The importance of the effect of mixed elements of marketing in the development of medical tourism in Gilan Province

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(Communicated by Sirous Moradi)

Abstract

The presence of expert and skilled doctors and Iran's abundant natural attractions, each of them alone, can attract many tourists. Previous studies have mainly focused on the attraction of health tourists, the segmentation of the medical tourism market, the challenges and solutions for the development of medical tourism, and the design of medical and health tourism models in government or selected hospitals in the country, as well as the impact of some marketing components in medical tourism. According to the capacities of Gilan province, the need to pay attention to market segmentation in medical tourism in a provincial way is more evident than before, and it is necessary to determine the marketing mix elements as well as the extent of its impact in the development of medical tourism in the province. Considering the complexities of the medical tourism market and the country's little experience, the lack of such an issue is very noticeable. Therefore, determining the impact of mixed marketing elements to promote medical tourism in the province to cover this theoretical and practical gap is an aspect of innovation and newness of the present research. The statistical population includes experts in the fields of management, executive and medical tourism, and using Cochran's formula, 36 questionnaires were distributed among the members of the statistical population. In this research, to analyze the fuzzy Delphi methods to screen and identify the effective factors in the mixed model of medical tourism marketing, the AHP method to determine the weights of the indicators that are effective in the mixed model of medical tourism marketing, and also the fuzzy ANP method to determine the optimal indicators in the conditions Uncertainty of information will be exploited. In order to solve the fuzzy ANP method and the multi-objective mathematical programming model, MATLAB software was used. The results show that the marketing mix index (A3) is the closest to the positive ideal answer and the most distant from the negative ideal answer, and the first priority among the effective factors in Gilan medical tourism in terms of the desired criteria is the medical tourism marketing mix.

Keywords: mixed marketing, health tourism, medical tourism, Gilan marketing
2020 MSC: 90B60, 91B26

1 Introduction

Tourism is the third largest industry in the world after the oil and automobile industries. This industry has a significant impact on the foreign exchange earnings of countries and will definitely become the first industry in the

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world in the near future. With the passage of time and the development of this industry, tourism has gone out of the general state and has been divided into specialized branches such as cultural tourism, sports tourism, adventure tourism, religious tourism, health tourism, etc. What is the basis of this division is the tourist's "main intention" of tourism. The World Tourism Organization (WTO) defines health tourism as "the use of services that lead to the improvement or enhancement of health and morale of a person (using mineral water, climate or medical intervention) and provided in a place outside the person's residence and more It lasts from 24 hours. Health tourism includes different types of tourism with the main motive of participation in physical, mental or spiritual health, which through medical and health activities increases the capacity of people to meet their needs and better performance of the individual in the environment and society. Health is a term that has two sub-categories: health tourism and medical tourism. Medical tourism is the most common and sensitive sub-branch of health tourism. Medical tourism is a type of tourism activity that includes the use of evidence-based medical resources and services (both invasive and non-invasive) and may include diagnosis, treatment, prevention and rehabilitation [4].

Medical tourism is travel that requires travel to foreign countries to access a wide range of medical services. Patients who feel they have to pay more to access medical care in their home countries are always looking for alternatives to reduce their medical expenses. Such people do this by travelling to other countries where it is cheaper to find similar medical services such as dentistry, medicine and surgery than those available in their country or place of residence [1]. The growing importance of medical tourism is caused by important factors such as:

1. Changes in demographic structure: the rapid increase in the elderly population, especially in developed countries such as the United States, Japan and many European countries, has increased the demand for medical services, while the supply of medical services It is limited in those countries. This excessive demand for medical treatment, compared to its supply, creates long waiting lists and forces people in developed countries to seek medical services abroad.
2. Increasing the cost of health care in developed countries: This causes people from developed countries to travel abroad in order to receive medical treatment with the same criteria as their countries but at a lower cost.
3. The impossibility of performing different procedures at the origin: in some cases, there are medical treatments that patients cannot receive in their country due to legal restrictions or access, such as abortion, some types of organ transplants, or stem cell treatment. to receive Therefore, these patients decide to perform these treatments in other provider countries.
4. Expansion of low-cost airlines: this will make international travel easier with the lowest travel costs. So traveling abroad to receive medical services will become more accessible.
5. Increasing high-quality medical care in developing countries: In developing countries, especially in Asia, there are many hospitals that have gained the credit of international services with international quality [10].

Among the tourism sectors, health tourism is the fastest-growing tourism sector at the international level. Health tourism is currently a $100 billion global business and is experiencing an average growth of 25% [1]. Meanwhile, medical tourism is an important industry with the potential to diversify the existing forms of tourism, improve the economy, strengthen local healthcare systems, create employment, etc. The potential impact of medical tourism on community well-being can be attributed to its ability to generate economic benefits and create significant jobs in the health sector of the community [17], investment in the medical industry is a way to increase GDP, improve services, generate foreign exchange, creating a more favorable balance of trade and tourism development. Patients have many reasons to go abroad for medical care. Among the notable cases, we can mention the financial ability and the level of quality of medical services [1].

"Marketing mix" is a general term that is used to describe the types of choices that organizations must make in the overall process of entering a product or service into the market. The concept of customer service led to the expansion of the traditional marketing mix from p4 to p7 and differentiated your services (which include a combination of tangible and intangible components) from your competitors to gain market share and position [3].

The marketing mix is a set of controllable marketing variables that the organization combines in the target market to create the reaction it needs, and by combining them, it finds the right answer for the needs of the target market. This combination includes any type of action that the company can take for its product to influence the demand [13].

Because medical tourism is one of the new capacities of tourism in the current market. The development of medical tourism leads to the strengthening of human resources, organizations and individual/social capacities [8], on the other hand, Iran has similar advantages compared to countries that have a developed brand of health tourism, such as low costs, quality medical services, Qualified doctors and many natural and cultural attractions [6].

According to the statistics published by the World Tourism Organization, the health tourism sector had one of the fastest growths in 2017 compared to other sectors (a figure equal to 6.5 percent). The health tourism statistics of 2017

show that the economy of health tourism is a total of 6.639 It has earned billions of dollars for the international economy. Since the condition of success and planning in the health tourism industry is to have accurate and documented statistics in this industry, but Iran is facing a serious gap in this field. All the statistics presented in this field are completely estimated and no specific organization or institution has accurate statistics on the number of health tourists [20]. According to the statistics available in 2017, between 500,000 and 550,000 foreign patients from neighboring countries came to Iran for treatment. About 72,000 of these foreign patients were hospitalized in the country's hospitals and the rest received outpatient medical services. 70% of the visits of medical tourists from foreign countries are for five diseases and medical services, including obstetrics, gynaecology, eye, orthopaedics, beauty, and cardiology, and 30% include other medical services [11].

