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Medical tourism supply chain under scrutiny: a hybrid grounded theory and DEMATEL method

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Abstract – This study sought to provide a comprehensive analysis of the medical tourism supply chain (MTSC) in Shiraz, Iran, to improve the city's potential tourism market share in the post-COVID-19 future. The study relied on a mixed research methodology. Primarily, semi-structured interviews were conducted with 12 stakeholders involved in Shiraz MTSC. The data from the interviews were then analyzed using grounded theory (GT). To detect any interrelationships among the elements, the model was further analyzed quantitatively through the rough DEMATEL (decision-making trial and evaluation laboratory) method. Rough set theory was used to aggregate group information to overcome the vagueness of the group decision-making process. The results of the qualitative phase helped to configure a model which included 6 main dimensions, 17 sub-dimensions, and 48 elements. Also, according to the quantitative findings, "poor service delivery" was the most significant threat and challenge facing medical tourism in the studied city. The study provides practical insights that could help to improve the states of different stakeholders in the MTSC of developing countries.

Keywords: Medical tourism; supply chain; Grounded Theory; DEMATEL; Rough Set Theory

1. Introduction

Traveling for medical and health-related purposes is not a new phenomenon. Historically speaking, people always travel to find quality healthcare services (Reed, 2008). However, medical tourism gained popularity only in the late twentieth century (Connell, 2013) as a subset of health tourism, along with wellness tourism (Smith & Puczkó, 2008). Most studies define medical tourism as the process of traveling abroad to receive medical services to save money or reduce waiting time (de la Hoz-Correa et al., 2018). Some definitions have also highlighted the domestic aspect of medical tourism (Hudson & Lee, 2012).

Although medical tourism is a newly emerging phenomenon, this lucrative type of tourism that has the potential to produce a huge amount of revenue annually (Nakhaeinejad et al., 2022), has faced various challenges in different destinations, such as a lack of coordination and cooperation between tourism and healthcare systems (Kesar & Rimac, 2011), incomplete laws and regulations (Kim et al., 2013), inadequate support from governments (Singh, 2014), poor medical services, and insufficient insurance coverage (Zarei & Maleki, 2019). In addition to these challenges, the COVID-19 pandemic exacerbated the situation of the medical tourism industry worldwide (Kosaka et al., 2021; Chhabra et al., 2021; Tatum, 2020; Sharma et al., 2020). Iran has been one of the most important medical tourism destinations in the Middle East. However, the country encountered numerous obstacles even

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before the COVID-19 outbreak, despite its high potential for medical tourism. Some of these obstacles are a lack of a comprehensive information management system for medical tourists, poor marketing, underdeveloped infrastructure, a shortage of skilled human resources, and a lack of effective training programs in this field (Momeni et al., 2018).

What is important about medical tourism is that it can potentially rebound in the post-COVID-19 future, although medical tourist arrivals almost entirely disappeared during the pandemic (Abbaspour et al., 2020). The coronavirus could leave long-term health effects on infected individuals (Bremser et al., 2022; del Rio et al., 2020). As a result, among different tourism types, medical tourism is likely to gain momentum in the post-COVID-19 period. This situation could bring about an opportunity for medical tourism destinations (e.g., Iran) and could contribute to the recovery of tourism in destinations that offer medical tourism in the post-COVID-19 future (Abbaspour et al., 2020). As such, by adopting different initiatives and various approaches, the industry could improve the current situation, overcome the barriers mentioned above, and prepare itself to benefit from the potential market after the COVID-19 pandemic is fairly contained.

One of the most effective approaches that could enhance the state of the medical tourism industry is to analyze its supply chain (SC). MTSC analysis plays a crucial role in maximizing operational effectiveness, ensuring quality and safety, and coordinating stakeholders within the medical tourism sector. By analyzing and optimizing the supply chain, destinations can enhance their competitiveness and promote the success of their medical tourism industries. Supply chain management (SCM), as a technical concept, first appeared in the literature in the 1980s and came to the fore in the 1990s, when many scholars sought to clearly define this concept (Ellram & Murfield, 2019). Since then, SC management has been a topical concept in research on management.

An SC consists of different actors who try to (in)directly fulfill customers' demands. Such actors may include manufacturers/producers, suppliers, transporters, warehouse managers, retailers, and even customers (Chopra & Meindl, 2007). Alford (2005) was among the first scholars who investigated the SC in the tourism context, followed by other researchers such as Ke (2006), Wan-Li et al. (2007a), and Wan-Li et al. (2007b). Chen (2009) defined the tourism SC as a medium that connects all tourism activities performed through the flow of information, materials, and funds. According to Chen (2009), the tourism SC is meant to share resources, reduce costs, and generate customer value. In a more specific context, Fernando and Lee (2015) defined the medical tourism supply chain (MTSC) as a complex network including at least five different sectors: accommodation, chemistry and pharmaceuticals, hospitals, transportation, and insurance. Several studies have tried to investigate MTSCs in different destinations such as Turkey (Karadayi-Usta & Serdarasan, 2020a, Karadayi-Usta & Serdarasan, 2020b), Thailand (Kaewkitipong, 2018; Fongtanakit et al., 2019; Janchai et al., 2022), and Malaysia (Fernando & Lee, 2015; Lee & Fernando, 2015). A major problem, however, is that MTSCs in the ecosystems of less developed destinations have remained relatively unexplored. More importantly, such destinations should be analyzed from the perspective of novel methodologies and approaches.

The purpose of this study is to propose a novel mixed (qualitative and quantitative) methodology for analyzing MTSCs and to practically examine it in a real case study. The study, more specifically, conducts a comprehensive analysis of the MTSC in Shiraz City, one of Iran's most significant medical tourism destinations. The study draws on a mixed research methodology. First, in the qualitative analysis, the study uses the grounded theory (GT) methodology to identify the factors that could help analyze MTSC. Then, in quantitative analysis, the interrelationships among the factors identified are determined through the rough DEMATEL (decision-making trial and evaluation laboratory) technique. This study makes two major contributions: (a) it combines GT and rough DEMATEL, which offers a new method in the literature on the tourism industry. Importantly, the proposed hybrid methodology can be applied to other medical tourism ecosystems as well; and (b) it tries to provide practical findings that could help improve the situation for different stakeholders engaged in the medical tourism industry in developing countries.

The rest of the paper is structured as follows: The next section provides a comprehensive review of the relevant literature on MTSC. Following that, Section 3 outlines the adopted method. Section 4 presents the results. Section 5 discusses the results, and finally, Section 6 draws a conclusion.

2. Literature review

Investigating the literature on MTSCs revealed that few studies addressed this topic. In addition, most of the previous studies were incoherent as they pursued entirely different purposes and objectives. For instance, Ferrer

and Medhekar (2012) examined three main factors (cost, speed, and reliability) that could affect the global MTSC and the decision-making process for traveling to another country for treatment purposes. The results showed that low cost, no waiting time, and privacy (or reliability) of medical treatment could increase demand for medical tourism. Also, it is essential to establish a sustainable global MTSC to ensure the delivery of high-quality medical care. Fernando and Lee (2015) conducted an investigation into the factors affecting the MTSC. As they explain, there are four effective factors in the MTSC: cooperation, coordination, information sharing, and integration. Their findings could raise practitioners' awareness in the medical tourism industry, especially in developing countries.

