

Determinants and indicators for destination competitiveness: The case of Shiraz City, Iran

Abstract:

Purpose

Nowadays, the tourism industry is considered the largest and most diverse industry in the world, which can play a significant role in the economic growth and development of a country as the main source of income and employment. In this regard, the present study focuses on evaluating the competitiveness indicators of Shiraz city tourism destination based on a combined model.

Design/methodology/approach

For this purpose, a questionnaire with 78 questions was used to evaluate the indicators, in which a total of 1432 tourists participated, including 927 domestic tourists and 505 international tourists. The collected data were analyzed to determine the hierarchical relationship between the indicators using equation structural modeling.

Findings

The research findings indicate that the most effective and influential indicators in the field of tourism competitiveness are natural and handmade resources, and the most influential factors are demand conditions and cultural and natural resources. In this hierarchy, each factor affects its previous level and influences the next level.

Originality/value

This study offers significant potential for uncovering credible and robust approaches to further investigate the contextualization of tourism competitiveness on both national and international scales, thereby generating valuable new insights. By conceptualizing the diverse dimensions of tourism competitiveness and delving into the variations in its impacts across multiple levels, this research not only challenges existing notions but also aids destinations in maintaining and enhancing their market position and share over time. This study offers valuable insights and practical implications for both researchers and practitioners in the field of urban tourism. It enhances our understanding of destination competitiveness, informs policy decisions, facilitates benchmarking and best practices, guides strategic decision making, and promotes sustainable tourism development.

Keywords: Destination competitiveness; destination development; Iran tourism; tourism planning; tourism policies.; urban tourism

1. Introduction

The tourism industry is a major global sector that drives economic growth, creates jobs, and contributes to prosperity (Nicolaidis, 2020; Chin, Lo & Wong, 2022; Soh, Pua & Arip, 2023). It generates billions of dollars in revenue and is predicted to see a significant increase in international tourists in the coming years (Sundram & Gani, 2022).

The World Travel and Tourism Council (WTTC) reported that the travel and tourism industry's contribution to global GDP increased from 4.1% in 2019 to 5.5% in 2020. From 2014 to 2019, the sector generated 334 million jobs, accounting for 10.6% of all jobs and one-third of new jobs globally. According to WTTC (2023), a report analyzing 82 cities predicts that the direct contribution of travel and tourism to GDP will surpass 2019 levels by 2022, with the highest growth anticipated in Asia and Oceania between 2022 and 2032. In 2021, Iran's travel and tourism sector contributed \$118.3 million to the country's GDP, experiencing a 40% growth compared to 2020. These statistics highlight the industry's expanding growth and its significant role in the economy, making it a suitable solution for development as a key sector of the global economy. (Heidari, Rahmani, Khanmoradi, & Haghi, 2021; Marinello, Butturi, Gamberini & Martini, 2023).

Destination competitiveness is crucial for the survival and success of tourism destinations. Maintaining competitiveness is recognized as vital by tourism destination managers in dynamic and saturated markets (Luštický & Štumpf, 2021). Researchers, policymakers, and practitioners emphasize its importance in planning and developing tourism destinations (Shariffuddin et al., 2022). The concept of destination competitiveness has been extensively studied since the late 1970s, with various authors contributing to the literature (Porter, 1990; Poon, 1993; Crouch & Ritchie, 1999; Hassan, 2000; Dwyer & Kim, 2003; Ritchie & Crouch, 2003; Enright & Newton, 2004) and highlighting its significance for tourism success (John, 2022). Competitiveness enables destinations to maintain or improve their market position and gain a competitive advantage (Tu et al., 2022). To accurately assess destination competitiveness, studies focused on specific destinations within countries are essential, as tourism is a local phenomenon (Goffi, Cucculelli & Del Chiappa, 2022). Therefore, this study aims to develop destination competitiveness in the city of Shiraz.

Shiraz, a captivating city nestled in the heart of Iran, holds a rich heritage and is renowned for its enchanting blend of history, culture, and natural beauty. As one of the major tourism destinations in Iran, Shiraz boasts a vibrant tourism industry that attracts visitors from all corners of the globe. Home to UNESCO World Heritage Sites like the spectacular Persepolis and the mesmerizing Eram Garden, this city offers an immersive experience into Iran's ancient civilization and architectural wonders. Moreover, Shiraz is celebrated as the birthplace of renowned Persian poets, including Hafez and Saadi, attracting literature enthusiasts seeking inspiration and reflection. With its rich cultural and tourism heritage, the city holds significant potential to contribute to Iran's tourism revenue and long-term development policies. Prioritizing the tourism industry in the city can positively impact its economy, employment rates, per capita income, and overall growth (Bagheri, Shojaei & Kayani, 2016).

Researching and developing the competitiveness of the tourism industry in Shiraz city can generate transferable knowledge applicable to other cities aiming to enhance their tourism sectors. By examining the strategies, policies, and initiatives implemented in Shiraz, valuable insights can be gained regarding destination attractiveness, sustainable tourism practices, stakeholder collaboration, and overall competitiveness. This knowledge contributes to the broader discourse and informs efforts to strengthen and develop tourism sectors worldwide. The study adds to the existing knowledge by investigating the determinants and indicators of destination competitiveness, specifically within the context of urban tourism. Focusing on Shiraz City, Iran, it provides insights into a specific case that enriches the understanding of destination competitiveness through comparisons with other destinations. The study's findings offer valuable guidance for policymakers and destination managers engaged in urban tourism development. By identifying the determinants and indicators of competitiveness, the study

provides a framework for assessing and enhancing the competitive advantage of destinations, facilitating more effective destination planning and policy formulation.

In pursuit of this objective, we conducted a comprehensive study to identify the determinants and indicators of destination competitiveness, following established models. We then applied these extracted indicators to assess the competitiveness of Shiraz city as a tourist destination, while also determining the hierarchy of their effectiveness. The primary contributions of our research can be summarized as follows:

1. This study marks the first attempt to integrate various popular destination competitiveness models into a comprehensive framework.
2. We introduce key indicators of destination competitiveness and establish their hierarchical relationships using a novel method known as ESM.
3. Our aim extends beyond exploring the mere existence of relationships between determinants and indicators of destination competitiveness; we also seek to understand how these constructs contribute to both the driving and dependence powers.

While research on the competitiveness of tourist destinations has traditionally been concentrated on an international scale, capturing the attention of scholars and policymakers alike, the majority of these studies have overlooked the exploration of this subject at the national level, especially within the realm of urban tourist destinations. In contrast to the international spotlight frequently placed on global tourism competitiveness, there has been a conspicuous gap in the examination of national-level competitiveness within the context of urban destinations. This research serves as a significant contribution by addressing this gap, with a specific focus on Shiraz, one of Iran's foremost tourist destinations. By delving into the intricacies of competitiveness at the urban level, this study offers a unique perspective that extends beyond the more common international assessments. It provides insights into how individual cities, like Shiraz, contribute to a nation's overall tourism competitiveness. This localized perspective can be invaluable for urban planners, policymakers, and destination management organizations seeking to optimize the potential of their urban tourism sectors. Moreover, the research acknowledges that urban destinations play a pivotal role in a nation's overall tourism landscape. Their success can significantly impact a country's tourism revenue, job creation, and economic development. Therefore, understanding the competitiveness of urban tourist destinations, as exemplified by Shiraz in this study, not only adds depth to the field of urban and city research but also provides practical insights that can guide strategic decisions and policies at both the urban and national levels.

This study makes a significant contribution to urban and city research by focusing on the competitiveness of tourism in urban destinations, with Shiraz City as a case study. By analyzing various factors influencing destination competitiveness, such as infrastructure, tourism services, and cultural resources, the study provides valuable insights into the dynamics of urban tourism development. Furthermore, it sheds light on the importance of tailored strategies and interventions to enhance the competitiveness of urban tourist destinations, offering practical implications for policymakers and stakeholders involved in urban planning and tourism management. Overall, this study expands the understanding of urban tourism dynamics and provides a framework for future research in this field.

2. Theoretical Foundations of Research

Tourist destinations aim to attract visitors by leveraging their unique features and providing superior experiences (Baruca & Čivre, 2023: 351). To gain a competitive advantage, destinations must prioritize managing tourism resources and enhance their ability to compete globally (Murayama et al., 2022). The complexity of destinations, with diverse actors and varying interests, has sparked research interest in tourism destination competitiveness (Abou-Shouk et al., 2022). Competition involves achieving success and advantage in the market, while competitiveness pertains to managing competencies for prosperity (Sul, Chi & Han, 2020; Namatpour et al., 2022: 3).

Competitiveness can be viewed through behavioral, structural, and performance approaches. The behavioral approach focuses on unique business strategies in competitive conditions. The structural approach considers competition in terms of production regulations. The performance approach highlights competitiveness as a driver of economic growth through innovative development strategies, low-cost production, and meeting customer demand (Phuthong et al., 2022: 27). The field of competitiveness in management emerged in the late 1970s, pioneered by Smith. Competitiveness within the context of a tourism destination is a crucial factor for successful destination management and ensuring its long-term viability (González-Rodríguez, Díaz-Fernández & Pulido-Pavón, 2023: 2). Nevertheless, defining tourism destination competitiveness remains a complex and debated concept with no universally accepted definition. Ritchie and Crouch (2003) describe destination competitiveness in tourism as the destination's ability to increase tourism expenditures, attract more visitors, provide satisfying and memorable experiences, and do so profitably while preserving natural resources and the well-being of local residents (John, Firoz & Ramanan, 2023: 74).

It plays a significant role in driving tourism flows, GDP, and income globally. Countries strive to maintain their competitive position in the tourism market, especially with the emergence of new destinations. It is crucial for creating policies and strategies that foster the development of tourist destinations. Competitive advantages attract more visitors, leading to economic growth and improved local welfare. Effective destination management enhances tourist satisfaction, experience quality, revisits, and recommendations, while poor management diminishes competitiveness and discourages revisits (Martinez-Gonzalez, Diaz-Padilla, & Parra-Lopez, 2021; Abou-Shouk et al., 2022; Phi et al., 2022). Countries are increasingly compelled to exert greater efforts to maintain their competitive position in the tourism market, particularly in light of the emergence of new destinations (Konstantaki & Ivanidou, 2021). Tourism competitiveness refers to a destination's capacity to sustain and enhance its market position. It brings about several advantages, such as stimulating economic growth, preserving market share, establishing strong market positions, and facilitating sustainable tourism development and effective destination management (Bohalis, 2020; Ahn & Mesir, 2023). This concept plays a pivotal role in shaping policies and strategies for the development of tourism destinations (Martinez-Gonzalez et al., 2021). A cursory examination of the literature reveals that destination competitiveness occupies a significant portion of the tourism discourse, holding great importance for destination management organizations and policymakers (Mior Shariffuddin et al., 2023: 788). The literature on tourism destination competitiveness is extensive and can be distilled into three primary dimensions: (1) Economic aspects, encompassing factors like pricing, productivity, employment, and wealth. (2) Attractiveness, evaluating the appeal of the destination. (3) Sustainability, involving the preservation of environmental resources and cultural heritage (Grassini et al., 2023: 3525). Yuvicic (2016) emphasizes an environmental perspective as the basis for tourism destination competitiveness. In contrast, Pearce (1997) and Kim (2014) describe it as a technique and methodology for assessing destinations (Sakti et al., 2023: 1999).