In Iran, in order to solve the problems caused by the dependence on oil exports, it is necessary to invest in the production and export of those products and services that can earn foreign currency. Iran's tourism industry, despite its high potential, is suffering due to extensive nuclear sanctions. , the negative public image in Western countries and the lack of effective management of resources have faced many challenges. In addition, the development of this industry by itself will improve the quality of hospital services and treatment and create employment in health sectors and the implementation of global standards will lead to foreign exchange income and economic, social, cultural and political prosperity in the country.

With proper medical infrastructure, numerous medical research centers, advanced facilities and equipment, and experienced and skilled doctors, Iran can become one of the centers of medical tourism in the region. However, despite having all the necessary capabilities in the field of medicine, Iran has not been able to be successful enough in attracting medical tourists and is lagging behind its regional competitors. Considering the profitability of this industry, paying special attention to the export of medical services can play a significant role in increasing Iran's foreign exchange earnings. Iran can attract more tourists through marketing and identifying its capabilities in providing medical services and thus increase its foreign exchange earnings. This industry has prospered a lot in the last two decades and has become one of the most important sources of income in several developing countries [14].

In this regard, the model of mixed elements of marketing is one of the best tools that can help to create a suitable strategy in the management of tourism marketing, based on which each of the elements can be considered as a controllable variable [16]. Apart from this, today tourism marketers are facing a complex environment that is the result of the unprecedented growth of the tourism industry in recent years. Tourism marketers must influence the decision-making process of consumers who are in a global and complex competitive market [19]. In the field of medical tourism and attracting health tourists, one should always pay attention to four basic factors, which are: the capabilities of medical professionals, modern technologies and global standards, treatment economics and treatment costs, and internal regulations of countries. In the above cases, compared to the neighboring countries and the Middle East, Iran has higher capabilities, but unfortunately, there has not been proper publicity to identify Iran's medical and tourism capabilities abroad [12].

Since the World Tourism Organization has chosen Gilan as a pilot for the implementation of the country's comprehensive tourism plan "Silk Road Project" due to its natural capacities and being suitable for travellers from the countries of the Caucasus region, and this plan is a road map to guide tourists from all over the world to It is Gilan and creates a kind of sustainable and competitive tourism, and despite the high ability of Gilan province to attract health tourists, the special geographical location of Gilan and its border with northern neighboring countries, and the fact that this province has unique natural landscapes, wonderful nature, numerous natural tourism attractions, experienced medical staff and medical facilities. The equipment has not been able to have a significant share of medical tourism revenues. Therefore, this province can be a desirable destination for health tourists.

On the other hand, determining the appropriate and coordinated marketing mix with modern tourism is one of the effective factors for success in attracting medical tourists. Especially for medical marketing in Asia, especially in the corner markets of this industry, more specific models should be provided, in the macro discussions of medical tourism management, the necessity of marketing to attract regional and even global tourists is raised. One of the tools for determining the appropriate marketing mix is to study the market and its segmentation and choose the appropriate target market, which then based on the characteristics of this selected market, an effective marketing mix is designed.

According to the foregoing, the studies conducted show that despite the existence of some studies to determine the elements of the marketing mix at the national level, no systematic study has been done to determine the impact of the elements of the marketing mix for medical tourism in Gilan province. Therefore, the importance and necessity of conducting such research for the benefit of the scientific community and centers providing medical and tourism services double.

The presence of expert and skilled doctors and Iran's abundant natural attractions, each of them alone can

attract many tourists. This is while, for various reasons, these facilities have not been used in the best way, and no serious action has been taken to attract tourists and foreign exchange earnings, and an acceptable contribution to the development of the health tourism industry in the country has not been made And to have a proper understanding of Iran's potential capabilities in various fields of health tourism, to identify the priorities and the most important obstacles and basic challenges for the development of this industry and considering the fact that other countries in the Middle East and Asia region are attracting some tourists are healthy, it is necessary to examine the current state of this industry in the country, identify its weaknesses and strengths and leave it to the relevant authorities and their management actions to create a competitive advantage with other competitors to gain the market share that Iran deserves. Therefore, the current research aims to examine this scientific gap by investigating the following questions:

What are the components (elements) of the mixed marketing model for medical tourism in Gilan province?

What is the impact of each element of the marketing mix for medical tourism in Gilan province?

The overall goal is to conduct research that can determine the impact of the elements of the mixed marketing model for medical tourism in Gilan province, causing a better use of resources and the expansion of the market for the provision of medical services, and in line with economic, social and cultural development and ultimately development balanced and stable province to take an effective step. Previous studies have mainly focused on the attraction of health tourists, the segmentation of the medical tourism market, the challenges and solutions for the development of medical tourism, and the design of medical and health tourism models in government or selected hospitals in the country, as well as the impact of some marketing components in medical tourism. Considering the capacities of Gilan province, the need to pay attention to market segmentation in medical tourism is more evident than before and it is necessary to determine the impact of mixed marketing elements on it. Considering the complexities of the medical tourism market and the country's little experience, the lack of such a comprehensive model is very noticeable. Therefore, determining the importance of the impact of mixed marketing elements to promote medical tourism in the province in order to cover this theoretical and practical gap is the aspect of innovation and newness of the present research.

2 Research background

Choi et al. in [5], studied 33 patients who were asked about their reasons for choosing a medical tourism destination to travel to that country, 20 of them, i.e. about 61%, considered the praise of others or word-of-mouth advertising as the main reason for visiting Korean hospitals, and 24% considered the care factor. Medicine and advanced technology and the rest were chosen by two other factors.

Sultana et al. showed that the most important factors in attracting tourists include factors related to the destination (infrastructure, weather, health and treatment areas, entertainment and recreational places), the price of services (cost of health services, food cost, travel cost and accommodation cost), tourist attitude (culture, income, race and religion) and service quality (reliability, empathy, responsiveness, guarantee and feelings) [18].