In another study, Lee and Fernando (2015) developed a model analyzing the MTSC. The model was composed of three main dimensions: drivers, practices, and MTSC performance. The drivers of the MTSC included trust, commitment, and mutual dependency, while practices encompassed collaboration, coordination, and information sharing. Similarly, MTSC performance was divided into financial and non-financial categories. The study then statistically investigated the relationships between the different elements of the MTSC. According to the findings, mutual dependency has the greatest impact on all the antecedent variables, and coordination and information sharing within the medical tourism supply chain directly impact organizational performance. Chung and Chang (2017) constructed a framework to measure the sustainability of the MTSC. The framework consisted of four main criteria (financial, customer, internal process, and growth perspectives) and 16 sub-criteria. The framework was analyzed using the analytical network process (ANP) technique. The results demonstrated that the financial perspective was the most significant element for integrating and improving the MTSC. As such, a healthy financial status would be essential to achieve stability in such SCs. In the same vein, Rahman Muhammad and Zailani (2017) examined the effectiveness and outcomes of Muslim-friendly medical tourism, determining the relationships among the determinants of the MTSC, including trust, commitment, mutual dependency, collaboration, coordination, information sharing, and performance. The findings show that Muslim-friendly medical tourism practices positively impact the MTSC's overall performance.

Conducting an exploratory study, Kaewkitipong (2018) investigated the MTSC in Thailand, identified its stakeholders, and explored the information flow in the chain. The results indicated that the lack of cooperation and integration among the SC stakeholders in the sector had led to limited information exchange. Fongtanakit et al. (2019) statistically analyzed the factors affecting the MTSC in Thailand, using structural equation modeling (SEM). The results of this study suggested that mutual dependency, information sharing, and coordination were among the significant effective factors in improving the performance of the MTSC members. Furthermore, there was a lack of commitment and trust among the members of Thailand's MTSC. Ahmadimanesh et al. (2019) designed a dental tourism SC model in Mazandaran province, Iran, employing mathematical modeling. This model could be used for strategic and effective planning in medical tourism. The SC model proposed consisted of three components: tourists, medical facilities, and accommodation. Its objective was to determine the optimal number of medical units, accommodation centers, and the final capacity of medical centers. The findings of this study demonstrate the application of the proposed model for strategic planning and efficient investment. The results of the developed mathematical model were used to make recommendations for improvement of the dental tourism SC. Karadayi-Usta and Serdarasan (2020a) proposed a conceptual model of the MTSC to gain a clear understanding of its nature and business processes. The conceptual model identified seven business processes, namely service design, service recovery management, customer relationship management, supplier relationship management, demand management, capacity and resource management, and service delivery management. The model helps its users to internally shape their organization's SC. In addition, this model serves as the basis for SC collaboration decisions. Similarly, Karadayi-Usta and Serdarasan (2020b) built a collaborative framework for MTSC operations. More specifically, they concentrated on the collaboration between an assistance company and a medical institution, by developing a framework composed of steps, tools, and techniques, for SC operations in medical tourism services. Mekhum (2020) measured the impact of SC capabilities on health tourism performance by considering the mediating role of healthcare quality. The results revealed that SC capabilities, such as distribution channels, staff skills, and distribution time, positively affected the quality of health services and health tourism performance. The quality of health services also had a significant positive effect on health tourism and had a mediating effect on the distribution channel, time, and tourism performance. Janchai et al. (2022) developed an MTSC knowledge representation model based on the ontology methodology in Thailand to provide a better understanding of the medical tourism business for its stakeholders. This developed MTSC ontology offers 21 actors, 21 primary roles, 5 processes, 20 activities, 21 core products, 122 objects, 82 roles in the activity, and 61 flows. Finally, in an exploratory investigation, Somabutr et al. (2022) determined 10 critical success factors for

customer preferences in Thailand MTSC using thematic analysis methodology. The identified critical success factors were collaboration with local stakeholders, advertisement, service readiness, short waiting time, consultant accessibility, international accreditation, medical facilitators, language interpretation, courtesy service, and cost consideration. Table 1 shows the core information of the important studies in the literature on the MTSC.

Table 1. Previous research on MTSC.

Study	Case	Methodology	Core Findings
Ferrer and Medhekar (2012)	Australia	Statistical Analysis	The influence of supply chain costs, waiting time, and privacy on demand and smooth flow
Lee and Fernando (2015a)	Malaysia	Literature Review	Identifying the factors influencing MTSC
Lee and Fernando (2015b)	Malaysia	Structural Equation Modeling(SEM)	Identifying mutual dependency, coordination, and information sharing in MTSC
Rahman Muhammad and Zailani (2017)	Malaysia	Structural Equation Modeling (SEM)	The Effectiveness of Muslim-friendly MTSC on organizational performance
Chung and Chang (2017)	Thailand	Analytical Network Process (ANP)	Integrating the MTSC based on a healthy financial perspective
Kaewkitipong (2018)	Thailand	Thematic Analysis	Needing long-term policy and macro-level support as well as existing limited data exchange among the stakeholders
Ahmadimanesh et al. (2019)	Iran	Mathematical Modeling	The necessity of strategic planning and effective investment in MTSC
Fongtanakit et al. (2019)	Thailand	Structural Equation Modeling (SEM)	Focusing on mutual dependency, commitment, and trust to provide MTSC guideline
Karadayi-Usta and Serdarasan (2020a)	Turkey	Content Analysis	Identifying seven business processes, including CRM, SRM, etc.
Karadayi-Usta and Serdarasan (2020b)	Turkey	Statistical Analysis	Suggesting steps, tools, and techniques for collaborative MTSC operations
Mekhum (2020)	Thailand	Statistical Analysis	Measuring the impact of supply chain capabilities on the performance of MTSC
Janchai et al. (2022)	Thailand	Ontology	The existence of appropriate schema design, terminologies, and query results in MTSC ontology
Somabutr et al. (2022)	Thailand	Thematic Analysis	Identifying critical success factors of MTSC for customer preferences

There is a need for a clearer understanding of medical tourism in the future (Seow et al., 2022). On the other hand, as shown in Table 1, there are only a few studies with conflicting objectives and findings regarding the MTSC. Meanwhile, the number of studies that have developed a model for analyzing the MTSC is very limited. Due to the mentioned need and this major gap in the literature on the topic, it would be necessary to propose more analysis models for the MTSC in new ecosystems. This response to this situation is by adopting a hybrid method and applying it to a real context, trying to address the shortage of analysis models in the literature on the MTSC.

3. Method

3.1 Place of study

Located in the southwest of Iran, Shiraz is the fifth most populous city in Iran and the capital of Fars Province. The city benefits from a wide range of clinical and paraclinical services, qualified and renowned physicians, and the latest medical equipment (Jabbari et al., 2013). Also, Shiraz hosts 31 public/private specialized hospitals (Shiraz University of Medical Sciences, 2019). Geographically speaking, Shiraz is located in a region conveniently close to the Arab States of the Persian Gulf, which considerably invest in the medical market. Therefore, every year a significant number of tourists travel to this city to receive medical treatment, which shows the high potential of this city in attracting medical tourists as a “hub” in the south of Iran. In addition to its medical services, Shiraz, famous for its rich history and culture, offers a wide array of leisure facilities. This serves as an additional incentive

for tourists to visit the city, not only for medical purposes but also to partake in diverse leisure activities; another aspect highlighted by Lovelock and Lovelock (2018), is the possibility of incorporating leisure elements to further motivate medical tourists. Therefore, Shiraz is selected for analyzing MTSC analysis due to its wide range of medical services, qualified physicians, latest equipment, an abundance of specialized hospitals, strategic geographic location, and the availability of leisure facilities, which collectively contribute to its high potential in attracting medical tourists. Shiraz MTSC has different actors, which are illustrated in Figure 1.