Tourism competitiveness plays a crucial role in generating valuable foreign currency. Researchers suggest that assessing destination competitiveness should take into account the standard of living for both residents and tourists. The World Economic Forum periodically releases the Travel and Tourism Competitiveness Index (TTCI) every two years to gauge a country's competitiveness (Kumar et al., 2024: 2). Notably, in 2021, this index evolved into a comprehensive development indicator for the travel and tourism sector, providing insights into various aspects of tourism development within a country (Uppink & Soshkin, 2022). Muller (1994) emphasized that a competitive destination should not only cater to the needs of visitors but also enhance the well-being of its residents while preserving its natural and cultural assets (Goffi, Cucculelli & Del Chiappa, 2023: 5). The long-term success and sustainability of a tourism destination hinge on its ability to effectively manage and leverage both its natural and developed resources (YILMAZ & Güneren, 2023: 142). However, the determinants of a destination's success remain somewhat ambiguous (Pagliara, Aria, Brancati & Morrison, 2022).

A primary objective of a successful tourism destination is to ensure visitor satisfaction. Customer satisfaction stands out as one of the most crucial performance indicators for a destination and a significant source of competitive advantage. Factors such as accommodation services, amenities and activities, local transportation services, guest hospitality, hygiene, and pricing are some of the key criteria contributing to visitor satisfaction (Vojtko, Štumpf, Rašovská, McGrath & Ryglová, 2022: 136-137). Li et al. (2016) have identified accessibility, amenities, affordability, attractions, and the portrayal of an appealing image as vital competitive factors. Likewise, Jin and Weber (2016) have demonstrated in their research that factors such as leisure opportunities, accessibility, host city leadership, and venue facilities significantly impact competitiveness (Woyo & Slabbert, 2023). Furthermore, multiple authors have underscored the importance of infrastructure development in enhancing destination competitiveness. Jovanovic & Illic (2016) contend that substantial investments in basic infrastructure are essential for achieving a desirable level of competitiveness. Adequate infrastructure development stands as a critical determining factor in attracting international tourists (Agina, E. K., & Nwambuko, 2023: 19-20). A review of previous studies reveals that four primary factors exert influence on destination competitiveness: destination resources, infrastructure, support services, human resources, and the overall business environment (Woyo & Slabbert, 2023).

Tourism destination competitiveness models

With the increasing global significance of tourism, the expansion of access to new tourism destinations, and the integration of information and communication technology into the tourism sector, competition among various tourism destinations has intensified. Destinations now find themselves in competition for economic benefits, prompting all stakeholders to identify the key indicators that define a tourism destination's competitiveness. Experts in the field have developed various models for assessing tourism destination competitiveness, offering stakeholders valuable tools to tap into the economic advantages that tourism can bring. Researchers employ different models to measure tourism destination competitiveness, which include the Porter Diamond Model, the Dwyer and Kim Model, the Crouch and Ritchie Model, and the World Economic Forum Model.

2.1.1. Porter Diamond Model

Porter explains the concept of country competitiveness. According to Porter, competitiveness is a productivity in which productivity improves product quality and production efficiency. Six elements are used to measure tourism competitiveness, such as strategy, structure and competition, chance, demand conditions, government, supporting industries, and internal factors (Mior Shariffuddin, Azinuddin, Hanafiah & Wan Mohd Zain ,2023: 789; Thong, Lo, Ramayah & Mohamad, 2023; Moradi, Ehsani, Saffari & Norouzi Seyed Hosseini, 2023; Agustin, Martini & Setiyono et al., 2022: 16).

2.1.2. Dwyer and Kim Model

According to the Dwyer and Kim Model (Figure 1), tourism destination competitiveness is a function of six categories of characteristics: (1) natural and cultural heritage resources, (2) created resources, (3) support resources, (4) destination management, (5) demand factors, and (6) situational factors. Each of these categories has subcategories (Kvasnová, Gajdošík & Maráková, 2019: 812).

[Figure 1 here]

(1) Natural and Cultural Heritage Resources: This characteristic encompasses historical sites, heritage, traditional art, plants and animals, art and architecture features, nature, and natural parks, which contribute to a destination's attractiveness (Murayama et al., 2022; Shariffuddin et al., 2022). (2) Created Resources: This characteristic includes events, festivals, winter activities, rural tourism, sports facilities, recreational facilities, and visitor access to natural environments, which form the basis for successful tourism (Lesmana & Sugiarto, 2021). (3) Supporting Factors and Resources: This category focuses on effectively managing natural and cultural heritage, man-made resources, and supportive factors to enhance their attractiveness and quality. It considers factors such as service quality, educational structure of tourism staff, efficiency of tourism companies, and availability of educational programs in tourism (Santos et al., 2022; Rheeders, 2022). (4) Destination Management: This refers to effectively managing inherited and created resources, along with supporting factors, to improve attraction, quality, and effectiveness, thereby enhancing destination competitiveness and sustainability (Berdo, 2021). (5) Demand Factors: This includes information, perceptions, and tourist preferences, which influence tourism demand. Variables such as product compatibility with tourist interests, international awareness of destination products, and overall destination image represent this category (Berdo, 2021). (6) Situational Factors: These factors moderate or influence competition for a destination, encompassing the micro and macro environment, safety, and price competition. Variables such as collaboration between sectors, environmental investments, managers' capabilities, political stability, e-commerce utilization, information technology, and visitor security represent this category (Santos et al., 2022).

2.1.3. Crouch and Ritchie Model

Crouch and Ritchie (1993, 2003) developed a widely recognized model for tourism destination competitiveness, focusing on providing superior travel experiences compared to rival destinations. Their comprehensive model encompasses 32 competitive components based on five pillars: core resources & attractions, supporting factors & resources, policy, planning & development, destination management, and qualifying & amplifying (Nametpour et al., 2022: 3; Trang, Ha & Anh, 2023: 18). This model (Figure 2) is considered the most comprehensive in the field of tourism competitiveness (Goffi et al., 2022; Baruca & Čivre, 2023).

[Figure 2 here]

According to various studies, destination competitiveness is influenced by key elements such as resources and attractions, resource support, destination management, qualification, global environment, and sustainable tourism drivers (Kubickova & Martin, 2020; Zhu, Zhan & Li, 2021). However, there are differing opinions on the comprehensive assessment of competitiveness indicators. While some studies argue that certain models lack reliability and validity (Azzopardi & Nash, 2017), others emphasize factors like facilities, accessibility, service quality, affordability, destination image, climate, and attractiveness (Sul, Chi, & Han, 2020). The Dwyer and Kim model encompasses destination policy, planning and development, destination management, resources and attractions, resource support, and attractive factors and supportive resources, distinguishing it from the Crouch and Ritchie model (Berdo, 2021).

2.1.4. Tourism Competitiveness: World Economic Forum

Since 1979, the World Economic Forum has published annual reports on economic competitiveness, examining factors that contribute to sustainable economic growth and improved income and welfare levels. In 2007, the World Economic Forum expanded its focus to include competitiveness in the travel and tourism sector, publishing the first report based on research by the World Travel and Tourism Council (Crouch, 2007). The World Tourism and Travel Council previously developed a "Competitiveness Monitoring" index between 2001 and 2004, with the aim of fostering tourism industry development. However, its scope was limited, prompting collaboration with the World Economic Forum and other stakeholders to enhance data depth and breadth. Today, the World Economic Forum is a respected authority in introducing and expanding the competitive framework for the travel and tourism sector. The tourism competitiveness index serves as a strategic tool for measuring and managing important factors and policies for tourism development in different countries. The index's quantitative results facilitate collaboration among policymakers to enhance competitiveness, fueling national growth and economic prosperity (see Figure 3)

In addition to the above, examining this index allows different countries to monitor and measure the development process of various sectors over time (Saleh et al., 2021; Abou-Shouk et al., 2022).

[Figure 3 here]

2.1.5. Destination 2030 Model: Global Cities' Readiness for Tourism Growth

The World Travel & Tourism Council (WTTC) and Jones Lang LaSalle Incorporated (JLL) introduce the inaugural assessment of cities' readiness for tourism growth. This initiative involves the development of a unique model to evaluate and implement solutions that promote sustainable growth in tourism activity (see Table 1). Known as Destination 2030, this comprehensive index is based on the analysis of over 75 indicators across 50 global markets. It seeks to address the fundamental question of what characteristics make a city ready for Travel & Tourism growth (WTTC & JLL, 2019).

[Table 1 here]

In essence, the primary distinction among these presented models arises from the customization of indicators and dimensions to suit the specific environmental context of each country or region. Domestic research studies, coupled with global model comparisons, have highlighted the necessity of expanding these models to align with the unique conditions in each country. This observation is corroborated by numerous studies conducted in both developed and

developing countries, where researchers have introduced diverse indigenous models to better capture the nuances of their respective environments.

3. Conceptual Framework

In their 2023 study titled "Competitiveness of Tourism Destinations: An International Analysis Using the Travel and Tourism Competitiveness Index," González-Rodríguez, Díaz-Fernández, and Pulido-Pavón explored the competition within tourism destinations by focusing on two critical dimensions: relative advantage and competitive advantage. Drawing from Kracher and Ritchie's competitiveness model, their research utilized the Travel and Tourism Competitiveness Index, analyzing a sample size of 137 individuals. Their analysis involved regression and data envelopment analysis, revealing that countries with substantial relative advantages may not necessarily possess a high competitive advantage. They found that the positioning in both competitiveness dimensions closely correlates with the developmental stage of countries. Furthermore, the study identified key management capabilities related to tourism and environmental factors.

Uyar, A., Kuzey, C., Koseoglu, M. A., & Karaman (2023) aimed to investigate the impact of the Travel and Tourism Competitiveness Index (TTCI) on the tourism sector, specifically focusing on tourist arrivals, tourism receipts, and the changes in these two factors. Their findings indicated that while the primary TTCI index (level 1) exhibited a positive correlation with tourist arrivals, it did not demonstrate a similar relationship with tourism receipts or changes in either factor. Further analysis revealed that various sub-indicators within the TTCI influenced different aspects of tourism, such as price competitiveness, air transport infrastructure, and cultural resources. However, some factors like information and communication technology readiness and natural resources showed negative associations with tourist arrivals.

Sonila Berdo (2015) conducted research to evaluate the effectiveness of the Dwyer-Kim model in assessing and ranking the determinants of tourism destination competitiveness. The study concluded that while the Dwyer-Kim model provides a structured approach to evaluating competitiveness, it faces challenges due to the qualitative, multidimensional nature of its attributes. Despite its limitations, the model offers a comprehensive framework for comparing destinations and assessing the relative importance of various attributes.

