,0.489,0.739)	(0.007,0.24,0.49)	(0.42,0.74,0.978)	(0.252,0.502,0.752)	(0.51,0.76,0.988)	(0.0,0.25)	(0.065,0.259,0.509)	(0.518,0.768,0.996)	(0.241,0.491,0.741)
F8	(0.231,0.481,0.731)	(0.012,0.255,0.505)	(0.5,0.75,0.998)	(0.002,0.25,0.5)	(0.496,0.746,0.964)	(0.496,0.746,0.97)	(0.545,0.795,0.995)	(0.0,0.25)	(0.55,0.8,0.998)	(0.146,0.396,0.646)
F9	(0.745,0.995,1)	(0.536,0.786,1)	(0.182,0.432,0.682)	(0.204,0.454,0.704)	(0.026,0.246,0.496)	(0.517,0.765,0.981)	(0.535,0.785,0.983)	(0.0,1.29,0.379)	(0.0,0.25)	(0.246,0.496,0.746)
F10	(0.739,0.989,1)	(0.065,0.28,0.53)	(0.209,0.459,0.709)	(0.543,0.792,0.999)	(0.201,0.451,0.701)	(0.55,0.8,0.997)	(0.562,0.812,1)	(0.259,0.509,0.759)	(0.72,0.97,1)	(0.0,0.25)

Table 3

The FIDI matrix for the international customer group.

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	(0.0,0.25)	(0.246,0.496,0.746)	(0.015,0.225,0.475)	(0.255,0.505,0.755)	(0.006,0.013,0.263)	(0.278,0.524,0.778)	(0.246,0.496,0.746)	(0.002,0.005,0.255)	(0.238,0.488,0.738)	(0.195,0.445)
F2	(0.458,0.708,0.952)	(0.0,0.25)	(0.217,0.467,0.717)	(0.48,0.73,0.973)	(0.001,0.225,0.475)	(0.007,0.236,0.486)	(0.253,0.503,0.753)	(0.012,0.246,0.496)	(0.501,0.751,0.955)	(0.008,0.255,0.505)
F3	(0.746,0.726,0.958)	(0.276,0.526,0.776)	(0.0,0.25)	(0.256,0.506,0.756)	(0.008,0.212,0.462)	(0.182,0.432,0.682)	(0.19,0.044,0.69)	(0.012,0.221,0.471)	(0.712,0.962,1)	(0.211,0.461,0.711)
F4	(0.5,0.75,0.98)	(0.3,0.55,0.8)	(0.243,0.484,0.743)	(0.0,0.25)	(0.012,0.245,0.491)	(0.513,0.763,0.994)	(0.497,0.747,0.99)	(0.268,0.518,0.768)	(0.738,0.988,1)	(0.248,0.498,0.748)
F5	(0.173,0.423,0.673)	(0.0,246,0.496)	(0.48,0.73,0.973)	(0.189,0.439,0.689)	(0.0,0.25)	(0.505,0.755,0.998)	(0.466,0.716,0.96)	(0.499,0.749,0.986)	(0.475,0.725,0.96)	(0.497,0.747,0.971)
F6	(0.502,0.752,0.975)	(0.006,0.2,0.45)	(0.215,0.465,0.715)	(0.509,0.759,0.978)	(0.22,0.47,0.72)	(0.518,0.768,0.975)	(0.53,0.78,0.988)	(0.228,0.478,0.728)	(0.748,0.998,1)	(0.253,0.503,0.753)
F7	(0.695,0.945,1)	(0.253,0.503,0.753)	(0.006,0.208,0.458)	(0.501,0.751,0.986)	(0.244,0.494,0.744)	(0.518,0.768,0.975)	(0.567,0.817,0.999)	(0.012,0.22,0.47)	(0.547,0.797,0.996)	(0.27,0.497,0.747)
F8	(0.241,0.491,0.741)	(0.017,0.231,0.481)	(0.532,0.782,0.988)	(0.015,0.233,0.483)	(0.546,0.796,0.981)	(0.562,0.812,0.996)	(0.511,0.761,0.998)	(0.0,0.25)	(0.527,0.777,0.986)	(0.24,0.49,0.74)
F9	(0.717,0.967,1)	(0.509,0.759,0.978)	(0.244,0.494,0.744)	(0.232,0.482,0.732)	(0.026,0.24,0.49)	(0.51,0.76,0.991)	(0.511,0.761,0.998)	(0.007,0.233,0.483)	(0.0,0.25)	(0.195,0.445,0.695)
F10	(0.746,0.996,1)	(0.019,0.24,0.49)	(0.258,0.508,0.758)	(0.496,0.746,0.975)	(0.248,0.498,0.748)	(0.501,0.751,0.995)	(0.515,0.765,0.994)	(0.255,0.505,0.755)	(0.739,0.989,1)	(0.0,0.25)

Table4
The results of the final calculations.