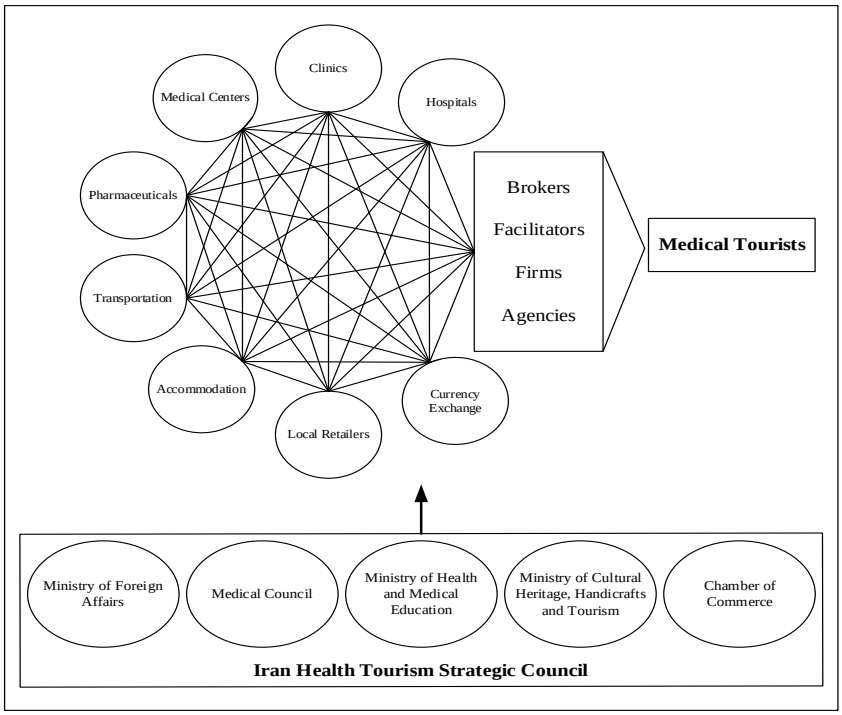

Figure 1. Shiraz MTSC stakeholders.

Iranian medical tourism involves various official organizations responsible for general policymaking, including the Ministry of Health and Medical Education, the Ministry of Cultural Heritage, Handicrafts, and Tourism, the Ministry of Foreign Affairs, and the Chamber of Commerce and Medical Council, which have collectively founded the Iranian Health Tourism Strategic Committee. Moreover, the private sector (including travel agencies and medical tourism facilitators) is considered the most significant actor in Iran's medical tourism.

3.2 Research process

As mentioned earlier, this study sought to conduct a comprehensive analysis of MTSC using a mixed research methodology. First, in the qualitative investigation, GT was used to frame a process analysis model. A panel consisting of 12 experts was used for the qualitative investigation. The experts were selected through purposive sampling from different MTSC stakeholders, including general policymakers, managers of private/public healthcare providers, managers of tourism agencies and medical tourism firms, hotel managers, facilitators, and academics. The experts were selected based on their practical and academic knowledge of the MTSC. In addition, to include representatives of all these stakeholders of the supply chain, at least one expert from each stakeholder group was selected through the snowball sampling method. The exclusion criterion was the participants' reluctance to participate in the study. Table 2 shows information about the experts in the panel.

Table 2. Experts' information.

Expert	Related Organization	Demographic Characteristics		
E1	Member of Shiraz Health Tourism Committee Ministry of Health and Medical Education	Gender	Male	11
E2	Member of the International Air Transport Association		Female	1
E3	Member of the Medical Tourism Committee in Shiraz Chamber of Commerce	Age	Less than 30	3
E4	Chief Executive Officer of a Medical Tourism Facilitating Firm		Between 30 and 45	2
E5	Supervisor of the International Patients Department of a Private Hospital		More than 45	7
E6	Member of Shiraz Health Tourism Committee in the Ministry of Cultural Heritage, Handicrafts, and Tourism	Education	Master's Degree	4
E7	Medical Tours Consultant and Guide		Ph.D.	8
E8	Chief Executive Officer of a Hotel	Experience	Less than 5 Years	2
E9	Secretary of Iran Health Tourism Strategic Committee		Between 5 to 15 Years	5
E10	Internal Director of Private Beauty Clinic			
E11	Faculty Member of the Tourism and Hospitality Department of Shiraz University		More than 15 Years	5
E12	Representatives of the Ministry of Foreign Affairs in Shiraz			

Moreover, the qualities of the data analyzed and the model proposed were evaluated according to the nine criteria suggested in Flint et al. (2002) framework (Quality Control of GT is available in the supplementary material. Also, see Flint et al. (2002) for further information). Next, in the quantitative analysis stage, the interrelationships among the model elements were determined using the rough-DEMATEL technique and the judgment of three members of the expert panel who were more familiar with the purposes of the study. These experts included a member of the Shiraz Health Tourism Committee in the Ministry of Health and Medical Education, a member of the International Air Transport Association, and a member of the Shiraz Health Tourism Committee in the Ministry of Cultural Heritage, Handicrafts, and Tourism. The process of research is illustrated in Figure 2.

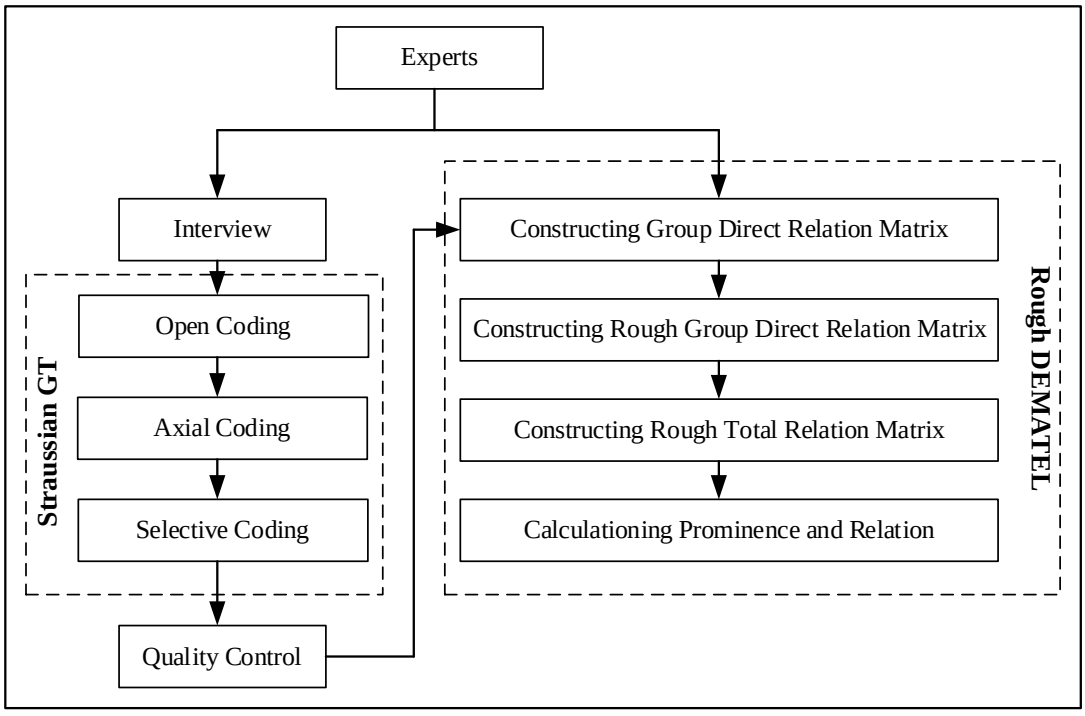

Figure 2. Research process.

3.3 Data collection

In-depth, face-to-face semi-structured interviews were conducted with the experts mentioned above. The sampling procedure was continued until theoretical saturation was achieved. The interviews were carried out from April to August 2020. Given the social distancing policy imposed following the COVID-19 outbreak, the interviews were conducted via online platforms. After an interview protocol was formulated, the quality of its questions was evaluated by two experts (the interview protocol appears in supplementary material). Moreover, several factors were taken into account in the interview process. First, the interviewers ensured that the interviewees were prepared in advance. Next, each interviewee orally expressed his/her consent, and the interview was carried out in a friendly and stress-free online environment. The interview questions were in Persian/Farsi, and no translation was required as all the experts were native Persian speakers, and the interviews lasted 30-45 minutes. As each potential participant received the necessary explanations about the purpose of the interview, s/he was assured of their data confidentiality and anonymity. The interviewees had the option to cancel the interview whenever they desired, even if they had previously agreed to it. Then, individuals who were completely informed and willing to participate went on to complete and sign a written consent document. Next, in the quantitative analysis stage, the interrelationships among the model elements were determined using the rough-DEMATEL technique. In doing so, copies of a questionnaire regulated by pairwise comparison were submitted to three of the members of the expert panel.