In 2021, Fernando conducted research to offer strategic recommendations for tourism development in Sri Lanka during the COVID-19 pandemic, leveraging the Porter model. The study highlighted the significance of locational forces in influencing tourism economics and proposed several strategic recommendations to promote tourism growth. Additionally, a separate study by Saleh, Alsowaidi, Saha, and Yap applied the Dwyer-Kim integrated model to Qatar, identifying primary resources as the highest-ranking determinants of destination competitiveness.

Other studies, such as Kunst, I., & Ivandić (2021) and Gabor, Kardos, Cristache, Nastase, and Petrariu (2021), explored tourism competitiveness in the Mediterranean region and Middle Eastern countries, respectively, using the Travel and Tourism Competitiveness Index. Their analyses provided insights into the factors influencing destination competitiveness and the changes in tourism performance indicators over time.

Javdan, Tavallaei & Mehraban (2021) conducted a study on Sar-ein City's hot spring tourism destination, highlighting weaknesses in organizational capacity and proposing improvements to enhance competitiveness. Similarly, Khanzadeh et al. (2021) developed a model emphasizing the impact of destination management on the competitiveness of tourist cities in Iran. These studies contribute to our understanding of tourism destination competitiveness, providing insights into the factors influencing competitiveness and offering strategic recommendations for sustainable tourism development.

The studies discussed, such as González-Rodríguez et al. (2023), Uyar et al. (2023), Sonila Berdo (2015), and others, provide valuable insights into tourism destination competitiveness. These insights can be linked to various models and frameworks used in tourism research, including the Dwyer and Kim model, Crouch and Ritchie model, and indicators proposed in the research model. Here's how they align (Table 2):

[Table 2 here]

Natural & Cultural Resources: These studies shed light on the importance of natural and cultural resources in destination competitiveness. This aligns with the emphasis on Core Resources & Attractors in the Dwyer and Kim model, as well as the recognition of Natural & Cultural Resources in the World Economic Forum's assessment. Additionally, the indicators of the proposed research model likely encompass elements related to natural and cultural resources.

Created Resources: While not explicitly mentioned in the discussed studies, the concept of Created Resources, which includes human-made attractions and infrastructure, is likely addressed indirectly in various recommendations and analyses presented. This aligns with the idea of created resources in the table.

Supporting Resources: Studies like González-Rodríguez et al. (2023) and Uyar et al. (2023) discuss the significance of factors such as infrastructure and management capabilities in supporting destination competitiveness. This corresponds to Supporting Factors & Resources in the Crouch and Ritchie model and Infrastructure in the World Economic Forum's assessment. These factors are also likely part of the indicators proposed in the research model.

Destination Management: The importance of effective destination management is highlighted in several studies, including Javdan, Tavallaei & Mehraban (2021) and Khanzadeh et al. (2021). This aligns with the emphasis on Destination Management in the Crouch and Ritchie model and Policy Conditions in the World Economic Forum's assessment.

Situational Conditions: Factors related to situational conditions, such as safety and security, are discussed in studies like Uyar et al. (2023) and Javdan, Tavallaei & Mehraban (2021). This corresponds to the concept of Environment in the Crouch and Ritchie model and Situational Conditions in the World Economic Forum's assessment.

Demand: While not explicitly addressed in the discussed studies, the concept of demand, including factors influencing tourist demand, is likely implicit in various recommendations and analyses presented.

In summary, this section presents a comprehensive exploration of various studies focused on tourism destination competitiveness. The studies discussed, ranging from González-Rodríguez et al. (2023) to Javdan, Tavallaei & Mehraban (2021), offer valuable insights into the factors influencing competitiveness and provide strategic recommendations for sustainable tourism development. Leveraging models and frameworks such as the Dwyer and Kim model, Crouch and Ritchie model, and indicators proposed in the research model, these studies shed light on

the importance of natural and cultural resources, created resources, supporting resources, destination management, situational conditions, and demand in shaping destination competitiveness. The alignment of these studies with theoretical frameworks enriches our understanding of the complex dynamics underlying tourism destination competitiveness. Overall, this synthesis highlights the significance of the conceptual framework in guiding research efforts and informing strategic interventions aimed at enhancing destination competitiveness.

4. Methodology

The research employed a descriptive-survey methodology, utilizing a conceptual model with measurable indicators (Table 3). The statistical population consisted of domestic and foreign tourists visiting Shiraz city. Convenience sampling was used to select participants from tourist centers and attractions in the city. The sample size was 1432 people, including 927 domestic tourists and 505 foreign tourists, selected to enhance analysis accuracy. A closed-ended questionnaire with a five-point Likert scale was used as the data collection tool, assessing the desirability of each indicator. As tourists arrive in Shiraz through various means of transportation, including air travel, land travel, personal vehicles, or guided tours, there is no existing database that records their presence. Therefore, the researcher employed a sampling method based on availability. This involved personally administering the questionnaire to visitors at popular tourist destinations in Shiraz, including Hafeziyeh, Saadiyeh, Persepolis, Arg-e Bam, Shah Cheragh, and others, which are typically frequented by tourists. Data collection for the research commenced in February 2020 and spanned a duration of six months. Initially, a sample of 30 tourists was carefully selected to evaluate the effectiveness of the tool. Following this preliminary assessment, the pertinent indices were meticulously analyzed.

[Table 3 here]

4.1. Equation Structural Modeling (ESM)

The study employed Equation Structural Modeling (ESM), a novel research approach in the field (Amini & Alimohammadlou, 2021), for data analysis. ESM was utilized to enhance the ability to draw and statistically validate the structural model. It also facilitated a clearer revelation of the varying levels of effectiveness between the variables in the research model. This method offered several advantages, including the capacity to handle a large number of variables with complex relationships and mitigate the influence of personal biases on judgments. A graphical, hierarchical, and intuitionistic model was constructed, providing a statistically verifiable framework (Amini & Alimohammadlou, 2021).

Traditionally, previous studies have assessed the competitiveness of tourist destinations using statistical methods, particularly regression models like structural equation modeling, or decision modeling techniques such as interpretive structural modeling. However, the methodological focus of this study is on the advantages of simultaneously employing both statistical methods and decision models. This approach aims to eliminate subjective judgments from evaluators and to measure identified indicators in real-world scenarios, thereby ensuring the validity of research findings. Furthermore, this approach facilitates the development of a comprehensive hierarchy of interrelated indicators for tourism competitiveness. It accomplishes this by constructing a hierarchical model that enhances transparency and analytical rigor. Figure 4 presents an overview of the study's procedures inspired by ESM.

[Figure 4 here]

5. Findings and Analysis

5.1. Measure the variables, fit the model, and investigate the significance of the structural equations

To confirm the validity of the questionnaire, content validity ratio (CVR) was used. As such, 15 tourism managers of Shiraz city were asked to measure each category. As the results showed, the CVR for the 78 items was greater than 0.99, which confirmed the content validity of the questionnaire (Table 4). Next, to inspect the reliability of the questionnaire, Cronbach's alpha was used. Because the values of this test for all of the categories were greater than 0.60, the reliability of the instrument was also confirmed. Convergent validity is the second criterion used to fit measurement models in the AMOS software. To measure convergent validity, Fornell and Larcker's average variance extracted (AVE) was run and its acceptable result for a category would have to be at least 0.5 (Table 5).

[Table 4 here]

[Table 5 here]

5.2. Significance of structural equation

To fit the model, structural equation modeling fitness indicators were used, and based on that, the indicators were estimated as shown in Table 6, indicating good fit for the research model .

[Table 6 here]

In this step, according to Table 7, the paired impacts and the sensitivity of the variables were examined and decisions were made based on the statistical significance of the test used. The relationships that showed a P_{value} less than 0.05 were confirmed and the rest were rejected.

[Table 7 here]

5.3. Create the structural reachability matrix

In this step, the data in the matrix of the significant relationships and the regression coefficients were converted into 0s and 1s, and thus a structural reachability matrix was constructed (see Table 8).

[Table 8 here]

5.4. Create the final structural reachability matrix

After the structural reachability matrix was obtained, its internal consistency had to be established. Based on the transitivity principle, if indicator 1 affects indicator 2, and if indicator 2 affects indicator 3, then indicator 1 must affect indicator 3 as well. If this condition cannot be observed in the structural reachability matrix, the relationships unidentified in the matrix should be corrected (Table 9).

[Table 9 here]

As such, indicators indirectly affecting each other should be highlighted. After applying this logic, the relationship between two variables associated with each other should be represented by 1*.

5.5. Categorize the factors and determining their level partitions

In this step, the sets of inputs and outputs for all of the factors were computed through the final structural matrix. The intersection set was formed by finding the intersections of all the sets (Table 10). The first row in which the intersections of two sets were equal to the output set shaped level 1 (the topmost level).

[Table 10 here]

Similarly, in the next iteration, the indicators identified were excluded from the sets, and the subsequent levels included the indicator or indicators whose output sets were equal to their intersection sets. This procedure was continued until the levels of all the elements were determined.

5.6. Construct the diagram

In the light of the reachability matrix and the levels obtained from the previous step, the diagram of the model was illustrated. The ESM results in this step revealed that there was a bottom-up movement of effects (Figure 2) as the underlying factors left the strongest degree of impact on the factors at higher levels. That is, the lower-level factors led to the formation of the top-level ones. At level 3, factors “Supporting Factors & Resources” and “Created Resources” hugely affected the factor immediately on top of it (“Destination Management”, “Situational Conditions” and “Performance”).

Supporting factors and resources are crucial determinants of tourism destination competitiveness, as they encompass quality services, hospitality, and tourism infrastructure. Additionally, created resources contribute to enhancing destination competitiveness by establishing suitable tourism infrastructure, facilitating favorable shopping conditions, organizing entertainment programs, and offering diverse and attractive activities and special events for tourists. By providing safe and satisfying conditions, these factors attract a higher number of tourists to the region, leading to a competitive advantage over other destinations and improved efficiency for tourism companies.

At level 2, "Destination Management," "Situational Conditions," and "Performance" significantly impact the factors above them, namely "Demand" and "Natural & Cultural Resources." The success of a tourist destination depends on its ability to increase tourism spending, attract more tourists, provide memorable experiences and satisfaction, promote economic development, maintain favorable conditions for residents, and utilize natural and cultural resources sustainably. Effective destination management enables the creation of a competitive environment and empowers tourists to make informed choices and comparisons. It plays a crucial role in diversifying and enhancing the quality of tourism services, addressing challenges, and solving issues. To create an appealing destination, factors such as environmental conditions, price competition, safety, and security should be considered. Marketing tools, including the internet, can be used to educate and raise awareness among tourists, promoting responsible behavior and environmental preservation, leading to increased satisfaction and repeat visits. Establishing secure infrastructure and ensuring the safety of

tourists contributes positively to the destination brand, while neglecting these aspects can weaken its competitive advantage and deter new competitors.