In [7] Frost et al. investigated the future growing demand for nature-based tourism in the Asia-Pacific region. In this study, the most important examples affecting the future success of tourism are cases such as protected areas, zoos, mineral springs and nature. In addition, the research showed that a strong attachment to nature may manifest itself in overdevelopment and overuse of natural attractions in 2050.

Badlesko in [2], to clarify the status of entrepreneurship opportunities and the boundaries of bioethics in the field of tourism and provide a wide range of services related to tourism in the private sector based on entrepreneurship opportunities and examining the contribution of import and export of medical services to the total medical expenses in selected countries. OECD (Organisation for Economic Co-operation and Development) (Luxembourg, Iceland, Canada, Germany, Korea, France, Netherlands, United States, Czech and Hungary) has paid.

Ricafort in [15], by choosing 20 influential factors, he examined the issue from the tourists' point of view and finally prioritized the influential factors. The results of the research show that among the factors, the factor of expert and reliable doctors has the highest score.

Ghorbani and Amir Hesari in [9], identified the factors influencing the choice of a doctor by patients and identified their expectations from doctors. The results showed that doctors can improve their medical services by using a marketing mix and increasing the number of patients as their customers.

None of the studies specifically focused on the importance of the influence of mixed elements of marketing in the development of medical tourism. By identifying these elements and their importance, this research identifies and determines the factors that are most important in attracting foreign tourists to the field of health.

3 Research method

This research, analyses the fuzzy Delphi methods to screen and identify the effective factors in the mixed model of medical tourism marketing, the AHP method to determine the weights of the indicators that are effective in the mixed model of medical tourism marketing, and also the fuzzy ANP method to determine the optimal indicators in the conditions Uncertainty of information was exploited. In order to solve the fuzzy ANP method and the multi-objective mathematical programming model, MATLAB software has been used.

The statistical population of this research includes all experts in two categories, including management and executive experts and expert experts who are familiar with the topic of evaluating and ranking the design and explanation of the mixed model of medical tourism marketing. To select statistical samples, analytical methods of inferential statistics and simple random sampling are used, that is, there is no subjective selection in advance, and due to the limited number of community members, the sample members were determined using Cochran's formula.

$$n = (Z^2.pq/d^2)/1 + 1/N((Z^2.pq/d^2) - 1) \tag{3.1}$$

n: sample size,

p: a proportion of the population without a certain attribute (0.5),

q: a proportion of the population without a certain attribute (0.5),

d: degree of certainty or possible accuracy (0.07),

Z: the size of the investigated variable according to the standard normal distribution (1.96),

$$n = ((1.96)^2.(0.5).(0.5)/(0.05)^2)/(1 + 1/39).((1.96)^2.(0.5).(0.5)/(0.05)^2) = 35.49.$$

As a result, 36 questionnaires were distributed among the members of the statistical community and answered and returned to the researcher.

4 Discussion

Table 1: Criteria

Row	Criteria	Reference
1	product (service)	[4]
2	Price or other service charges	[10]
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	[3]
4	Facilitate service delivery processes	[1]
5	Advertising	[14]
6	The presence of well-equipped medical centers	[20]
7	The presence of domestic and foreign investors to attract tourists in the country	[3]
8	Creating an international health tourism market	[16]
9	Existence of suitable economic conditions and efficient competitive market in the country	[10]
10	Stability of currency value	[8]
11	Active international electronic banking	[20]
12	Security for foreign tourists in the country	[7]
13	The existence of a suitable relationship between the countries of the region and the country	[4]
14	Ease of issuing and extending medical visas for patients and their companions	[8]
15	Creating an international market for providing medical services and developing health tourism	[6]
16	Establishing international medical tourism offices	[4]
17	Government and private sector interaction	
18	Target market selection based on religious similarity	[10]
19	Identifying a set of competitive products	[16]
20	Collecting information related to customer opinions about products in the competitive environment	[5]
21	Preparing a comprehensive report to help the marketing strategy design process	[7]
22	The existence of necessary facilities for safe and high-quality surgery in the country	[13]
23	Modern and high-tech equipment	[8]
24	Existence of historical and religious places	[4]
25	The existence of international standards of medical equipment in the country	[20]
26	The existence of accommodation facilities and sufficient facilities for patients and their companions	[10]

The criteria examined in this research have been finalized according to Table 1. In order to implement the fuzzy Delphi technique, a questionnaire was designed and distributed among the experts (attached to the appendix). In

this questionnaire, the experts were asked to specify the importance of each criterion. The degree of importance in the questionnaire is reflected in a range of five options, which are: "very little", "low", "moderate", "high" and "very high". The rating of the mentioned spectrum is done according to Table 2.

Table 2: The spectrum and scoring of the questionnaire to identify the factors of the mixed model of medical tourism marketing (using fuzzy Delphi)

The degree of importance	Score
Very low	1
Low	2
Medium	3
Much	4
Very much	5

In the following, the definitive score is provided by the experts. It was converted into fuzzy numbers according to the table. At this stage, trapezoidal fuzzy numbers have been used for the sensitivity of the subject (trapezoidal fuzzy numbers consider a larger range of data for more accurate modelling). The reason for using trapezoidal numbers is that it is more accurate than triangular numbers.

Table 3: Converting the decisive points of the criteria into fuzzy values

Importance range	Score	Corresponding trapezoidal fuzzy number			
		First	Second	Third	Fourth
Very low	1	0	1	2	3
Low	2	1	3	4	5
Medium	3	4	5	6	7
Much	4	6	7	8	9
Very much	5	8	9	10	10

Finally, the fuzzy data were converted to definite numbers using Equation (4.1). The de-fuzzified score of each spectrum is shown in Table 4.

$$C = (a_1 + a_2 + a_3 + a_4)/4. \tag{4.1}$$

Table 4: Spectrum, score, fuzzy number and de-fuzzified value of the questionnaire

Importance range	Score	Corresponding trapezoidal fuzzy number				De-fuzzified numbers
		First	Second	Third	Fourth	certain
Very low	1	0	0	1	3	1
Low	2	1	3	4	5	3.25
Medium	3	4	5	6	7	5.50
Much	4	6	7	8	9	7.50
Very much	5	8	9	10	10	9.25

The first stage of questionnaire distribution

At this stage, for the first time, the questionnaire was distributed for consensus about the effective criteria in the elements of the mixed model of medical tourism marketing. The contents of this questionnaire were presented in three general parts, in the first part, sufficient information about the questionnaire was conveyed to the expert, in the second part of the questionnaire, demographic information of the expert was explored, and in the last part, the criteria were extracted from the relevant literature, were brought in the form of tables. Also, at the end of the questionnaire, blank spaces were inserted so that the expert could suggest criteria that he/she wants and which are not included in the questionnaire. The result of experts' opinions in the first stage of questionnaire distribution is given in Table 5.