3.4 Grounded Theory

As a research strategy used in social sciences, GT was developed by Glaser and Strauss in 1967 (Kenny & Fourie, 2014). It can be simply defined as the process of constructing a theory from obtained data (Glaser & Strauss, 1967). Although Glaser and Strauss (1967) initially applied GT to nursing research, it has been successfully applied to numerous other contexts, such as SC risk management (Shojaei & Haeri, 2019), entrepreneurship and leadership (Maysami & Mohammadi Elyasi, 2020), and tourism research (Momeni et al. 2018; Sun et al., 2019).

GT has undergone various changes throughout its development; however, currently, there are three main streams using GT: The Straussian approach or the systematic approach (Strauss & Corbin, 1990), the Glaserian approach (Glaser, 1992), and the constructive approach (Charmaz, 2000). Researchers are advised to select one of these approaches depending on the purposes they pursue in their investigations (Heath & Cowley, 2004). Combining these approaches, however, does not seem to be an ideal option (Van Niekerk & Roode, 2009). Given these issues, the present study relied on the Straussian approach to achieve its purposes because this approach provided more guidelines compared with the others (Heath & Cowley, 2004; Van Niekerk & Roode, 2009). According to Strauss and Corbin (1990), GT is accomplished through three core steps, namely open coding, axial coding, and selective coding (as elaborated below).

The process of verbatim analysis of data for the purpose of discovering concepts, their specifications, and dimensions is called open coding. In this step, categories are constructed that encompass all objects, events, or actions/interactions related to the phenomenon under investigation (in this case, MTSC). When categories emerge, by comparing their subordinate members with each other, one learns the differences between such classified elements (objects, events, or actions/interactions) in terms of their properties and dimensions. Therefore, they are classified into sub-categories, after which this step is finalized.

"Axial coding" is conducted to construct a detailed description of the phenomenon. Thus, axial coding links categories with their sub-categories based on their properties and dimensions. This process occurs around the axis of a category, and that is why it is called axial coding. All concepts identified revolve around a main phenomenon. According to Strauss and Corbin (1990), axial coding is carried out based on the following categories:

- ***Causal conditions (C):*** Categories related to conditions that affect the main phenomenon;
- ***Intervening conditions (I):*** General conditions that affect the strategies;
- ***Contextual conditions (G):*** Conditions that affect the strategies;
- ***Strategies (S):*** Actions and reactions resulting from the main phenomenon;
- ***Outcomes (O):*** The result of applying the strategies.

The last step of GT is "selective coding." In this step, the theory is refined and integrated. According to Strauss and Corbin (1990), at the selective coding stage, no new properties, dimensions, or relationships emerge through the analysis. The researcher selects the main category that encapsulates the central theme of the study and then integrates all other categories. The objective of this step is accomplished by reviewing technical memos collected through data analysis and interviews.

3.5 Rough Set Theory

Rough set theory was introduced by Pawlak (1982) as a mathematical approach; following that, Zhai et al. (2008) introduced the rough number concept. Since then, rough set theory has been incorporated into many decision-making techniques, such as TOPSIS (Song et al., 2014), AHP (Pamučar et al., 2018), ANP (Li & Wang, 2018), DEMATEL (Shojaei et al., 2022), and BWM (Haqbin et al., 2022). By aggregating group information, rough set theory can overcome the vagueness and subjectivity that arise from diverging judgments in a group decision-making process (Mao et al., 2020). Zhu et al. (2015) mention the following definitions regarding rough numbers:

Definition 1. Let U be the universe containing all objects, and P be a random object of U, A be a set of n classes $\{A_1, A_2, \dots, A_n\}$ that cover all the objects in U. Given that these classes are ordered as $\{A_1 < A_2 < \dots < A_n\}$ then $\forall P \in U, A_k \in R, 1 \leq k \leq n$ point to the class to which the object belongs. The lower approximation, upper approximation, and boundary region of the class A_k are defined as:

$$\underline{Apr}\ (A_k) = \{P \in U | R(P) \leq A_k\} \tag{1}$$

$$\overline{Apr}\ (A_k) = \{P \in U | R(P) \geq A_k\} \tag{2}$$

$$\text{Bnd}\ (A_k) = \{P \in U | R(P) \neq A_k\} = \{P \in U | R(P) > A\} \cup \{P \in U | R(P) < A\} \tag{3}$$

Definition 2. A_k can be shown as the rough number $R(A_k)$, which is determined by its corresponding lower limit and upper limit:

$$\underline{Lim}\ (A_k) = \frac{1}{M_L} \sum \{P \in \underline{Apr}\ (A_k)\} \tag{4}$$

$$\overline{Lim}\ (A_k) = \frac{1}{M_U} \sum \{P \in \overline{Apr}\ (A_k)\} \tag{5}$$

$$\text{RN}\ (A_k) = [\underline{Lim}\ (A_k), \overline{Lim}\ (A_k)\ ] \tag{6}$$

where M_L, M_U are the numbers of objects that are contained in Apr, respectively.

Definition 3. A rough number can be converted into a crisp number using the following equations:

$$W_k^e = \frac{\tilde{C}_k^e}{\sum_{k=1}^{n} \tilde{C}_k^e} \tag{7}$$

$$\tilde{C}_k^e = \min_k\{w_k^{e*L}\} + \chi_k^e \times (\max_k\{w_k^{e*U}\} - \min_k\{w_k^{e*L}\}),\ k = 1, 2, \dots, n \tag{8}$$

$$\chi_k^e = \frac{w_k^{e*L} \times (1 - w_k^{e*L}) + w_k^{e*U} \times w_k^{e*U}}{1 - w_k^{e*L} + w_k^{e*U}} \tag{9}$$

3.6 Rough DEMATEL

Decision-making trial and evaluation laboratory (DEMATEL) is a useful technique to conceptualize the structure of cause-effect relationships among the elements in a complex system (Fontela & Gabus, 1976). DEMATEL offers an effective way of visualizing the structure of complex causal relationships, describing the relationships between different elements of a system (Song & Cao, 2017).

Step 1: Construct a group direct-relation matrix

m experts make pairwise comparisons for n criteria (called *elements* in this study) according to the crisp DEMATEL scale, where 0 indicates "No Influence" and 4 shows "Very Strong Influence" (Wu, 2008). The k^{th} expert's direct-relation matrix M_k is created via:

$$M_k = \begin{bmatrix} 0 & r_{12}^k & \cdots & r_{1n}^k \\ r_{21}^k & 0 & \cdots & r_{2n}^k \\ \vdots & \vdots & \ddots & \vdots \\ r_{n1}^k & r_{n2}^k & \cdots & 0 \end{bmatrix}, k = 1, 2, \dots, m \tag{10}$$

Where r_{ij}^k is the crisp judgment of the expert k regarding the influence of the i^{th} criterion on the j^{th} criterion.