5.7. Determine the driving power and dependence power (MICMAC) and categorizing the elements

Upon completion of the diagram, the degrees of driving power and dependence power were quantitatively assessed to determine the causal-hierarchical relationships between the indicators. The degree of driving power for each element was derived by summing the rows of the final reachability matrix, while the degree of dependence was determined by summing the columns for each element. This analysis revealed that lower-level factors exhibited stronger driving power, influencing the top-level factors, which were more dependent on factors with stronger driving power.

[Figure 5 here]

The indicators were then categorized into four groups – autonomous, dependent, linkage, and independent – based on their degrees of driving power and dependence power. This categorization reflected the indicators' relative autonomy and interdependence within the system. Notably, in the present study, all factors were classified as linkage indicators, indicating their mutual relationships and influences. The MICMAC diagram, as depicted in Figure 5, not only confirmed the levels of the indicators but also elucidated the significant causal-hierarchical relationships between them.

Furthermore, the MICMAC diagram highlighted specific factors, such as "Created Resources," "Destination Management," and "Performance," which exhibited strong levels of both driving power and dependence power, positioning them as linkage or mediatory variables. These factors were highly susceptible to influences from other indicators and had the potential to instigate substantial system-wide changes with minor alterations. Conversely, "Supporting Factors & Resources" demonstrated higher driving power but lower dependence power, classifying them as independent variables with significant impacts on the system but minimal susceptibility to external influences.

Additionally, "Demand" and "Natural & Cultural Resources" emerged as dependent variables, displaying high dependence power but limited driving power, indicating their susceptibility to influences from other indicators with minimal reciprocal impact. Finally, "Situational Conditions" were identified as autonomous variables, exhibiting low levels of both driving power and dependence, signifying their detachment from the broader system dynamics. The MICMAC diagram provided a comprehensive understanding of the driving power and dependence relationships among the indicators, shedding light on their roles within the system and their potential impacts on system dynamics.

[Figure 6 here]

5.8. Interpreting and conceptualizing the final model

Drawing from Figure 6's hierarchical structure encompassing three distinct levels – level 1 focusing on natural and cultural resources alongside demand conditions, level 2 encapsulating destination competitiveness performance, situational conditions, and destination management, and level 3 comprising supporting factors and resources, and created resources – the study demonstrates the interdependence among these levels. Specifically, it underscores how

supporting factors and resources, as well as created resources, exert an impact on destination competitiveness performance, situational conditions, and destination management, subsequently influencing the realm of natural and cultural resources and demand conditions.

Various determinants, including events, festivals, winter activities, rural tourism, sports and recreational facilities, access to natural environs, hospitality, exchange facilities, tourism quality, health services, visa conditions, destination market competitiveness, and destination management, collectively shape the overarching tourism experience. These components not only contribute to heightened service quality and the operational efficiency of tourism entities but also bolster safety for visiting tourists. Studies conducted by Crouch and Ritchie (2003), Dwyer and Kim (2003), Ahn & Bessiere (2023), Phuthong et al. (2022), and Fernández (2022) corroborate these findings.

Secondary factors such as service quality, employee training, operational efficiency, educational initiatives, collaborative efforts between the public and private sectors, environmental investments, managerial expertise, political stability, utilization of e-commerce, information technology, and visitor safety play pivotal roles in influencing primary factors like demand and the preservation of natural and cultural resources. Leveraging e-commerce and information technology empowers tourists to access comprehensive information about cultural attractions, artistic endeavors, architectural marvels, thereby fostering heightened satisfaction and recurrent visits. This perspective is supported by research conducted by Crouch and Ritchie (2003), Dwyer and Kim (2003), Sul et al. (2020), Kubickova and Martin (2020), and Zhu et al. (2021).

Interestingly, while previous studies such as Goffi et al. (2022) and Murayama et al. (2022) noted significant importance to natural and cultural resources, assigning the highest score to natural resources, this study's outcomes revealed that support factors and artisanal resources hold paramount significance. Consequently, the results advocate for managerial focus on enhancing artisanal resources and supporting factors, considering their substantial influence. Strategic development of policies tailored to fortify these elements emerges as a crucial consideration for stakeholders and managers alike.

6. Conclusion

This research aimed to comprehensively identify the determinants and indicators of destination competitiveness in Shiraz, with a focus on enhancing the city's tourism sector. The study culminated in the identification of 7 components, 19 main factors, and 78 indicators, providing a robust framework for understanding and improving destination competitiveness. The components included natural and cultural resources, created resources, supporting factors and resources, destination management, situational conditions, demand conditions, and destination competitiveness performance. The findings of this research offer valuable insights to strengthen the tourism competitiveness of Shiraz City and promote robust growth in the tourism sector.

Considering the research findings, it is recommended to prioritize the enhancement and modernization of the welfare infrastructure of tourism services to facilitate the seamless acceptance of tourists. This includes strengthening the tourism information and communication network, producing targeted content, developing and enhancing infrastructure for various tourism activities, organizing and improving residential conditions for tourists, and focusing

on managerial intelligence in urban infrastructure services. Additionally, there is a need to enhance transportation and mobility services for tourists in the region.

Furthermore, the research underscores the significance of destination management, performance, and situational conditions as influential factors in the model. Recommendations in this area include enhancing the monitoring of tourism service quality, fostering collective participation and cooperation among stakeholders in the tourism sector, implementing effective branding for Shiraz tourism, improving advertising and promotion strategies with an awareness approach to tourists, identifying tourist preferences to attract visitors, updating the tourism industry development plan for Shiraz, formulating effective laws and regulations to ensure sustainable tourism development, promoting green tourism to minimize environmental impact, and developing a competitive business environment. Additionally, it is essential to enhance economic security conditions for tourism businesses, improve political, legal, and international infrastructure in the tourism sector, and regularly monitor pricing in line with tourist attraction policies.

At the highest level, with the presence of demand indicators and natural & cultural resources, it is suggested to implement effective advertising and marketing strategies, employ advanced systems to attract tourists, and establish Shiraz as a national and international tourism hub. The focus should be on market-oriented and customer-centric tourist attractions, preserving cultural and historical heritage, revitalizing local traditions, concentrating major tourism activities on harnessing the region's potential resources and attractions to generate income, create employment, and ensure sustainable development, and creating exceptional tourist experiences related to the cultural and historical heritage of the region. Additionally, there is a need to preserve and protect cultural and historical heritage sites and the region's identity, strengthen the production and promotion of handicrafts in the region, and concentrate on safeguarding the region's cultural identity and promoting cultural tourism. These recommendations are essential for policymakers, tourism authorities, and stakeholders to consider in their efforts to enhance the destination competitiveness of Shiraz and foster sustainable growth in the tourism sector.

7. Research implications and limitations

This study significantly contributes to urban and city research by examining destination competitiveness within the context of urban tourist destinations, focusing particularly on Shiraz in Iran. By filling a notable gap in the literature regarding destination competitiveness assessments at the city level, the research offers valuable insights into the specific factors influencing urban tourist destinations' competitiveness. Through empirical analysis and the application of established theoretical frameworks and methodologies, such as the Travel and Tourism Competitiveness Index (TTCI), the study provides actionable strategies for enhancing urban destination competitiveness. Moreover, by leveraging Shiraz as a case study, the findings offer practical implications for urban development and tourism policy in similar cities, thereby enriching scholarly discourse and advancing theoretical frameworks in urban tourism research. Research on fostering competitiveness in Shiraz city's tourism industry can generate transferable knowledge for other cities. By analyzing strategies, policies, and initiatives in Shiraz, valuable insights can be gained for improving destination appeal, sustainable practices, stakeholder collaboration, and overall industry competitiveness. This knowledge can guide global efforts in developing and strengthening tourism sectors worldwide, with implications for urban tourism research and practice.

This study contributes to the conceptual development of destination competitiveness in urban tourism. It identifies specific determinants and indicators relevant to urban destinations, which

can serve as a foundation for further research in this area. The findings enable researchers to compare and contrast the competitiveness of different urban destinations. By examining the determinants and indicators across various cities, researchers can identify commonalities, differences, and contextual factors that shape destination competitiveness. The study's methodology for assessing destination competitiveness can serve as a reference for future research. Researchers can build upon the methods employed in this study, refine them, and apply them to other urban tourism destinations.

The findings of this study also offer several practical implications for destination managers and policymakers involved in urban tourism. For instance, (1) the identified determinants and indicators can be employed to develop comprehensive and tailored strategies to enhance destination competitiveness. This may involve focusing on improving infrastructure, promoting unique cultural experiences, or enhancing marketing efforts, among other aspects. (2) The study also provides insights into policy formulation for urban tourism development. Policymakers can consider the identified determinants when designing policies to support sustainable tourism practices, strengthen local communities' involvement, and preserve cultural heritage, thereby enhancing the overall competitiveness of urban destinations. (3) The study's findings can guide destination positioning and branding strategies. Urban destinations can leverage their strengths in specific determinants to differentiate themselves from competitors. For example, if a city excels in cultural heritage preservation, it can position itself as a cultural hub to attract tourists seeking authentic experiences. (4) The study highlights the importance of collaboration among various stakeholders involved in urban tourism. Destination managers can use the findings to foster partnerships with local communities, businesses, and government entities to collectively work towards enhancing destination competitiveness. (5) The identified indicators can be used as benchmarks for evaluating the performance and progress of urban tourism destinations over time. Destination managers can track their performance in each indicator, identify areas for improvement, and monitor the effectiveness of implemented strategies. In summary, the findings of the study have implications for advancing research in destination competitiveness in urban tourism. Moreover, our study offers practical guidance for destination managers and policymakers in formulating strategies, enhancing destination positioning, fostering collaboration, and evaluating performance. By incorporating these findings into both research and practice, urban destinations can strive for greater competitiveness and sustainable development in the dynamic field of urban tourism.

As a limitation of the research, the implementation of this study and data collection were influenced by significant events in the tourism industry (such as the occurrence of devastating floods in the city, public protests, and ultimately the outbreak of the COVID-19 pandemic), which severely affected the presence of tourists in the city. The limitations caused by the COVID-19 pandemic prevented timely access to experts to prioritize the proposed operational objectives based on their role in financial performance, tourism development, and feasibility of implementation. Furthermore, in the context of tourism competitiveness, indicators are typically categorized into two sections: those that reflect tourists' viewpoints and those that represent the perspectives of other stakeholders. This study primarily focuses on indicators that target tourists' viewpoints. Analysis of indicators related to the perspectives of other stakeholders should be a subject of future research.