The second stage of questionnaire distribution

The second stage of the questionnaire was carried out in order to reach a consensus on the criteria provided by the researcher. In the second to fifth stages of the distribution of the questionnaire, a questionnaire was designed in which the difference between expert opinion with the average opinion of all experts (which can be calculated according to equation (4.2)) was displayed and the expert was asked to modify or confirm his previous opinion. The information collected in this step is according to Table 6.

$$(b_{m1} - b_1^{(i)}, b_{m2} - b_2^{(i)}, b_{m3} - b_3^{(i)}, b_{m4} - b_4^{(i)}) = \left(\frac{1}{n} \sum_{i=1}^{n} b_1^{(i)} - b_1^{(i)}, \frac{1}{n} \sum_{i=1}^{n} b_2^{(i)} - b_2^{(i)}, \frac{1}{n} \sum_{i=1}^{n} b_3^{(i)} - b_3^{(i)}, \frac{1}{n} \sum_{i=1}^{n} b_4^{(i)} - b_4^{(i)} \right). \tag{4.2}$$

Table 5: The result of the first stage of asking experts

Row	Criteria	Overall averaging				definite number
		a_1	a_2	a_3	a_4	average
1	product (service)	7.82	8.82	9.82	9.91	9.09
2	Price or other service charges	5.45	6.45	7.45	8.45	6.95
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	7.82	8.82	9.82	9.91	9.09
4	Facilitate service delivery processes	5.09	6.09	7.09	8	6.57
5	Advertising	4.09	5.18	6.18	7.18	5.66
6	The presence of well-equipped medical centers	6.91	7.91	8.91	9.45	8.30
7	The presence of domestic and foreign investors to attract tourists in the country	4.09	5.09	6.09	7.18	5.61
8	Creating an international health tourism market	6.91	7.91	8.91	9.45	8.30
9	Existence of suitable economic conditions and efficient competitive market in the country	6.63	7.36	8.36	9.18	7.82
10	Stability of currency value	5.09	6.09	7.09	8	6.57
11	Active international electronic banking	4.91	5.91	6.91	7.82	6.39
12	Security for foreign tourists in the country	3.82	5	6	7	5.45
13	The existence of a suitable relationship between the countries of the region and the country	7.27	8.27	9.27	9.64	8.61
14	Ease of issuing and extending medical visas for patients and their companions	5.36	6.45	7.45	8.45	6.93
15	Creating an international market for providing medical services and developing health tourism	5.27	6.27	7.27	8.18	6.75
16	Establishing international medical tourism offices	5.09	6.09	7.09	8.09	6.59
17	Government and private sector interaction	6.55	7.55	8.55	9.27	7.98
18	Target market selection based on religious similarity	4.36	5.55	6.55	7.55	6
19	Identifying a set of competitive products	7.27	8.27	9.27	9.64	8.61
20	Collecting information related to customer opinions about products in the competitive environment	3.27	4.64	5.64	6.64	5.05
21	Preparing a comprehensive report to help the marketing strategy design process	3.73	4.73	5.73	6.82	5.25
22	The existence of necessary facilities for safe and high-quality surgery in the country	4	5.18	6.18	7.18	5.64
23	Modern and high-tech equipment	3.36	4.55	5.55	6.64	5.02
24	Existence of historical and religious places	5.09	6.09	7.09	8	6.57
25	The existence of international standards of medical equipment in the country	6.55	7.55	8.55	9.27	7.98
26	The existence of accommodation facilities and sufficient facilities for patients and their companions	4.09	5.18	6.18	7.18	5.66

Using equation (4.3), the difference of opinion was calculated in the first and second stages and the results were reflected in Table 7. The criteria that were agreed upon are marked with the ✓ symbol and the criteria that have disagreements (no consensus has been reached) are shown with the × symbol.

$$S(A_{m2}, A_{m1}) = \left| \frac{1}{4}[(a_{m21} + a_{m22} + a_{m23} + a_{m24}) - (a_{m11} + a_{m12} + a_{m13} + a_{m14})] \right|. \tag{4.3}$$

According to table 7, it can be seen that there is no significant difference (more than 0.2) in criteria number 1, 3, 5, 26 (obtained according to fuzzy Delphi test). For this reason, it can be concluded that a consensus has been reached on these 4 criteria. The process did not stop here, and for consensus on other criteria (the remaining 22 criteria), the third stage of questionnaire distribution took place.

The third stage of questionnaire distribution

In the previous stage, out of 26 criteria, only 4 criteria were agreed upon and the other 22 criteria had differences of opinion among experts. For this purpose, the third stage of questionnaire distribution was formed. Disagreement was calculated in the second and third stages and the results are reflected in Table 8. The criteria that were agreed upon are marked with the ✓ symbol and the criteria that have disagreements (no consensus has been reached) are shown with the × symbol.

According to table 8, it can be seen that the criteria number 1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, and 17 have significant differences (more than 0.2) doesn't exist. For this purpose, it can be concluded that a consensus has been reached on these 14 criteria. The process did not stop here and for consensus on other criteria (the remaining 8 criteria), the fourth stage of questionnaire distribution took place (Fuzzy Delphi method).