Step 2: Determine the rough group direct-relation matrix

The crisp judgments are then converted into rough ones according to Definition 1 and 2. Then, the rough group direct-relation matrix R can be created through:

$$R = [\overline{RN\ (\tilde{r}_{ij}^k)}]_{\text{n×n}} = \begin{bmatrix} [0.0] & [r_{12}^L, r_{12}^U] & \cdots & [r_{1n}^L, r_{1n}^U] \\ [r_{21}^L, r_{21}^U] & [0.0] & \cdots & [r_{2n}^L, r_{2n}^U] \\ \vdots & \vdots & \ddots & \vdots \\ [r_{n1}^L.\ r_{n1}^U] & [r_{n2}^L, r_{n2}^U] & \cdots & [0.0] \end{bmatrix} \tag{11}$$

Step 3: Create the rough total-relation matrix

The linear scale transformation is adopted in order to transform the elements into comparable scale. The normalized rough group direct-relation matrix R' is constructed as follows:

$$R' = [\overline{RN\ (\tilde{r}_{ij})'}]_{\text{n×n}} = \begin{bmatrix} \overline{RN\ (\tilde{r}_{11})'} & \overline{RN\ (\tilde{r}_{12})'} & \cdots & \overline{RN\ (\tilde{r}_{1n})'} \\ \overline{RN\ (\tilde{r}_{21})'} & \overline{RN\ (\tilde{r}_{22})'} & \cdots & \overline{RN\ (\tilde{r}_{2n})'} \\ \vdots & \vdots & \ddots & \vdots \\ \overline{RN\ (\tilde{r}_{n1})'} & \overline{RN\ (\tilde{r}_{n2})'} & \cdots & \overline{RN\ (\tilde{r}_{nn})'} \end{bmatrix} \tag{12}$$

Additionally, the rough total-relation matrix (T) can be created via:

$$\overline{RN\ (\tilde{r}_{ij})'} = \frac{\overline{RN\ (\tilde{r}_{ij})}}{\tau} = [\frac{r_{ij}^L}{\tau}, \frac{r_{ij}^U}{\tau}], \tau = \max_{1 \le i \le n} (\sum_{j=1}^n r_{IJ}^U) \tag{13}$$

$$T = \left[t_{ij}\right]_{n \times n}, t_{ij} = [t_{ij}^L, t_{ij}^U] \tag{14}$$

$$TS = [t_{ij}^S] = R'S\,(1 - R'S) - 1\,, S = L, U \tag{15}$$

where t_{ij}^L and t_{ij}^U are the lower and upper limits of the rough interval t_{ij} in the total relation matrix, and I is the unit matrix.

Step 4: Calculate the "prominence" and "relation" values

Next, the sum of the rows and the sum of the columns are showed by x_i and y_j, repressively, within the rough total-relation matrix using the following equations:

$$x_i = [x_i^L, x_i^U] = [\sum_{j=1}^n t_{ij}^L, \sum_{j=1}^n t_{ij}^U] \tag{16}$$

$$y_j = [y_j^L, y_j^U] = [\sum_{i=1}^n t_{ij}^L, \sum_{i=1}^n t_{ij}^U] \tag{17}$$

where x_i^L and x_i^U are the lower limit and upper limit of the rough interval x_i. Similarly y_j^L and y_j^U are the lower and upper limits of the rough interval y_j. In order to calculate the prominence and relation values, x_i and y_j should be converted into crisp values according to Definition 5. Finally, prominence and relation values are calculated through the following equation, where the vector (m_i) shows prominence and the vector n_i determines relation:

$$m_i = x_i + y_j \quad (18)$$

$$n_i = x_i - y_j, i = j \quad (19)$$

4. Results

To accomplish the objectives of the study, first the transcripts of the interviews were analyzed according to the steps of the Straussian grounded theory (open coding, axial coding, and selective coding). Following that, "poor service delivery in medical tourism" was extracted as the main phenomenon and the basis of the process model. As the interviewees stated, "poor service delivery" was the most significant threat and challenge facing medical tourism in the case study. According to Expert 9: "*The fact that a medical tourist enters Shiraz and we cannot provide a proper service to his/her is the most serious threat. Even though s/he finally receives the service in question, despite all shortcomings, this problem must be solved for the sake of development*." Expert 11 also explained that: "*The mismatch between the price and the quality of the services provided is certainly a weakness of the medical tourism industry in Shiraz*."

The other dimensions of the process model, including causal conditions, contextual conditions, intervening conditions, strategies, and outcomes, were determined based on the main phenomenon. The sub-dimensions and elements of each dimension are shown in Table 3.

Table 3. The process model.

Dimension	Sub-Dimension	Code	Elements
Causal Conditions	Poor control and monitoring	C1	A lack of transparent pricing
		C2	Poor anti-corruption measures in medical tourism
		C3	Poor supervision over adherence to the rules and regulations
	Underdeveloped infrastructure	C4	Lack of internationally accredited hospitals
		C5	Shortage of infrastructures compatible with medical tourists' expectations in the tourism sector
		C6	No insurance provided
	Structural and managerial challenges	C7	A lack of specialization in the medical tourism industry
		C8	A lack of cooperation and coordination between the MTSC members
		C9	No organization designated for supervision over medical tourism
		C10	No strategic planning formulated in medical tourism
		C11	Weak marketing and branding
	The nascent structure of Shiraz's MTSC	C12	The infancy of modern medical tourism in Iran
		C13	Shortage of academic studies concerned with medical tourism in Iran
Contextual Conditions	Iran's international relations	G1	Ineffective international relations
		G2	Political fluctuations
		G3	Imposed international sanctions
	Economic conditions	G4	Economic fluctuations and devaluation of the Iranian currency
		G5	Low prices for medical and tourism services
	Sociocultural issues	G6	The special place of Shiraz in the tourism industry
		G7	Problems caused by cultural differences
		G8	Restrictive religious and state laws
	Shiraz's medical status	G9	High-quality and varied medical services in Shiraz
		G10	The long history of medical tourism in Shiraz
		G11	Availability of world-renowned doctors in Shiraz
	Shiraz's geographical conditions	G12	The strategic geographical location of Shiraz
		G13	The desirable ecosystem of Shiraz

Dimension	Sub-Dimension	Code	Elements
Intervening Conditions	The important role of mediators	I1	Brokers who inevitably mediate the relationship between physicians and medical tourists
		I2	Medical tourists' poor knowledge and information
		I3	The importance of word-of-mouth advertising in target countries
	The role of government in medical tourism	I4	Problems medical tourists face in the medical visa application process
		I5	Moving beyond an oil-dependent economy
		I6	The expansion of the Cultural Heritage, Handicrafts and Tourism Organization into a ministerial organization
Intervening Conditions	Domestic/foreign professional competitors	I7	Foreign investment in the medical tourism industry of target countries
		I8	Domestic and foreign competitors
	Stakeholders' short-term approach	I9	The profit-oriented vision of different members in the medical tourism SC
		I10	Hospitals established in target countries by the Iranian Ministry of Health
Strategies	Improving medical tourism infrastructure	S1	The need to create an appropriate structure for organizing/ monitoring SC members
		S2	Using cyberspace to promote medical tourism
		S3	Operating domestic/international flights to Shiraz
	Gaining competitive advantage by focusing on products and the market	S4	Emphasizing domestic and regional tourism
		S5	Emphasizing beauty tourism
Outcomes	Reducing the market share of Shiraz in global medical tourism	O1	Inefficient solutions offered by the Iranian Health Tourism Strategic Council
		O2	The negative impact of brokers
		O3	Losses the private sector incurs
		O4	The small share of medical tourism in the economy
		O5	Medical tourists' increasing complaints about the services received in Shiraz
		O6	Building a brand and a negative image of Shiraz medical tourism
		O7	Loss of collective benefit of the MTSC members

As mentioned earlier, in the quantitative stage, the interrelationships among the elements of the process model were identified using the rough DEMATEL methodology. Based on the steps of rough-DEMATEL, the rough total-relation matrix is calculated and shown in Table 4.

Table 4. Rough total-relation matrix.