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References

- Abou-Shouk, M., Zoair, N., Elbaz, A. M., & Abdel-Jalil, M. (2022). Local tourists' perceptions of tourist destinations' competitiveness: a comparative study of the United Arab Emirates, Egypt, and Oman. *Worldwide Hospitality and Tourism Themes*, (ahead-of-print).
- Agina, E. K., & Nwambuko, T. C. (2023). Assessing the Relationship Between Infrastructural Development and Tourism Destination Competitiveness: Evidence from Nigeria. *European Journal of Hospitality and Tourism Research*, 11(1). 17-26.
- Agustin, E. S. A. S., Martini, R., & Setiyono, B. (2022). Evaluating rural tourism competitiveness: Application of PROMETHEE-GAIA method. *Cogent Economics & Finance*, 10(1), 2054526.
- Ahn, Y. J., & Bessiere, J. (2023). The Relationships between Tourism Destination Competitiveness, Empowerment, and Supportive Actions for Tourism. *Sustainability*, 15(1), 626.
- Amini, A., & Alimohammadlou, M. (2021). Toward equation structural modeling: an integration of interpretive structural modeling and structural equation modeling. *Journal of Management Analytics*, 1-22.
- Bagheri, Muslim, Shojaei, Payam, Kayani, Mehrdad. (2016). Presenting a structural interpretive model of travel and tourism competitiveness indicators (case study: Fars province). *Tourism Planning and Development*, 5(18), 137-157.
- Baruca, P. Z., & Čivre, Ž. (2023). Unique Destination Attributes as a Basis of Tourism Experience. *Academica Turistica-Tourism and Innovation Journal*, 15(3).
- Berdo, S. (2021). The integrated model of Dwyer and Kim as a tool to evaluate and rank the determinant attributes of a tourist destination competitiveness. *European Journal of Economics and Business Studies*. 1(1). 27-30.
- Buhalis, D. (2020). Technology in tourism from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article, *Tourism Review*, 75(1), 267-272.
- Chin, C. H., Lo, M. C., & Wong, P. M. W. (2022). The connection between competitiveness and sustainability in tourism destinations: Examining the hard, soft, and moderating effects of knowledge sharing. *Enlightening Tourism. A Pathmaking Journal*, 12(1), 1-32.
- Gabor, M. R., Kardos, M., Cristache, N., Nastase, M., & Petrariu, I. R. (2021). Dynamic Analysis of Tourism Competitiveness of The European Countries Based on Discriminant Statistical Analysis. *Economic Computation & Economic Cybernetics Studies & Research*, 55(3), 103-118.

- Grassini, L., Magrini, A., & Conti, E. (2023). Formative-reflective scheme for the assessment of tourism destination competitiveness: an analysis of Italian municipalities. *Quality & Quantity*, 57(4), 3523-3548.
- Crouch, G.I. (2007). *Measuring Tourism Competitiveness: Research, Theory and the WEF index*, La Trobe University
- Goffi, G., Cucculelli, M., & Del Chiappa, G. (2023). Tourism Destination Competitiveness in Italy: A Stakeholders' Perspective. *Tourism Planning & Development*, 20(4), 721-745.
- González-Rodríguez, M. R., Díaz-Fernández, M. C., & Pulido-Pavón, N. (2023). Tourist destination competitiveness: An international approach through the travel and tourism competitiveness index. *Tourism Management Perspectives*, 47, 101-127.
- Dwyer, L & Kim, C (2003). Destination competitiveness: determinants and indicators. *Current Issues in Tourism*, 6(5), 369-414.
- Fernández, J., Martínez, J., & Martín, J. (2022). An analysis of the competitiveness of the tourism industry in a context of economic recovery following the COVID19 pandemic. *Technological Forecasting and Social Change*, 174 (121301).
- Goffi, G., Cucculelli, M., & Del Chiappa, G. (2022). Tourism Destination Competitiveness in Italy: A Stakeholders' Perspective. *Tourism Planning & Development*, 1-25.
- Heidari, M. T., rahmani, M., Khanmoradi, S., & haggi, Y. (2021). Strategic Explanation of the Properties of Tourism Competitiveness in Reaching Tourism Target Markets (Case Study: Zanzan Province). *Journal of Tourism and Development*, 10(3), 35-49. doi: 10.22034/jtd.2020.223240.1987
- Javdan, M., Tavallaee, S., & Mehraban, F. (2021). Analyzing The Effect of the Organizational Capacity on the Competitiveness of Spa Tourism Destinations; Case Study: Sarein City. *Tourism Management Studies*, 16(56), 83-129. doi: 10.22054/tms.2021.63304.2603
- Jobst, L. J., Bader, M., & Moshagen, M. (2023). A tutorial on assessing statistical power and determining sample size for structural equation models. *Psychological Methods*, 28(1), 207.
- John, A. (2022). Competitiveness of tourism destinations: a mixed-method bibliometric approach. *Enlightening Tourism. A Pathmaking Journal*, 12(2), 691-731.
- John, A., Firoz C, M., & Ramanan, T. R. (2023). Destination competitiveness of a tourist region: A case of Kerala, India. *Journal of Global Hospitality and Tourism*, 2(1), 71-98.
- Khanzadeh, H., Rahnavard, F., Bamdad, N., & Mahmoudzadeh, S. M. (2021). Explanation Model of Tourism Competitiveness in Iran Touristic Cities. *New Marketing Research Journal*, 11(2), 45-68. doi: 10.22108/nmrj.2021.126677.2339

- Kubickova, M., & Martin, D. (2020). Exploring the relationship between government and destination competitiveness: The TALC model perspective. *Tourism Management*, 78, 104040.
- Kumar, S., Kumar, D., & Nicolau, J. L. (2024). How does culture influence a Country's travel and tourism competitiveness? A longitudinal frontier study on 39 countries. *Tourism Management*, 100, 104822.
- Kunst, I., & Ivandić, N. (2021). The viability of the travel and tourism competitiveness index as a reliable measure of destination competitiveness: the case of the Mediterranean region. *European Journal of Tourism Research*, 27, 2704-2704.
- Kvasnová, D., Gajdošík, T., & Maráková, V. (2019). Are partnerships enhancing tourism destination competitiveness?. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 67(3), 811-821.
- Kunst, I., & Ivandić, N. (2021). The viability of the travel and tourism competitiveness index as a reliable measure of destination competitiveness: the case of the Mediterranean region. *European Journal of Tourism Research*, 27, 2704-2724.
- Lesmana, H., & Sugyanto, S. (2021). Formulating a competitive advantage model for tourism destinations in Indonesia. *The Journal of Asian Finance, Economics and Business*, 8(3), 237-249.
- Luštický, M. and Štumpf, P. (2021), Leverage points of tourism destination competitiveness dynamics, *Tourism Management Perspectives*, 38, p. 100792.
- Marinello, S., Butturi, M. A., Gamberini, R., & Martini, U. (2023). Indicators for sustainable touristic destinations: A critical review. *Journal of Environmental Planning and Management*, 66(1), 1-30.
- Martínez-González, J., Díaz-Padilla, V., & Parra-López, E. (2021). Study of the Tourism Competitiveness Model of the World Economic Forum Using Rasch's Mathematical Model: The Case of Portugal. *Sustainability*, 13(7169), 1-20.
- Mior Shariffuddin, N. S., Azinuddin, M., Hanafiah, M. H., & Wan Mohd Zain, W. M. A. (2023). A comprehensive review on tourism destination competitiveness (TDC) literature. *Competitiveness Review: An International Business Journal*, 33(4), 787-819.
- Moradi, E., Ehsani, M., Saffari, M., & Norouzi Seyed Hosseini, R. (2023). How can destination competitiveness play an essential role in small island sports tourism development? Integrated ISM-MICMAC modelling of key factors. *Journal of Hospitality and Tourism Insights*, 6(3), 1222-1252.

- Murayama, T., Brown, G., Hallak, R., & Matsuoka, K. (2022). Tourism Destination Competitiveness: Analysis and Strategy of the Miyagi Zaō Mountains Area, Japan. *Sustainability*, *14*(15), 9124.
- Pagliara, F., Aria, M., Brancati, G., & Morrison, A. M. (2022). Destination performance evaluation: When can a destination be considered successful? 9th ITSA Biennial Conference, Gran Canaria, Spain.
- Phi, H. D., Quang, T. N., Phuong, T. H. T., & Linh, N. N. (2022). Effects of Destination Image on Revisit Intention: The Intermediate Role of Satisfaction & Words of Mouth (Empirical Evidence in Ho Chi Minh City, Vietnam). *Estudios de economía aplicada*, *40*(1), 9.
- Phuthong, T., Anuntavoranich, P., Chandrachai, A., & Piromsopa, K. (2022). Developing and Validating an Assessment Scale to Measure the Competitiveness of Wellness Destinations. *Sustainability*, *14*(7), 4152.
- Rheeders, T. (2022). A review of the determinants of tourism destination competitiveness. *Journal of Contemporary Management*, *19*(2), 238-268.
- Ribeiro, D., Henriques, P., & Machado, L. P. (2020). Competitiveness of Tourist Destinations Theoretical Study of the Main Models. *Proceedings Book*, 43.
- Ritchie, B. J.R. & Crouch, G.I. (2003). The Competitive Destination”ansustainable tourism perspective. *Tourism Management*, *21*(1):1-7.
- Sakti, D. P. B., Armanu, A., Rofiaty, R., & Rohman, F. (2023). A Phenomenological Study on Lombok Island’s Competitiveness as Tourist Destination through Tourism Actors’ Perception. *Interdisciplinary Social Studies*, *2*(6), 1998-2015.
- Saleh, A., Alsowaidi, S., Saha, S., & Yap, G. (2021). Destination Competitiveness: The Perceptions of Foreign Tourists Visiting Qatar. Available at SSRN 3858560.
- Santos, M. C., Veiga, C., Santos, J. A. C., & Águas, P. (2022). Sustainability as a success factor for tourism destinations: a systematic literature review. *Worldwide Hospitality and Tourism Themes*. *14*(1), 20-37.
- Shariffuddin, N. S. M., Azinuddin, M., Hanafiah, M. H., & Zain, W. M. A. W. M. (2022). A comprehensive review on tourism destination competitiveness (TDC) literature. *Competitiveness Review: An International Business Journal*. ahead-of-print. <https://doi.org/10.1108/CR-04-2021-0054>
- Soh, A. N., Puah, C. H., & Arip, M. A. (2023). A Bibliometric Analysis on Tourism Sustainable Competitiveness Research. *Sustainability*, *15*(2), 1035.
- Stanišić, F. (2022). *Tourist Destination Competitiveness Model of ex-Yugoslavia countries. Validity in extraordinary circumstances?* (Doctoral dissertation, RIT Croatia).