Table 6: The result of the second stage of asking experts' opinions

Row	Criteria	Overall averaging				definite number
		a_1	a_2	a_3	a_4	average
1	product (service)	8	9	10	10	9.25
2	Price or other service charges	8	9	10	10	9.25
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	8	9	10	10	9.25
4	Facilitate service delivery processes	4.18	5.18	6.18	7.18	5.68
5	Advertising	4	5	6	7	5.5
6	The presence of well-equipped medical centers	8	9	10	10	9.25
7	The presence of domestic and foreign investors to attract tourists in the country	3.73	4.82	5.82	6.82	5.30
8	Creating an international health tourism market	7.82	8.82	9.82	9.91	9.09
9	Existence of suitable economic conditions and efficient competitive market in the country	8	9	10	10	9.25
10	Stability of currency value	4	5	6	7	5.5
11	Active international electronic banking	4	5	6	7	5.5
12	Security for foreign tourists in the country	3.45	4.64	5.64	6.64	5.09
13	The existence of a suitable relationship between the countries of the region and the country	8	9	10	10	9.25
14	Ease of issuing and extending medical visas for patients and their companions	4	5	6	7	5.5
15	Creating an international market for providing medical services and developing health tourism	4.18	5.18	6.18	7.18	5.68
16	Establishing international medical tourism offices	4	5	6	7	5.5
17	Government and private sector interaction	8	9	10	10	9.25
18	Target market selection based on religious similarity	3.73	4.82	5.82	6.82	5.30
19	Identifying a set of competitive products	7.82	8.82	9.82	9.91	9.09
20	Collecting information related to customer opinions about products in the competitive environment	2.91	4.27	5.27	6.27	4.68
21	Preparing a comprehensive report to help the marketing strategy design process	2.36	3.91	4.91	5.91	4.27
22	The existence of necessary facilities for safe and high-quality surgery in the country	2.36	3.91	4.91	5.91	4.27
23	Modern and high-tech equipment	2	3.45	4.45	5.55	3.86
24	Existence of historical and religious places	2.82	4.27	5.27	6.27	4.66
25	The existence of international standards of medical equipment in the country	7.09	8.09	9.09	9.55	8.48
26	The existence of accommodation facilities and sufficient facilities for patients and their companions	3.91	5	6	7	5.48

The fourth stage of questionnaire distribution

In the previous stage, out of 22 criteria, only 14 criteria were agreed upon and the other 8 criteria had differences of opinion among experts. For this purpose, the fourth stage of questionnaire distribution was formed. Disagreement was calculated in the third and fourth stages and the results were reflected in Table 9. The criteria that were agreed upon are marked with the ✓ symbol and the criteria that have disagreements (no consensus has been reached) are shown with the × symbol.

According to table 9, it can be seen that there is no significant difference (more than 0.2) in criteria number 1, 2, 3, 7, 8. For this reason, it can be concluded that a consensus has been reached on these 5 criteria. The process did not stop here and for consensus on other criteria (the remaining 3 criteria), the fifth stage of questionnaire distribution took place.

The fifth stage of questionnaire distribution

In the previous stage, out of 8 criteria, only 5 criteria were agreed upon and the other 3 criteria had differences of opinion among experts. For this purpose, the fifth stage of questionnaire distribution was formed (in order to collect the questionnaire, each stage of the questionnaire was sent to the experts by e-mail and received in this way after completion).

Disagreement was calculated in the fourth and fifth stages and the results were reflected in Table 10. The criteria that were agreed upon are marked with the ✓ symbol and the criteria that have disagreements (no consensus has been reached) are shown with the × symbol.

According to table 10, it can be seen that there is a consensus in all criteria, which means that there is no difference

Table 7: Calculation of disagreement in the first and second stages of questionnaire distribution

Row	Criteria	Mean difference	Condition
1	product (service)	0.16	✓
2	Price or other service charges	2.30	×
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	0.16	✓
4	Facilitate service delivery processes	0.89	×
5	Advertising	0.16	✓
6	The presence of well-equipped medical centers	0.95	×
7	The presence of domestic and foreign investors to attract tourists in the country	0.32	×
8	Creating an international health tourism market	0.80	×
9	Existence of suitable economic conditions and efficient competitive market in the country	1.43	×
10	Stability of currency value	1.07	×
11	Active international electronic banking	0.89	×
12	Security for foreign tourists in the country	0.36	×
13	The existence of a suitable relationship between the countries of the region and the country	0.64	×
14	Ease of issuing and extending medical visas for patients and their companions	1.43	×
15	Creating an international market for providing medical services and developing health tourism	1.07	×
16	Establishing international medical tourism offices	1.09	×
17	Government and private sector interaction	1.27	×
18	Target market selection based on religious similarity	0.70	×
19	Identifying a set of competitive products	0.48	×
20	Collecting information related to customer opinions about products in the competitive environment	0.36	×
21	Preparing a comprehensive report to help the marketing strategy design process	0.98	×
22	The existence of necessary facilities for safe and high-quality surgery in the country	1.36	×
23	Modern and high-tech equipment	1.16	×
24	Existence of historical and religious places	1.91	×
25	The existence of international standards of medical equipment in the country	0.48	×
26	The existence of accommodation facilities and sufficient facilities for patients and their companions	0.18	✓

Table 8: Calculation of disagreement in the second and third stages of questionnaire distribution

Row	Criteria	Mean difference	Condition
1	Price or other service charges	0	✓
2	Facilitate service delivery processes	0.18	✓
3	The presence of well-equipped medical centers	0	✓
4	The presence of domestic and foreign investors to attract tourists in the country	0.20	×
5	Creating an international health tourism market	0.16	✓
6	Existence of suitable economic conditions and efficient competitive market in the country	0	✓
7	Stability of currency value	0	✓
8	Active international electronic banking	0	✓
9	Security for foreign tourists in the country	0.41	×
10	The existence of a suitable relationship between the countries of the region and the country	0	✓
11	Ease of issuing and extending medical visas for patients and their companions	0	✓
12	Creating an international market for providing medical services and developing health tourism	0.18	✓
13	Establishing international medical tourism offices	0	✓
14	Government and private sector interaction	0	✓
15	Target market selection based on religious similarity	1.64	×
16	Identifying a set of competitive products	0.16	✓
17	Collecting information related to customer opinions about products in the competitive environment	0.02	✓
18	Preparing a comprehensive report to help the marketing strategy design process	0.82	×
19	There are safe and high-quality surgical procedures in children	1.02	×
20	Modern equipment and advanced technology	1.23	×
21	historical and religious existence	1.41	×
22	existence of international standards of medical equipment in children	0.64	×

of opinion more than 0.2. So, the fuzzy Delphi process stops at this stage.