	M	C1	C2	…	O5	O6	O7
M	[0.030,0.040]	[0.017,0.026]	[0.010,0.016]	…	[0.109,0.128]	[0.123,0.128]	[0.054,0.106]
C1	[0.010,0.013]	[0.007,0.012]	[0.094,0.107]	…	[0.002,0.003]	[0.003,0.005]	[0.001,0.002]
C2	[0.015,0.016]	[0.012,0.015]	[0.009,0.013]	…	[0.005,0.009]	[0.002,0.003]	[0.001,0.004]
…	…	…	…	…	…	…	…
O5	[0.000,0.000]	[0.000,0.000]	[0.000,0.000]	…	[0.000,0.000]	[0.107,0.107]	[0.000,0.001]
O6	[0.000,0.000]	[0.000,0.000]	[0.000,0.000]	…	[0.000,0.000]	[0.000,0.000]	[0.002,0.008]
O7	[0.000,0.000]	[0.000,0.000]	[0.000,0.000]	…	[0.000,0.000]	[0.000,0.000]	[0.002,0.008]

Next, through the equations in Definition 3, the sum of the rows (X_i) and the sum of the columns (Y_j) in the rough total-relation matrix were converted into crisp values (x_i and y_j, respectively) to determine the prominence (m_i) and (n_i) relation values. Needless to say, in the DEMATEL methodology, each criterion is categorized under

one of the two main groups: cause and effect. The cause-type elements refer to the factors that left an impact, whereas the effect-type elements were the factors that received influence (Fontela & Gabus, 1976). The two groups can be identified according to the values of their prominence and relation; if the relation value is positive, the criterion in question falls under the cause group. However, a negative relation value would mean that the criterion is an effect. On the other hand, the higher the prominence value is, the more important the criterion in question is (Song & Sakao, 2018). Table 5 shows the prominence and relation values of the elements of the model.

According to Table 5, "poor service delivery in medical tourism" was the most significant cause, with a prominence value of 3.67 and a relation value of 0.57. As such, this criterion was justifiably selected as the main phenomenon in the process model. Moreover, "lack of transparent pricing" (C1) and "poor anti-corruption measures in medical tourism" (C2) were two other cause-type elements of the model with prominence values less than that of the main phenomenon. In this regard, Expert 1 explained: "*A medical tourist can hardly find the exact prices of the services s/he wants to use through online platforms. We do not have medical tourism packages in which the final price is clearly defined. As such potential tourists remain uncertain about their decisions*."

Moreover, "a lack of cooperation and coordination between the MTSC members" (C8) was the most crucial effect criterion and was influenced by the cause elements. Expert 3 stated: "The confrontation between the stakeholders involved in Shiraz medical tourism has slowed down the industry's cycle; they see themselves more as adversaries than allies. This lack of coordination is the most serious challenge to this industry." Similarly, "economic fluctuations and devaluation of the Iranian currency" (G4) was the most critical cause in "contextual conditions", whereas "imposed international sanctions" (G3) was the most important effect under the same sub-dimension. According to Expert 2, "*The most important stimulus for medical tourism is the price. For example, heart surgery procedures in the United States are much costlier than those in countries such as India or Singapore. As a result, the high cost of medical care in some countries has encouraged people to try countries that offer the same surgeries at a lower cost*."

Furthermore, the studies unanimously mentioned price as an important motivation for medical tourists. Therefore, the devaluation of the Iranian currency can be the best opportunity for medical tourism development in Iran, and consequently in Shiraz, as emphasized by Expert 4, "*The devaluation of our country's currency is unfortunate, yet it is an opportunity in international markets, especially tourism.*" "*Moving beyond an oil-dependent economy" (I5) was the most significant cause in the "intervening conditions*." As Expert 2 clarified: "*We have never taken tourism seriously as a channel for earning national revenue. We have always relied on oil revenues and did not find it necessary to make money from other sources. However, the situation has drastically changed because we restrictions caused by oil-related sanctions, and we have to consider alternative sources.*" Meanwhile, "the profit-oriented vision of different members in the MTSC" (I9) was the most critical effect in the "intervening conditions." According to Expert 11, "*Stakeholders in the chain are not willing to think about the interests of society and the medical tourism industry; they only think about personal gain and interests. This is certainly an important weakness.*" Finally, "the small share of medical tourism in the economy" (O4) was the most significant "outcome", as it displayed the highest prominence value and fell under the cause group with its positive relation value. Explaining the role of medical tourism in the economy of Shiraz and Iran, Expert 11 shared the following comment: "*Tourism can be a panacea considering the current economic situation and problems such as inflation, lack of liquidity, sanctions, and unemployment. Under similar conditions, other countries faced with economic crises managed to save their country by having different types of tourism supported by their governments and the private sector*."

Table 5. The crisp values.

	Final Crisp Value		**Prominence** (m_i)	**Relation** (n_i)		**Final Crisp Value**		**Prominence** (m_i)	**Relation** (n_i)
	X	Y	$X+Y$	$X-Y$		X	Y	$X+Y$	$X-Y$
M	2.12	1.55	3.67	0.57	G12	0.00	0.13	0.13	**-0.13**
C1	0.97	0.33	1.30	0.64	G13	0.11	0.23	0.34	**-0.13**
C2	0.84	0.26	1.10	0.58	I1	0.21	0.32	0.54	**-0.11**
C3	0.34	1.05	1.39	**-0.71**	I2	0.15	0.31	0.46	**-0.16**
C4	0.11	0.63	0.75	**-0.52**	I3	0.18	0.36	0.54	**-0.18**
C5	0.10	0.57	0.68	**-0.47**	I4	0.29	0.22	0.51	0.08
C6	0.00	0.49	0.49	**-0.49**	I5	0.83	0.10	0.93	0.73
C7	0.00	0.57	0.57	**-0.57**	I6	0.00	0.31	0.31	**-0.31**
C8	0.58	2.14	2.72	**-1.56**	I7	0.00	0.12	0.12	**-0.12**
C9	0.00	0.75	0.75	**-0.75**	I8	0.00	0.12	0.12	**-0.12**
C10	0.21	1.38	1.60	**-1.17**	I9	0.15	0.83	0.97	**-0.68**
C11	0.49	0.78	1.27	**-0.29**	I10	0.22	0.30	0.52	**-0.09**
C12	0.00	0.56	0.56	**-0.56**	S1	1.05	1.83	2.88	**-0.78**
C13	0.32	0.24	0.55	0.08	S2	0.18	0.14	0.32	0.03
G1	0.00	0.34	0.34	**-0.34**	S3	0.12	0.23	0.35	**-0.11**
G2	0.21	0.22	0.43	**-0.01**	S4	0.77	0.95	1.72	**-0.18**
G3	0.00	0.66	0.66	**-0.66**	S5	0.11	0.06	0.18	0.05
G4	0.40	0.11	0.51	0.29	O1	0.57	0.84	1.41	**-0.27**
G5	0.13	0.13	0.26	0.00	O2	1.49	0.81	2.30	0.67
G6	0.12	0.16	0.28	**-0.04**	O3	2.80	0.22	3.02	2.58
G7	0.00	0.10	0.10	**-0.10**	O4	3.34	0.12	3.46	3.22
G8	0.00	0.16	0.16	**-0.16**	O5	1.01	0.13	1.14	0.87
G9	0.21	0.13	0.34	0.08	O6	1.68	0.25	1.93	1.43
G10	0.00	0.35	0.35	**-0.35**	O7	0.97	0.25	1.22	0.72

"The need to create an appropriate structure for organizing/monitoring SC members" (S1) was also an essential effect-type strategy. As the experts confirmed, the transformation of the Cultural Heritage Organization into a ministry was a turning point in restructuring tourism in Iran. Moreover, to depict the interrelationships among the elements, all the cells in the rough total-relation matrix were converted into crisp numbers using Definition 5. Then, a threshold (T) was calculated and implemented to eliminate the negligible relations in the rough total-relation matrix (Mao et al., 2020) ($A = 0.0104, SD = 0.0346, and\ T = A + SD = 0.0450$; $A\ and\ SD$ represent the average and standard deviation of all the values in the rough total-relation matrix). Figures 3-6 illustrate the relationships in each dimension. Given the large number of the elements and constraints of space, the elements were separated into four figures for the sake of clarity.