- Sul, H.-K., Chi, X., & Han, H. (2020). Measurement development for tourism destination business environment and competitive advantages. *Sustainability*, 12(20), 8587. <https://doi.org/10.3390/su12208587>.
- Sundram, S. D., & Gani, A. A. (2022). Importance Performance Analysis (IPA) on Tourism Destination Competitiveness in Mabul Island, Sabah.
- Thong, J. Z., Lo, M. C., Ramayah, T., & Mohamad, A. A. (2023). Revisiting perceived determinants of tourism destination competitiveness among tourists: The case of national parks in Sarawak, Malaysia. *Turyzm/Tourism*, 33(1), 93-107.
- Trang, T. T. T., Ha, N. T. T., & Anh, N. T. L. (2023). Improving the Competitiveness of Tourism in Moc Chau District, Son La Province, Vietnam. *European Journal of Development Studies*, 3(3), 17-23.
- Tu, W., Zhou, L., Haobin, B. Y., & Yan, Q. (2022). Conceptualizing and Assessing the Competitiveness of Slow Tourism Destinations: Evidence from the First Accredited Cittaslow in China. *Sage Open*, 12(1), 21582440211068823.
- Vojtko, V., Štumpf, P., Rašovská, I., McGrath, R., & Ryglová, K. (2022). Removing uncontrollable factors in benchmarking tourism destination satisfaction. *Journal of Travel Research*, 61(1), 136-149.
- YILMAZ, V., & Güneren, E. (2023). Determining destination competitiveness in medical tourism: A study based on AHP-QFD framework. *Journal of multidisciplinary academic tourism*, 8(2), 141-157.
- Uppink, L., & Soshkin, M. (2022). Travel & Tourism Development Index 2021: Rebuilding for a Sustainable and Resilient Future. <https://www.weforum.org/reports/travel-and-tour>
- Uyar, A., Kuzey, C., Koseoglu, M. A., & Karaman, A. S. (2023). Travel and tourism competitiveness index and the tourism sector development. *Tourism Economics*, 29(4), 1005-1031.
- World Travel and Tourism Council., & Jones Lang LaSalle. (2019). Destination 2030: Global Cities' Readiness for Tourism Growth. [Global Cities Readiness For Tourism Growth-Jun 2019.pdf \(wttc.org\)](https://www.wttc.org/~/media/World_Travel_and_Tourism_Council/2019/06/Global_Cities_Readiness_For_Tourism_Growth_Jun_2019.pdf)
- World Travel and Tourism Council. (2022). Cities Economic Impact Report. <https://wttc.org/research/economic-impact/cities>
- World Travel and Tourism Council. (2023). Cities Economic Impact Report. <https://wttc.org/research/economic-impact/cities>

- Woyo, E., & Slabbert, E. (2023). Competitiveness factors influencing tourists' intention to return and recommend: Evidence from a distressed destination. *Development Southern Africa*, 40(2), 243-258.
- Zhu, L., Zhan, L., & Li, S. (2021). Is sustainable development reasonable for tourism destinations? An empirical study of the relationship between environmental competitiveness and tourism growth. *Sustainable Development*, 29(1), 66-78.
- Zhang XA, Liao H, Li N, Colbert AE. (2020). Playing it safe for my family: exploring the dual effects of family motivation on employee productivity and creativity. *Acad. Manag. J.* 63:1923–50
- Zyphur, M. J., Bonner, C. V., & Tay, L. (2023). Structural equation modeling in organizational research: The state of our science and some proposals for its future. *Annual Review of Organizational Psychology and Organizational Behavior*, 10, 495-517.
- González-Rodríguez, M. R., Díaz-Fernández, M. C., & Pulido-Pavón, N. (2023). Tourist destination competitiveness: An international approach through the travel and tourism competitiveness index. *Tourism Management Perspectives*, 47, 101127.
- Berdo, S. (2015), "The integrated model of Dwyer and Kim as a tool to evaluate and rank the determinant attributes of a tourist destination competitiveness", *European Journal of Economics and Business Studies*, 1(1). 27-30.
- Fernando, I. (2021). Tourism Amid Covid-19 Pandemic in Sri Lanka Way-Forwarding Strategies Through the Porters' Diamond Model. *Imali Fernando,(2021), Tourism Amid Covid-19 Pandemic in Sri Lanka Way-Forwarding Strategies Through the Porters' Diamond Model, Sri Lanka Journal of Marketing*, 7(1).

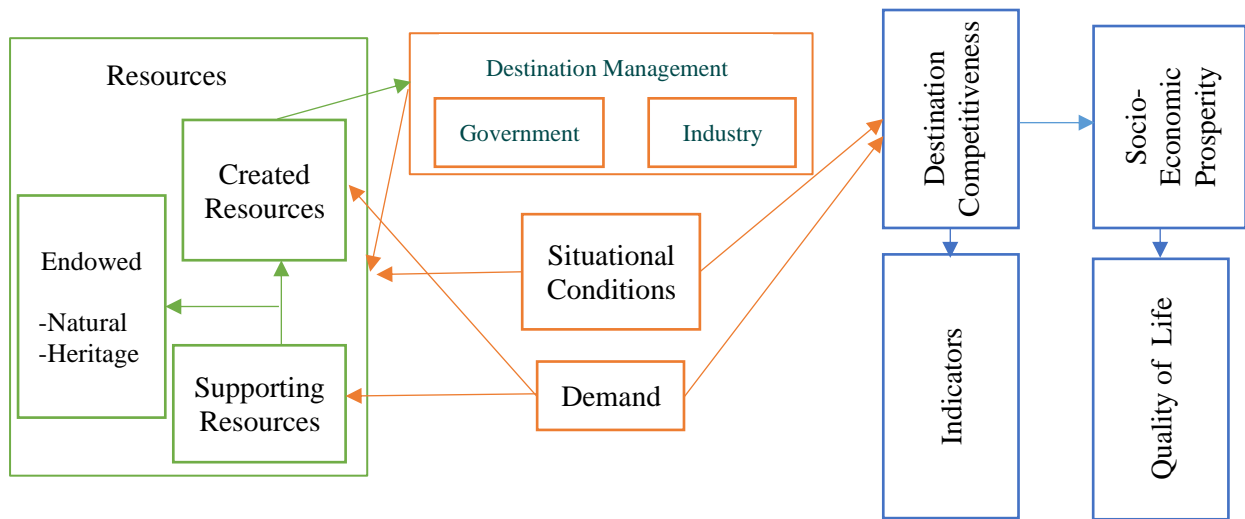


Figure 1. The main elements of competitiveness in the destinations of Dwyer and Kim.
 Source: (Berdo, 2021).

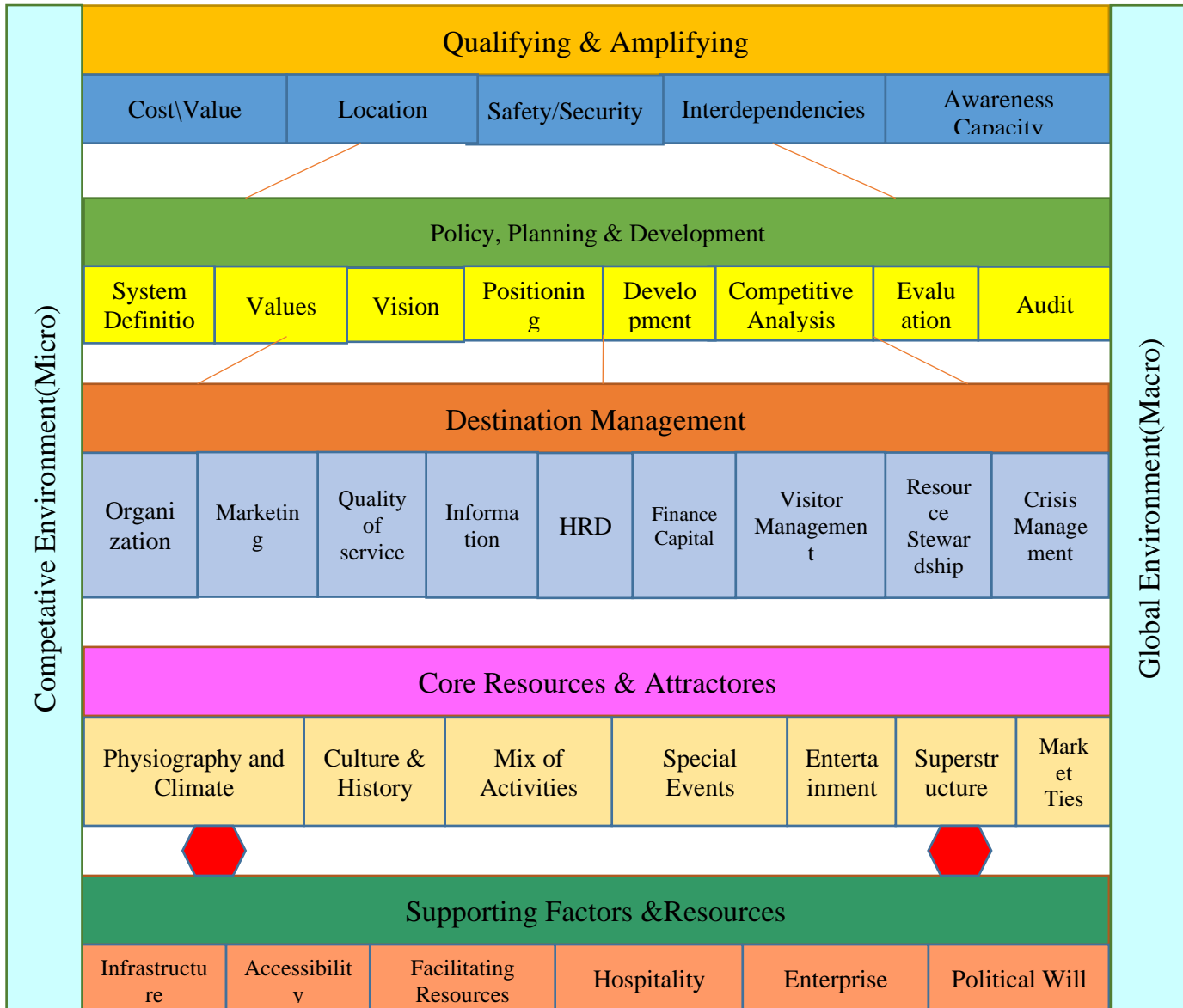


Figure 2. The competitiveness model of the destinations of Crouch and Ritchie.
 Source: Stanišić (2022: 6)



Figure 3. The competitiveness indicators of travel and tourism at the World Economic Forum in 2021