Table 9: Calculation of disagreement in the third and fourth stages of questionnaire distribution

Row	Criteria	Mean difference	Condition
1	The presence of domestic and foreign investors to attract tourists in the country	0	✓
2	Security for foreign tourists in the country	0	✓
3	Target market selection based on religious similarity	0	✓
4	Preparing a comprehensive report to help the marketing strategy design process	0.20	×
5	The existence of necessary facilities for safe and high-quality surgery in the country	0.20	×
6	Modern equipment and advanced technology	0.41	×
7	Existence of historical and religious places	0	✓
8	The existence of international standards of medical equipment in the country	0.16	✓

Table 10: Calculation of disagreement in the fourth and fifth stages of questionnaire distribution

Row	Criteria	Mean difference	Condition
1	Preparing a comprehensive report to help the marketing strategy design process	0	✓
2	The existence of necessary facilities for safe and high-quality surgery in the country	0	✓
3	Modern equipment and advanced technology	0	✓

Selection of effective criteria in evaluating the mixed model of medical tourism marketing

The previously described fuzzy Delphi technique established consensus among experts on the 26 proposed criteria. Now here, a limit must be defined by which the selection criteria can be sent to the next stages of the research implementation. The elders of the Delphi technique, in general, 67% of the points given by the experts to the criteria are introduced as a factor for choosing the criteria. In this research, the factor for selecting criteria and sending them to the next stages of analysis (conditions for rejecting or accepting the selected criteria) was to obtain at least 95% points, and the reason for choosing 95% points by the researcher was to refine the output model (this It is done using relation 4), it is from the Delphi process.

In Table 11, the acceptable limit for selecting the criteria is presented.

$$Nwk = Nwi \times Nwip. \tag{4.4}$$

Table 11: Definition of the acceptable limit for the selection of criteria

Score the highest criterion value	The score of the lowest criterion value	Scoring range of each criterion	Criterion selection factor	Domain share	Determining the acceptable score limit
9.25	1	8.25	0.95	7.83	8.83

The share of the domain score is 7.83, and by adding it with the lowest value (1), the acceptable value is 83.8. In the following, the criteria selection or rejection status is calculated in Table 12. The numbers that fall within the specified range are confirmed and the numbers that are outside the range are rejected.

4.1 Weighting the criteria selected by the fuzzy hierarchical analysis process technique

In order to implement the second part, a questionnaire was developed in which the criteria were compared in pairs. For scoring paired comparisons, a range from 1 to 9 was presented to the respondents, where a score of 1 indicates equal importance and a score of 9 indicates a relatively strong importance of the first criterion compared to the second criterion.

- **Collection of questionnaires**

  Questionnaires to collect data were distributed to the same experts who were asked to agree on the criteria in the previous stage. After numerous follow-ups and also experts' justification for answering, questionnaires were collected and analyzed by entering the data into Excel software.

- **Data analysis**

  Triangular fuzzy numbers were used to fuzzify the data, and in this way, the opinions of all the experts were collected in a general matrix. In this matrix, the first fuzzy number is the lowest opinion value, the third fuzzy number is the highest opinion value, and the second fuzzy number is the average. Geometrics is the opinion of experts.

Table 12: The final average of the criteria

Row	Criteria	Final average	Condition
1	product (service)	9.25	Confirmation
2	Price or other service charges	9.25	Confirmation
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	9.25	Confirmation
4	Facilitate service delivery processes	5.5	Rejection
5	Advertising	5.5	Rejection
6	The presence of well-equipped medical centers	9.25	Confirmation
7	The presence of domestic and foreign investors to attract tourists in the country	5.5	Rejection
8	Creating an international health tourism market	9.25	Confirmation
9	Existence of suitable economic conditions and efficient competitive market in the country	9.25	Confirmation
10	Stability of currency value	5.5	Rejection
11	Active international electronic banking	5.5	Rejection
12	Security for foreign tourists in the country	5.5	Rejection
13	The existence of a suitable relationship between the countries of the region and the country	9.25	Confirmation
14	Ease of issuing and extending medical visas for patients and their companions	5.5	Rejection
15	Creating an international market for providing medical services and developing health tourism	5.5	Rejection
16	Establishing international medical tourism offices	5.5	Rejection
17	Government and private sector interaction	9.25	Confirmation
18	Target market selection based on religious similarity	3.66	Rejection
19	Identifying a set of competitive products	9.25	Confirmation
20	Collecting information related to customer opinions about products in the competitive environment	4.66	Rejection
21	Preparing a comprehensive report to help the marketing strategy design process	3.25	Rejection
22	The existence of necessary facilities for safe and high-quality surgery in the country	5.5	Rejection
23	Modern and high-tech equipment	5.5	Rejection
24	Existence of historical and religious places	3.25	Rejection
25	The existence of international standards of medical equipment in the country	9.25	Confirmation
26	The existence of accommodation facilities and sufficient facilities for patients and their companions	9.25	Confirmation

Table 13: Combined matrix of experts' opinion

Row	Criteria	The first fuzzy number	The second fuzzy number	The third fuzzy number
1	product (service)	0.20	1.67	8
2	Price or other service charges	0.25	1.29	6
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	0.13	0.74	5
4	The presence of well-equipped medical centers	0.13	0.59	5
5	Creating an international health tourism market	0.11	0.50	7
6	Existence of suitable economic conditions and efficient competitive market in the country	0.13	0.99	7
7	The existence of a suitable relationship between the countries of the region and the country	0.14	1.88	9
8	Government and private sector interaction	0.20	0.64	3
9	Identifying a set of competitive products	1	1.72	5
10	The existence of international standards of medical equipment in the country	1	1	1
11	The existence of accommodation facilities and sufficient facilities for patients and their companions	1	1	1

Next, the matrix of Z values for the criteria was calculated by equation (4.5) for each of the criteria, the output of which is as described in Table 14.

$$Z_i = \left[\widetilde{a}_{i1} \bigotimes \widetilde{a}_{i2} \bigotimes ... \bigotimes \widetilde{a}_{in} \right]^{(1/n)}, \quad \forall i. \tag{4.5}$$

Then the sum of z values by equation (4.6) and its inverse by equation (4.7) became as follows.

$$\widetilde{a}_1 \bigoplus \widetilde{a}_2 \cong (\alpha_1 + \alpha_2, \beta_1 + \beta_2, \delta_1 + \delta_2) \tag{4.6}$$

$$Z_1^{(-1)} = (\delta_1^{(-1)}, \beta_1^{(-1)}, \alpha_1^{(-1)}) \tag{4.7}$$

Table 14: Matrix of Z values for criteria

Row	Criteria	The first fuzzy number	The second fuzzy number	The third fuzzy number
1	product (service)	0.20	1.67	8
2	Price or other service charges	0.25	1.29	6
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	0.13	0.74	5
4	The presence of well-equipped medical centers	0.13	0.59	5
5	Creating an international health tourism market	0.11	0.50	7
6	Existence of suitable economic conditions and efficient competitive market in the country	0.13	0.99	7
7	The existence of a suitable relationship between the countries of the region and the country	0.14	1.88	9
8	Government and private sector interaction	0.20	0.64	3
9	Identifying a set of competitive products	1	1.72	5
10	The existence of international standards of medical equipment in the country	1	1	1
11	The existence of accommodation facilities and sufficient facilities for patients and their companions	1	1	1