Factor s	Type of customers					
	Local customer			Non-Local customer		
	D^{def}	R^{def}	$(D+R)^{def}$	$(D-R)^{def}$	Weight	
F1	2.297	3.838	6.135	-1.542	0.115	
F2	2.786	3.596	6.382	-0.810	0.118	
F3	2.728	3.223	5.951	-0.495	0.109	
F4	3.039	2.851	5.889	0.188	0.107	
F5	3.264	2.463	5.727	0.801	0.105	
F6	3.120	2.080	5.200	1.040	0.097	
F7	3.034	1.674	4.707	1.360	0.089	
F8	3.219	1.259	4.477	1.960	0.089	
F9	3.090	0.873	3.963	2.218	0.083	
F10	3.368	0.449	3.817	2.919	0.088	

Factor s	Type of customers					
	Non-Local customer			International customer		
	D^{def}	R^{def}	$(D+R)^{def}$	$(D-R)^{def}$	Weight	
F1	1.953	3.324	5.278	-1.371	0.114	
F2	2.227	3.125	5.353	-0.898	0.113	
F3	2.461	2.823	5.284	-0.361	0.111	
F4	2.784	2.500	5.284	0.285	0.110	
F5	2.990	2.144	5.134	0.846	0.109	
F6	2.738	1.795	4.532	0.943	0.097	
F7	2.694	1.451	4.145	1.243	0.090	
F8	2.754	1.084	3.838	1.670	0.087	
F9	2.596	0.760	3.356	1.836	0.080	
F10	2.999	0.398	3.397	2.601	0.089	

Table 5
The decision matrix.

Factors	Customers		
	Local	Non-local	International
F1	0.36	0.33	0.31
F2	0.115	0.114	0.112
F3	0.117	0.113	0.114
F4	0.109	0.111	0.108
F5	0.107	0.110	0.112
F6	0.105	0.109	0.107
F7	0.097	0.097	0.098
F8	0.089	0.090	0.090
F9	0.089	0.087	0.089
F10	0.083	0.080	0.081
F10	0.088	0.089	0.089

Table 6
The WND matrix.

Factors	Customers		
	Local	Non-local	International
	F1	0.134	0.118
F2	0.136	0.117	0.111
F3	0.127	0.115	0.105
F4	0.124	0.114	0.109
F5	0.122	0.113	0.104
F6	0.113	0.100	0.095
F7	0.104	0.093	0.088
F8	0.104	0.090	0.087
F9	0.097	0.083	0.079
F10	0.102	0.092	0.087

Table 7
Final results.

Factors	d_i^-	d_i^+	CC_i	Ranking
F1	0.059	0.003	0.951	2
F2	0.061	0.001	0.983	1
F3	0.051	0.011	0.818	3
F4	0.052	0.013	0.805	3
F5	0.047	0.016	0.741	5
F6	0.029	0.033	0.468	6
F7	0.015	0.047	0.244	7
F8	0.013	0.049	0.205	10
F9	0.000	0.062	0	8
F10	0.013	0.049	0.216	9



Fig. 7. Final ranking.

5.3. Discussion

According to the final calculation and findings, shown in Figure 7, it is understood that for the local and the international customers, the factor “personnel” has the most influence in their decision to choose an EC but for non-local customers, the price is the most important factor for selection. The collective result as well as local and international customers introduces the personnel as the first rank and the main factor to choose an EC. Today, human resources are mentioned as one of the important factors for the superiority of an organization in a competitive environment. Suitable behavior of an organization's human resources plays a key role in its superiority over competitors, where the results of this study also confirm this matter. For domestic tourists (Local and non-local), security is the third determining factor to select a center, but for international tourists, the CRS is the third important factor. According to them, a good CRS such as a dedicated website and social networks such as Instagram and sharing worthwhile and up-to-date information is very effective in their choice

decision. Location of a center, diversity and quality of services offered by them are ranked fifth to seventh to choose an EC, respectively. Location refers to the natural tourist attractions of the environment that the center is located there. The more their number and variety, the higher impact on the tourist's decision. Also, to adopt an EC based on the opinions of the local and international tourists, native people and native originality are more important than infrastructure, while for non-local tourists, the opposite is true. Native people mean the way they treat tourists and their hospitality. If native people of an area have a respectful and kind behavior with tourists, it will definitely have a positive impact on the decision of tourists to choose the center that belongs to the area. Also, the native originality means that the centers in terms of architecture should reflect the local culture of the region. It is noteworthy that the factor “brand” among other considered factors has the least important in the selection process. The reason for this matter is that the brand and reputation of a center cannot guarantee the quality of the services of the center and its superiority over others in all times and periods. On the other hand, tourists are looking to find a center that offers a variety of services at an

acceptable quality level with a more reasonable price, which is true for newly established centers most of the time. Since the number and type of tourists are different for each EC, so in this study, we divided the customers of each EC into three different groups and ranked them based on each group. This action helps MAOs of each EC to strengthen the factors in their centers according to the importance of each customer visiting their centers. For example, some ECs having a small demand from international tourists can use the findings to consider the most effective factor that is important for this type of tourist to select an EC.

6. Conclusion

Due to the increasing and significant number of ECs in the Mazandaran province, a fierce competitive environment has been formed among these centers to absorb tourists. This matter has faced serious challenges for MAOs of ECs, so knowing the factors which affect the selection process of an EC is very important and crucial for them. All of this has persuaded us to do necessary and helpful investigation on this challenge and provide gainful and applicable solutions. Therefore, in this study, some influential factors are first identified with the help of tourism experts and specialists. Then, based on an online survey, the 10 factors that have the most impact in comparison with others are selected by customers. Finally, the fuzzy DEMATEL and the TOPSIS method are applied to rank these factors. The results reveal that the factors including personnel, price, and variety of services are the most important for tourists to choose a center, respectively. Also, the brand and the infrastructure have the least impact on choosing an EC to spend the holidays compared to other factors. We hope that the findings of our research will help MAOs of the ECs to consider and strengthen these factors in their centers and get rid of this challenge. Pricing of services offered by ECs and examining their cooperation in exchanging services and customers can be interesting and efficient topics for future research.

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