Source: Authors own creation

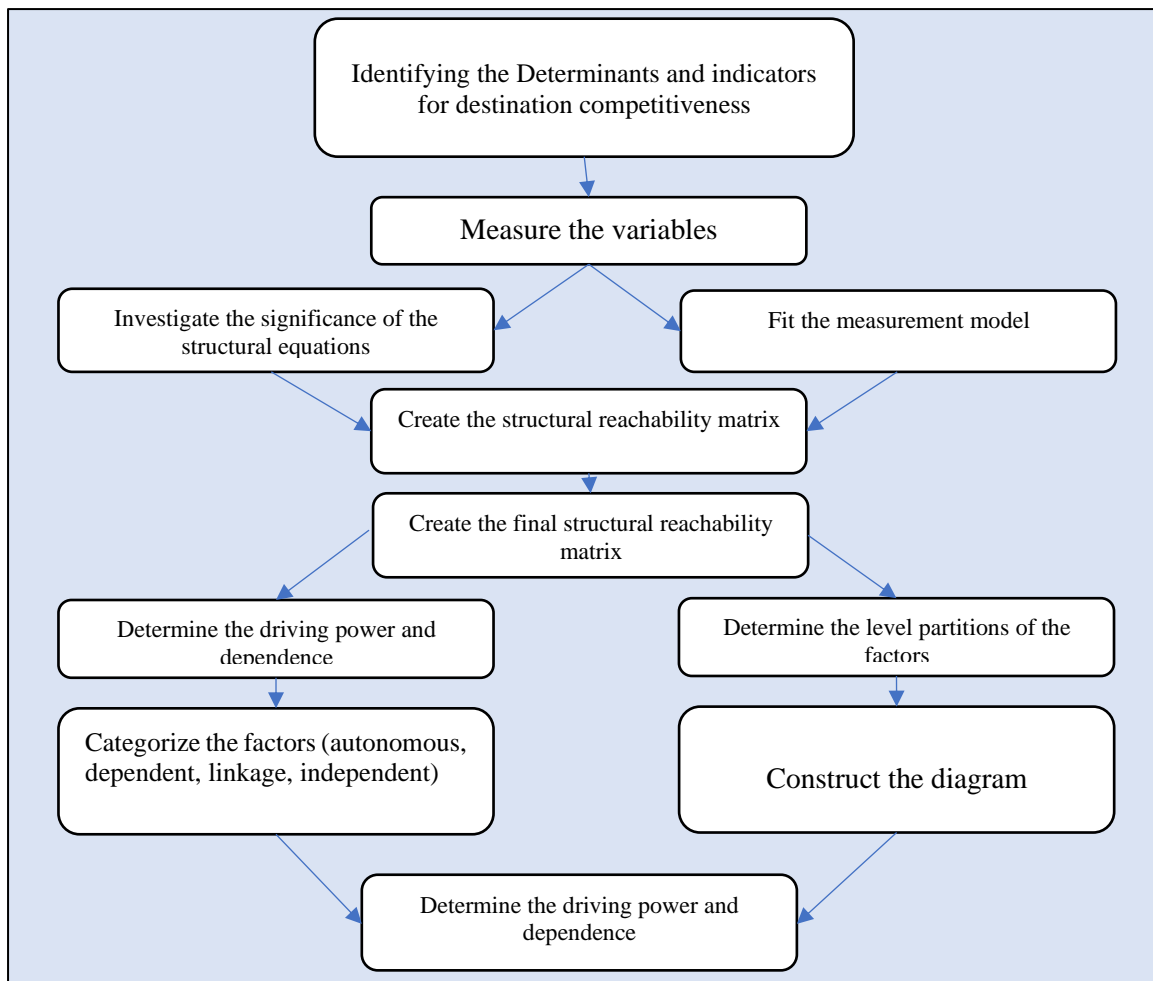


Figure 4. The research process

Source: Amini & Alimohammadlou (2021)

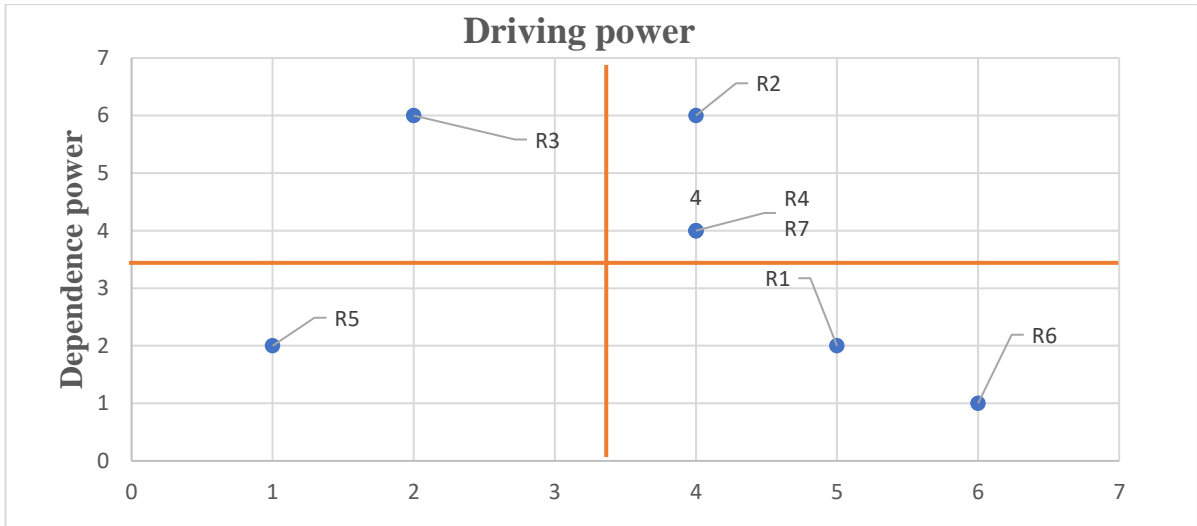


Figure 5. The driving power and dependence power diagram (MICMAC)
 Source: Authors own creation

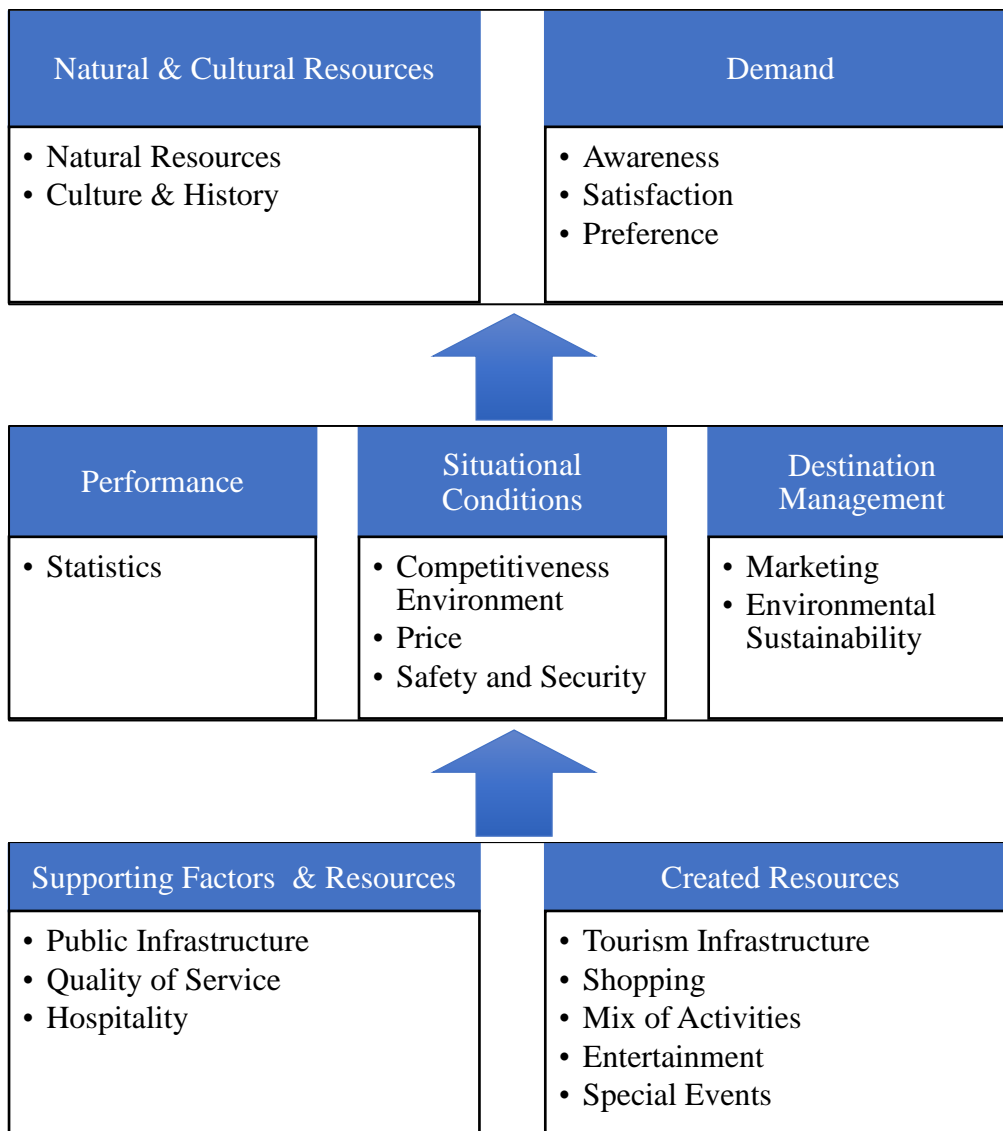


Figure 6. Relationship between the indicators using ESM
 Source: Authors own creation

Table 1. The key indicators of Destination 2030

Source: Authors own creation

| Category | Economic Indicators | | | | Travel and Tourism Indicators | | | | | Urban Indicators | | | Policy Indicators | | | | |
|------------|---------------------|-----------------|----------------|--------------------|-------------------------------|--|--|--|--|------------------|--|--|-------------------|--|--|--|--|
| Indicators | | City GDP | GDP per Capita | City Population | | | | | | | | | | | | | |
| | | Employment Rate | Tourism GDP | Tourism Employment | | | | | | | | | | | | | |
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Table 2. Tracking the indicators of the proposed research model
 Source: Authors own creation

| The indicators of the proposed research model | World Economic Forum | Crouch and Ritchie model | Dwyer and Kim model |
|--|------------------------------|---------------------------------|------------------------------|
| Natural & Cultural Resources | Natural & Cultural Resources | Core Resources & Attractors | Natural & Cultural Resources |
| Created Resources | *** | *** | Created Resources |
| Supporting Factors & Resource | Infrastructure | Supporting Factors & Resources | Supporting Resources |
| Destination Management | Policy Conditions | Destination Management | Destination Management |
| Situational Conditions | Environment | Qualifying & Amplifying | Situational Conditions |
| Demand | | | Demand |