Table 15: Calculation of overall Z values for criteria

	fuzzy numbers		
	First	Second	Third
Calculating the sum of Z values in general	5.29	13.01	58.00
Calculating the inverse of the Z matrix in general	0.02	0.08	0.19

Next, the final weight of each criterion (which is fuzzy) was calculated by Equation (4.8) and de-fuzzified by Equation (4.9).

$$W_i^- = Z_i \bigotimes (Z_1 \bigoplus Z_2 \bigoplus ... \bigoplus Z_n)^{(-1)} \qquad (4.8)$$

$$W_i = (W_{\alpha i} + W_{\beta i} + W_{\delta i})/3 \qquad (4.9)$$

Table 16: The final weight of the criterion

Row	Criteria	fuzzy numbers			The de-fuzzified weight of each criterion
		First	Second	Third	
1	product (service)	0	0.13	1.51	0.55
2	Price or other service charges	0	0.10	1.13	0.41
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	0	0.06	0.95	0.33
4	The presence of well-equipped medical centers	0	0.04	0.95	0.33
5	Creating an international health tourism market	0	0.04	1.32	0.45
6	Existence of suitable economic conditions and efficient competitive market in the country	0	0.08	1.32	0.47
7	The existence of a suitable relationship between the countries of the region and the country	0	0.14	1.7	0.62
8	Government and private sector interaction	0	0.05	0.57	0.21
9	Identifying a set of competitive products	0.02	0.13	0.95	0.36
10	The existence of international standards of medical equipment in the country	0.02	0.08	0.19	0.09
11	The existence of accommodation facilities and sufficient facilities for patients and their companions	0.02	0.08	0.19	0.09

Then the weight values were de-fuzzified, descaled by Equation (4.10) and reflected in Table 17.

$$NW_i = \frac{W_i}{\sum_{i=1}^{n} W_i}. \qquad (4.10)$$

4.2 Evaluation of the mixed model of medical tourism marketing with the fuzzy Delphi method

- **Formation of the decision matrix**

Table 17: Normal weight of each criterion

Row	Criteria	The normalized weight of each criterion
1	product (service)	0.14
2	Price or other service charges	0.10
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	0.08
4	The presence of well-equipped medical centers	0.08
5	Creating an international health tourism market	0.11
6	Existence of suitable economic conditions and efficient competitive market in the country	0.12
7	The existence of a suitable relationship between the countries of the region and the country	0.15
8	Government and private sector interaction	0.05
9	Identifying a set of competitive products	0.09
10	The existence of international standards of medical equipment in the country	0.02
11	The existence of accommodation facilities and sufficient facilities for patients and their companions	0.02

Table 18: Language spectrum of assessment

The spectrum of importance Score		Corresponding fuzzy number		
		First	Second	Third
Very low	1	0	0	0.15
Low	2	0	0.15	0.30
Relatively low	3	0.15	0.30	0.50
Medium	4	0.30	0.50	0.65
Relatively good	5	0.50	0.65	0.80
Good	6	0.65	0.80	1
Very good	7	0.80	1	1

In this matrix, the performance values of quality criteria using the opinion of experts and using the 7-point spectrum method are shown in Table 18.

At this stage, a questionnaire was designed and distributed among the experts, and they evaluated the priorities based on the criteria, the average opinion of the experts is given in Table 19.

It should be noted that in this matrix, 5 indicators with options A1 to A5 have been introduced.

A1: economic factors

A2: Political factors

A3: Marketing mix

A4: Management factors

A5: Infrastructural factors

- **Calculate the preference function**

  Regarding the selection of the preference function, during the meetings and negotiations with the experts, due to better familiarity and more logical justification of the issue, the linear preference function was used. It changes linearly, and if the difference is greater than P, the desired option has absolute priority. The value of P is included in the calculations as the superiority threshold according to Table 20. In the next step, according to each of the criteria and using the relation (4.11), the options were compared. The value of the preference function was calculated in each criterion and reflected in tables 21, 22, 23, 24, 25.

$$d_j(a, b) = g_j(a) - g_j(b) \qquad (4.11)$$

- **Calculation of cumulative preference index of options:** $\pi(a, b)$ **and** $\pi(b, a)$

  Using the equation (4.12), the preference index of the options was calculated and reflected in Table 26.

$$P_j(a, b) = F_j[d_j(a, b)] \quad \forall \quad a, b \in A,$$
$$d_j(a, b) = g_j(a) - g_j(b).$$
$$0 \le P_j(a, b) \le 1. \qquad (4.12)$$