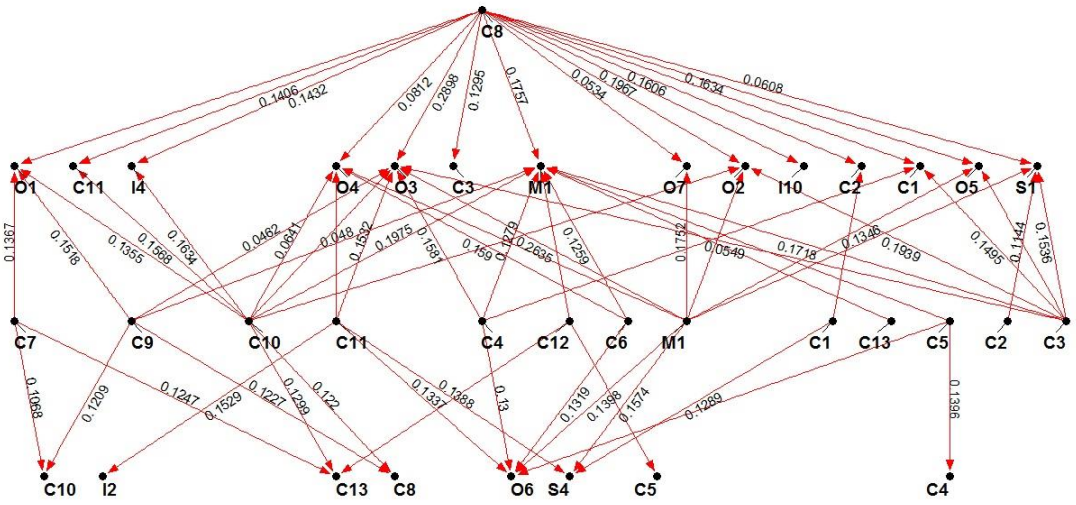

Figure 3. The main phenomenon and causal conditions.

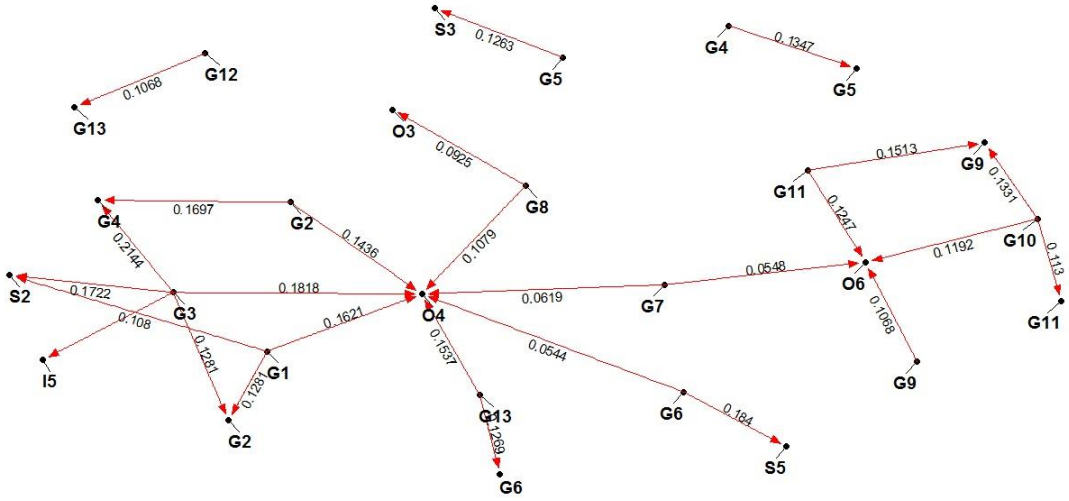

Figure 4. Contextual conditions.

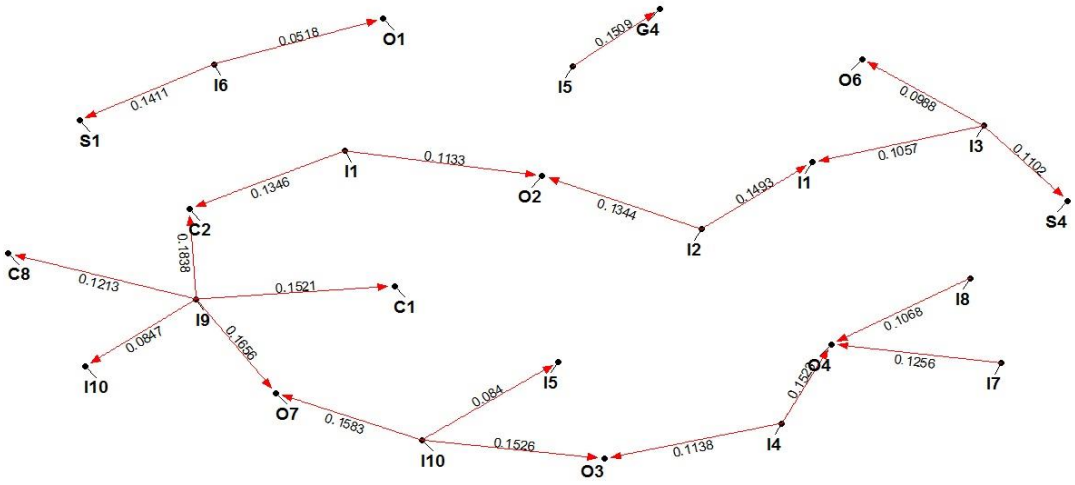

Figure 5. Intervening conditions.

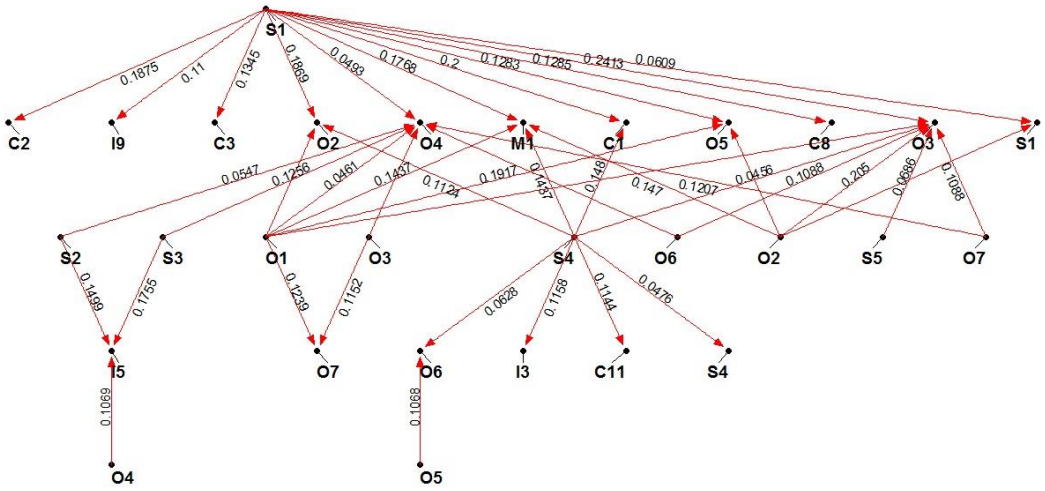

Figure 6. Strategies and outcomes.