Table 19: Average opinions of experts

Exact numbers	Average opinion of experts			Dimension	Criterion
	The third fuzzy number	The second fuzzy number	The first fuzzy number		
1.29	0.19	0	0	A1	
1.29	0.19	0	0	A2	
1.29	0.19	0	0	A3	product (service) (C1)
1.29	0.19	0	0	A4	
1.29	0.19	0	0	A5	
4.94	0.8	0.64	0.47	A1	
3.93	0.64	0.47	0.29	A2	
4.94	0.8	0.64	0.47	A3	Price or other service charges (C2)
5.79	0.94	0.77	0.62	A4	
3.93	0.64	0.47	0.29	A5	
2.15	0.33	0.17	0	A1	Specialist staff, especially doctors,
3.16	0.52	0.33	0.17	A2	who are familiar with international
2.15	0.33	0.17	0	A3	languages, especially Arabic and
3.16	0.52	0.33	0.17	A4	English (C3)
4.17	0.64	0.52	0.33	A5	
6.53	1	0.9	0.73	A1	
5.62	0.92	0.74	0.59	A2	
6.53	1	0.9	0.73	A3	The presence of well-equipped
5.62	0.92	0.74	0.59	A4	medical centers (C4)
4.61	0.74	0.59	0.42	A5	
15	15	15	15	A1	
17	17	17	17	A2	
15	15	15	15	A3	Creating an international health
20	20	20	20	A4	tourism market (C5)
25	25	25	25	A5	
6.53	1	0.9	0.73	A1	
6.53	1	0.9	0.73	A2	Existence of suitable economic
6.53	1	0.9	0.73	A3	conditions and efficient competitive
6.53	1	0.9	0.73	A4	market in the country (C6)
5.52	0.9	0.73	0.58	A5	
5.52	0.9	0.73	0.58	A1	
5.52	0.9	0.73	0.58	A2	The existence of a suitable
5.52	0.9	0.73	0.58	A3	relationship between the countries of
4.59	0.74	0.59	0.41	A4	the region and the country (C7)
5.52	0.9	0.73	0.58	A5	
5.69	0.92	0.76	0.6	A1	
4.77	0.77	0.61	0.44	A2	Government and private sector
5.69	0.92	0.76	0.6	A3	interaction (C8)
3.58	0.63	0.46	0.27	A4	
5.69	0.92	0.76	0.6	A5	
3.90	0.63	0.48	0.28	A1	
2.89	0.48	0.28	0	A2	Identifying a set of competitive
3.90	0.63	0.48	0.28	A3	products (C9)
4.90	0.79	0.63	0.48	A4	
1.95	0.3	0	0	A5	
5.62	0.92	0.74	0.59	A1	
5.62	0.92	0.74	0.59	A2	The existence of international
5.62	1	0.92	0.74	A3	standards of medical equipment in the
5.62	0.92	0.74	0.59	A4	country (C10)
5.62	1	0.92	0.74	A5	
3.60	0.59	0.42	0.23	A1	
4.61	0.74	0.59	0.42	A2	The existence of accommodation
4.61	0.74	0.59	0.42	A3	facilities and sufficient facilities for
3.60	0.59	0.42	0.23	A4	patients and their companions (C11)
3.60	0.59	0.42	0.23	A5	

Table 20: Criteria information

Criterion	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
Weight	0.14	0.10	0.08	0.08	0.11	0.12	0.15	0.05	0.09	0.02	0.02
Index type	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Function type	3	3	3	3	3	3	3	3	3	3	3
Threshold of excellence	p	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Table 21: Preference function of option A1 compared to other options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
	A2	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00
A1	A3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	A4	0.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00
	A5	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00

Table 22: Preference function of option A2 compared to other options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
	A1	0.00	1.00	1.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	1.00
A2	A3	0.00	0.00	1.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00
	A4	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
	A5	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00

Table 23: Preferred function of option A3 compared to other options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
	A1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
A3	A2	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00
	A4	0.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00
	A5	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00

Table 24: Preferred function of option A4 compared to other options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
	A1	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
A4	A2	0.00	1.00	0.00	0.00	0.60	0.00	0.00	0.00	1.00	0.00	0.00
	A3	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
	A5	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00

Table 25: Preferred function of option A5 compared to other options

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
	A1	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00
A5	A2	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00
	A3	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
	A4	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00

Table 26: Cumulative preference index of options

A5	A4	A3	A2	A1	
0.39	0.30	0.02	0.32	*	A1
0.31	0.24	0.14	*	0.14	A2
0.41	0.34	*	0.34	0.04	A3
0.39	*	0.38	0.26	0.38	A4
*	0.43	0.21	0.26	0.21	A5

- **Calculation of positive and negative rating streams: Φ^+ and Φ^-**

  Using relations (4.13) and 14, the value of Φ^+ and Φ^- was calculated and reflected in table 27.

$$\Phi^+(a) = \frac{1}{n-1} \sum_{x \in A} \pi(a, x) \tag{4.13}$$

$$\Phi^-(a) = \frac{1}{n-1} \sum_{x \in A} \pi(a, x) \tag{4.14}$$

Table 27: Flow of positive and negative ranking of options

A5	A4	A3	A2	A1	
0.28	0.33	0.28	0.20	0.26	Φ^+
0.36	0.31	0.18	0.26	0.19	Φ^-

- **Evaluation of the mixed model of medical tourism marketing**

Using equation (4.15), the value of net rating flow was calculated and reflected in table 28.

$$\phi(a) = \phi^+(a) - \phi^-(a) \tag{4.15}$$

Table 28: Net rating flow

A5	A4	A3	A2	A1	
-0.08	0.02	0.10	-0.06	0.07	ϕ

The evaluation of the mixed model of medical tourism marketing with the Delphi method, which provides a complete ranking according to relation (4.16), is as follows.

$$\begin{cases} aP^{II}b & \text{iff} & \phi(a) > \phi(b) \\ aP^{II}b & \text{iff} & \phi(a) = \phi(b) \end{cases} \tag{4.16}$$

$$A3 > A1 > A4 > A2 > A5$$

5 Conclusion

Currently, according to the strategic and geopolitical conditions of the region where Iran is located, it has many advantages to become a leading country in health tourism, especially medical tourism; But in a competitive strategic situation, it needs to develop and also needs to strengthen its related and supporting industries. According to the vision document of 1404, Iran plans to become the medical hub of the region and also plans to reach 20 million foreign tourists in 1404. Although medical tourism in Iran has many capabilities, it must meet several requirements.

The results of the research in line with the importance of the elements of the mixed model of medical tourism marketing using the fuzzy technique are presented in Table 29. In the next step, according to the degree of close distance (similarity index), the options are ranked; In such a way that options with a higher similarity index are prioritized. In the last step, the options are ranked from the largest to the smallest index.

$$A3 > A1 > A4 > A2 > A5.$$

The results show that the marketing mix index (A3) is closest to the positive ideal answer and the most distant from the negative ideal answer, and the first priority among the effective factors in Gilan medical tourism in terms of the desired criteria is the tourism marketing mix. It is medicine. This means that investing in the marketing mix index can create the highest benefit for the region in terms of the defined indicators.

Table 29: Weight of indicators

Row	Criteria	The normalized weight of each criterion
1	product (service)	0.14
2	Price or other service charges	0.10
3	Specialist staff, especially doctors, who are familiar with international languages, especially Arabic and English	0.08
4	The presence of well-equipped medical centers	0.08
5	Creating an international health tourism market	0.11
6	Existence of suitable economic conditions and efficient competitive market in the country	0.12
7	The existence of a suitable relationship between the countries of the region and the country	0.15
8	Government and private sector interaction	0.05
9	Identifying a set of competitive products	0.09
10	The existence of international standards of medical equipment in the country	0.02
11	The existence of accommodation facilities and sufficient facilities for patients and their companions	0.02

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