As mentioned earlier, Figures 3-6 illustrate the substantial interrelationships among the elements in the model. More precisely, each node represents a criterion, and the arrow between them shows their relation. As an instance, in Figure 4, "economic fluctuations and devaluation of the Iranian currency" (G4) would cause "low prices for medical and tourism services" (G5) with an intensity of 0.1068. Similarly, Figure 5 shows that "the expansion of the Cultural Heritage, Handicrafts and Tourism Organization into a ministerial organization" (I6) would lead to "the need to create an appropriate structure for organizing/monitoring SC members" (S1) (with an intensity of 0.1411) and would help to revisit and refine "inefficient solutions offered by the Iranian Health Tourism Strategic Council" (O1) (with an intensity of 0.0518). Naturally, higher intensity values would indicate the higher importance and significance of the relationship between two elements in the model.

5. Discussion

5.1 Discussion of key findings

Several studies explored MTSCs in different destinations. Yet, there is still a need to develop an MTSC analysis framework for ecosystems in less developed destinations. The reason for this is that MTSCs in the tourism ecosystems of many of developing countries (e.g., Iran) have not reached an advanced level of development and institutionalization. The issues including the lack of proper infrastructure in both medical and tourism sectors, the involvement of mediators and profiteers, and conflicts of interests between executive bodies and institutions in developing countries are among the main reasons necessitating the construction of an MTSC analysis model that could help to overcome or manage the shortcomings. Meanwhile, the COVID-19 crisis has left a negative financial influence on the medical tourism market, medical diagnostic centers, and facilitation companies. However, the current situation provides a good opportunity for the tourism sector to build the necessary infrastructure for the post-COVID-19 era. Some of the necessary measures are designing effective Internet websites, practicing digital marketing, managing activities on social networks, forming virtual clinics, expanding telemedicine for diagnostic and care purposes, revising policies addressing the health tourism market, etc.

Given these concerns, this research constructed a model composed of the elements of the MTSC in Shiraz, as one of the leading health tourism destinations in Iran, employing a mixed (qualitative and quantitative) methodology. This study made two major contributions: (a) it combined GT and rough DEMATEL, proposing an MTSC analysis model and the model was then applied to one of the main Iranian medical tourism destinations; and (b) it tried to provide practical findings that could help improve the situation for different stakeholders engaged in the medical tourism industry in developing countries.

The results of the qualitative phase helped to configure a model that analyzed MTSC, which included 6 main dimensions, 17 sub-dimensions, and 48 elements. As such, “poor service delivery in medical tourism” was extracted as the main phenomenon and the basis of the process model, and the most significant threat and challenge facing medical tourism in the place of study. Furthermore, according to the quantitative findings, “poor service delivery”, “lack of transparent pricing” (C1), and “poor anti-corruption measures in medical tourism” (C2) were the most significant cause-type elements of the model.

5.2 Theoretical implications

This study found 6 effective dimensions. It relied on Strauss' grounded approach to build the process theory for analyzing the MTSC. As a result, the main phenomenon, in the light of Strauss' grounded approach, was “poor service delivery in medical tourism.” This phenomenon was the most significant cause with a prominence value of 3.67 and a relation value of 0.57. As such, this criterion was justifiably selected as the main phenomenon in the process model. Corroborating this finding, Karadayi-Usta and Serdarasan (2020a) identified seven MTSC business processes, among which *service delivery management* was one of the key ones. As such, their observation was in line with the results obtained in this research. Moreover, factors such as poor marketing and underdeveloped infrastructure, which Momeni et al. (2018) observed in their research, were included in the causal conditions of the framework used in the present study. The findings, then, were compatible with the results of previous research. The other components of the proposed process theory, which represented the ecosystem under investigation, were highlighted by the Shiraz MTSC stakeholders (see Figure 1).

5.3 Managerial implications

To improve the situation of medical tourism in Shiraz and thus increase the market share of this city in global medical tourism, the following practical suggestions were raised during the interviews with the experts. The first solution is to strengthen the Iranian Health Tourism Strategic Council. In this regard, Expert 1 stated, “*The Iranian Health Tourism Strategic Council was meant to serve as an institution that would address problems of health and medical tourism in Iran, and it should be supported so that it can improve the status of the industry.*” The next solution is to create platforms to verify the qualifications of doctors, hospitals, hotels, firms, and facilitators, in line with medical tourists’ opinions and expectations. Concerned with this issue, Expert 9 explained: “*The solution is to implement a verification system. If there was a strong platform to reflect medical tourists’ voices and validate*

the qualities of service providers, the market would automatically ignore incompetent service providers. Validation leads to progress. Why did platforms such as TripAdvisor become so popular worldwide, and why does every hotel try to have a positive review in it? Because customers' voice and their experiences are heard there, and as a result, the overall level of quality can be raised."

The next important suggestion is to empower the private sector and human resources in the field of medical tourism. Expert 1 stated: "*Most importantly, human resources in the medical tourism industry of Shiraz are not very competent. The officials did not provide enough training for human resources. Many of employees are not fluent in English or other languages, and cannot communicate well with medical tourists and handle their problems.*" Moreover, some of the most critical solutions proposed by the experts were launching a comprehensive medical tourism portal, facilitating the medical visa issuance process, and paying attention to academic research in medical tourism.

5.4 Limitations and future research

Conducting face-to-face interviews under COVID-19 circumstances was a major challenge to this study and disturbed the research schedules. Furthermore, it was difficult to contact and interview more experts due to their busy schedules and management responsibilities. The outbreak of the pandemic, as well as delayed vaccinations, disturbed the process of conducting interviews with the experts. To partially respond to such problems, the interviews were conducted via online platforms. Additionally, the difficulty of digitally completing copies of the questionnaire at the second research (quantitative) stage made it difficult to include many experts. In fact, in this part of the research, only three members of the expert panel participated who were more familiar with the purposes of the study. these people were the main experts in this field and answered the questions completely.

The panel included a member of the Shiraz Health Tourism Committee in the Ministry of Health and Medical Education, a member of the International Air Transport Association, and a member of Shiraz Health Tourism Committee in the Ministry of Cultural Heritage, Handicrafts, and Tourism. Given this situation, the sample of this study was not completely representative of all groups. Most probably, studies in the post-COVID-19 future will find it easier to manage the research process and the participation of experts/respondents. Some future findings may be affected if studies include a wider range of data to answer the research questions. Future investigations are strongly advised to probe into the relationships among the dimensions, sub-dimensions, and elements, in the post-COVID-19 era through various statistical methods/techniques. Moreover, further studies can focus on medical tourism from a medical perspective rather than tourism viewpoint (e.g., investigating the quality of actual medical care services). Ecosystems must also examine the effects of COVID-19 and possible changes of behavior among MTSC stakeholders.

6. Conclusion

This study substantially investigated the MTSC in Shiraz ecosystem, Iran, to improve the city's potential tourism market share during the COVID-19 pandemic and in the post-pandemic future. Primarily, interviews were conducted with some stakeholders involved in MTSC of this place of study including general policymakers, managers of private/public healthcare providers, travel agency managers, and managers of medical tourism companies. The data were collected through semi-structured interviews and were then analyzed according to the systematic approach of grounded theory (GT). To detect any interrelationships among the elements, the model was further analyzed quantitatively through the rough DEMATEL. The results of the qualitative phase helped to configure a model that analyzed MTSC, which included 6 main dimensions, 17 sub-dimensions, and 48 elements. The results revealed "poor service delivery", "lack of transparent pricing", and "poor anti-corruption measures in medical tourism" were the most important elements in the model. Meanwhile, two groups of strategies, namely improving the medical tourism infrastructure and creating competitive advantage by focusing on the product and the market, was unfruitful and did not help to increase the market share of Shiraz in global medical tourism. Hence, to improve the situation of medical tourism in Shiraz and thus increase its market share, several solutions are possible, such as strengthening the Iranian Health Tourism Strategic Council, creating validation platforms, empowering the private sector and human resources in this industry, launching a comprehensive medical tourism portal, facilitating the medical visa issuance process, and paying attention to academic research in medical tourism.

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