Table 3. The competitiveness indicators in the research model.
Source: Authors own creation

| Index | Code | Item | Indicators |
|------------------------|---|---|------------------------------|
| Natural Resources | 1 | Favorable weather conditions | Natural & Cultural Resources |
| | 2 | Hygienic condition and environmental cleanliness | |
| | 3 | wonderful natural phenomena and beautiful scenes (such as Valleys, Straits, Caves and Waterfalls, Flowers aroma) | |
| | 4 | Fascinating plant and animal life (such as animal species, different trees, etc.) | |
| | 5 | Original and virginal nature at Shiraz region | |
| | 6 | Fascinating national museum parks for preserving plant and animal species | |
| Culture & History | 7 | Fascinating historical and ancient places | |
| | 8 | Fascinating the museums in Shiraz region | |
| | 9 | Fascinating the present architecture and available arts at Shiraz region | |
| | 10 | Region's traditional arts (such as handicrafts) | |
| | 11 | Ethnic food diversity | |
| | 12 | The attractiveness of rural areas and the lives of different ethnic groups in the region | |
| Tourism Infrastructure | 13 | The Quality of residential places such as hotels, inns in the region. | Created Resources |
| | 14 | The Diversity of residential places such as hotels, inns in the region. | |
| | 15 | The abundance of local residences for tourists in the region | |
| | 16 | The Diversity of restaurants, café and fast-food in the region. | |
| | 17 | The quality of food services offered by restaurants, café and fast-food | |
| | 18 | The efficiency of the information service(site, channel, and written, oral or visual media) for tourist guidance | |
| | 19 | The function of local guides and their information and technical mastery | |
| | 20 | The quality of road infrastructure of the region | |
| | 21 | The quality of road trips by bus (if used) | |
| | 22 | The quality of the rail transportation system (if used) | |
| | 23 | The quality of air travel of the region | |
| | 24 | The abundance of local transport vehicles such as buses, taxis, subway and others. | |
| | 25 | The efficiency and quality of local transportation vehicles like buses, taxies, subway and others. | |
| | 26 | The extent of tourists access to natural places and historical-cultural places around the city. | |
| 27 | Access to urban facilities for handicap persons | | |
| Shopping | 28 | Various shopping centers and facilities such as markets, shops, etc. for the tourist shopping | |
| | 29 | The attractiveness of modern markets | |
| | 30 | The attractiveness of ancient markets | |
| | 31 | Diverse fields of shopping (clothing, handicraft, etc.) | |
| | 32 | Quality of purchased items (such as clothing, handicraft, etc.) | |
| | 33 | The offered prices of vendors in the region market | |
| Mix of Activities | 34 | The quantity and quality or attractiveness of water-based activities (such as sailing, water walking, Hydrotherapy) | |

| | | | |
|------------------------------|---|---|--------------------------------|
| | 35 | The quantity and quality or attractiveness of nature-based activities (such as sailing, water walking, Hydrotherapy) | |
| | 36 | The necessary facilities to do dangerous activities for adventurous tourists (such as Jumping from a height with a parachute) | |
| Entertainment | 37 | entertainment facilities The quantity and quality of such as amusement parks or artificial parks | |
| | 38 | The extent of urban entertainment (such as cinema and theater, etc.) | |
| Special Events | 39 | National and international fame for holding special events such as flower and rosewater festival | |
| Public Infrastructure | 40 | National and international fame for holding special exhibitions, seminars, and events such as flower and rosewater festival | Supporting Factors & Resources |
| | 41 | Establishment of rescue teams and Red Crescent in the region | |
| | 42 | The quality of medical facilities | |
| | 43 | Drinking water quality | |
| | 44 | Waste collection and sewage disposal system in the region | |
| | 45 | Accessibility and quality of regional health infrastructure (such as restrooms) | |
| | 46 | The electric power supply system of region | |
| | 47 | Access and use of energy resources (solar, wind, etc.) in the region | |
| | 48 | Telecommunication network coverage for internal and external calls(mobile, telephone) | |
| | 49 | Internet communication network coverage in communication systems (mobile), Wi-Fi and ADSL. | |
| | 50 | Access to financial infrastructure (banks, Currency exchange, ATM which attached to domestic banking network) in the region. | |
| 51 | Access to financial infrastructure(banks, Currency exchange, ATM which attached to the abroad banking network) in the region. | | |
| Quality of Service | 52 | A high standard of service quality and hospitality in the area. | |
| | 53 | Existence of customer satisfaction assessment system in regional tourism places. | |
| | 54 | The level of quality of offered tourism services in the region. | |
| Hospitality | 55 | The friendly manner of locals with tourists. | |
| | 56 | Ease of communication between tourists and locals. | |
| Marketing | 57 | The reputation of "Shiraz" tourism destination brand in the world | |
| | 58 | Published List of tourist attractions, facilities, and experiences in the region | |
| | 59 | Various tour experiences and plans | |
| | 60 | Existence of suitable sites about region tourism in English languages | |
| | 61 | Existence of suitable mobile Apps about region tourism | |
| Environmental Sustainability | 62 | Existence of environmental pollutants in the region | Destination Management |
| Competitiveness Environment | 63 | Suitable service and ethical-fairly behavior of tourism activators to tourists | Situational Conditions |
| Price | 64 | Fair & suitable cost of residential places | |
| | 65 | Fair & suitable price of Shiraz's tours | |

| | | | |
|---------------------|----|---|-------------|
| | 66 | The fair cost of the plane, train, and bus ticket to the region | |
| | 67 | The fair price of the goods and services at the region | |
| | 68 | The suitable price of a trip to Shiraz, relative to other travel destinations | |
| Safety and Security | 69 | The secure environment of the region | |
| | 70 | Rarely occurrence of crime against tourists | |
| | 71 | Trust to police services in the region | |
| Awareness | 72 | How much is your previous knowledge about the region? | Demand |
| | 73 | How much is your awareness of tourism facilities and attractions in the region? | |
| Satisfaction | 74 | Your satisfaction with traveling to the area | |
| Preference | 75 | Tourists prefer to travel to Shiraz compared to the other tourism destinations | |
| | 76 | The suitability of the duration (day) of your stay in the area | |
| | 77 | The symmetry between tourism services and your needs and expectations | |
| Statistics | 78 | Would you like to revisit the region again? | Performance |

Table 4. The measurement model of effective indicators

Source: Authors own creation

| Index | Factor Loading | PValue | max | min | skew | kurtosis | Cronbach's alpha |
|------------------------------|----------------|--------|-------|-------|-------|----------|------------------|
| Natural Resources | .660 | /000 | 4.830 | 1.000 | 0.698 | 1.869 | 0.656 |
| Culture & History | .749 | /000 | 4.330 | 1.000 | 0.490 | .477 | |
| Tourism Infrastructure | .816 | /000 | 4.070 | 1.000 | .208 | .494 | 0.741 |
| Shopping | .687 | /000 | 5.000 | 1.000 | 0.302 | .759 | |
| Mix of Activities | .583 | /000 | 5.000 | 1.000 | .194 | .149 | |
| Entertainment | .502 | /000 | 6.500 | 1.000 | .374 | .918 | |
| Special Events | .496 | /000 | 5.000 | 1.000 | .381 | .141 | |
| Public Infrastructure | .768 | /000 | 4.330 | 1.000 | 0.211 | .425 | 0.656 |
| Quality of Service | .671 | /000 | 5.000 | 1.000 | .534 | .326 | |
| Hospitality | .458 | /000 | 7.500 | 1.000 | 0.928 | 2.697 | 0.603 |
| Marketing | .677 | /000 | 5.000 | 1.000 | .054 | .242 | |
| Environmental Sustainability | .492 | /000 | 5.000 | 1.000 | 0.625 | .876 | |
| Competitiveness Environment | .757 | /000 | 5.000 | 1.000 | .471 | .279 | 0.697 |
| Price | .809 | /000 | 5.000 | 1.000 | 0.211 | .086 | |
| Safety and Security | .582 | /000 | 5.670 | 1.000 | .541 | .923 | 0.668 |
| Awareness | .622 | /000 | 5.000 | 1.000 | 0.509 | .949 | |
| Satisfaction | .550 | /000 | 5.000 | 1.000 | .558 | .606 | |
| Preference | .759 | /000 | 5.000 | 1.000 | 0.309 | .453 | 1.00 |
| Statistics | 1.000 | /000 | 5.000 | 1.000 | .898 | .868 | |

Table 5. The correlation matrix of effective indicators

Source: Authors own creation

| Indicators | Code | R1 | R2 | R3 | R4 | R5 | R6 | R7 |
|--------------------------------|------|-------|-------|-------|-------|-------|-------|----|
| Natural & Cultural Resources | R1 | 0.861 | | | | | | |
| Created Resources | R2 | 0.604 | 0.701 | | | | | |
| Supporting Factors & Resources | R3 | 0.539 | 0.661 | 0.767 | | | | |
| Destination Management | R4 | 0.415 | 0.510 | 0.569 | 0.813 | | | |
| Situational Conditions | R5 | 0.405 | 0.467 | 0.510 | 0.471 | 0.738 | | |
| Demand | R6 | 0.371 | 0.336 | 0.440 | 0.425 | 0.446 | 0.769 | |
| Performance | R7 | 0.283 | 0.190 | 0.305 | 0.269 | 0.351 | 0.562 | 1 |

Table 6. The fit indices of the research models

Source: Authors own creation

| Index | Reached | Ideal | Acceptable |
|---------------|----------|---------------------------|----------------------------|
| df | 127 | - | - |
| χ^2 | 1093.717 | $0 \leq \chi^2 \leq 2df$ | $2df \leq \chi^2 \leq 3df$ |
| Sig. χ^2 | .000 | $.01 < p \leq .05$ | $.05 < p \leq 1.00$ |
| χ^2/df | 8.612 | $0 \leq \chi^2/df \leq 2$ | $2 < \chi^2/df \leq 3$ |
| GFI | .924 | $.95 \leq GFI \leq 1.00$ | $.80 \leq GFI < .95$ |
| RMR | .035 | $0 \leq RMR \leq .05$ | $0 < RMR \leq .10$ |
| CFI | .906 | $.97 \leq CFI \leq 1.00$ | $.90 \leq CFI < .97$ |
| RMSEA | .073 | $0 \leq RMSEA \leq .05$ | $.05 < RMSEA \leq .08$ |
| PGFI | .618 | $.60 \leq PGFI \leq 1.00$ | $.50 \leq PGFI < .60$ |
| PNFI | .665 | $.60 \leq PNFI \leq 1.00$ | $.50 \leq PNFI < .60$ |

Table 7. The significant relationships and the regression coefficients

Source: Authors own creation

| | <i>Statistics</i> | <i>R1</i> | <i>R2</i> | <i>R3</i> | <i>R4</i> | <i>R5</i> | <i>R6</i> | <i>R7</i> |
|-----------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <i>R1</i> | PValue | //// | 0.000 | 0.598 | 0.333 | 0.839 | 0.320 | 0.000 |
| | R | | 0.850 | 0.047 | 0.122 | 0.029 | -0.130 | 0.351 |
| <i>R2</i> | PValue | 0.011 | //// | 0.000 | 0.152 | 0.394 | 0.775 | 0.809 |
| | R | 0.707 | | 0.870 | -0.880 | -0.818 | -0.266 | -0.060 |
| <i>R3</i> | PValue | 0.420 | 0.006 | //// | 0.057 | 0.188 | 0.301 | 0.633 |
| | R | 0.476 | 1.020 | | 1.273 | 1.510 | 1.240 | 0.248 |
| <i>R4</i> | PValue | 0.217 | 0.014 | 0.366 | //// | 0.710 | 0.803 | 0.000 |
| | R | 0.176 | 0.169 | 0.089 | | 0.119 | 0.072 | 0.931 |
| <i>R5</i> | PValue | 0.390 | 0.216 | 0.811 | 0.205 | //// | 0.687 | 0.577 |
| | R | 0.076 | -0.081 | -0.024 | 0.111 | | 0.067 | 0.047 |
| <i>R6</i> | PValue | 0.263 | 0.803 | 0.000 | 0.000 | 0.000 | //// | 0.193 |
| | R | -0.529 | 0.093 | 0.888 | 0.646 | 0.744 | | -0.547 |
| <i>R7</i> | PValue | 0.909 | 0.118 | 0.000 | 0.000 | 0.843 | 0.176 | //// |
| | R | 0.009 | -0.044 | 0.144 | 0.373 | -0.014 | -0.085 | |

Table 8. The structural reachability matrix
Source: Authors own creation

| | R1 | R2 | R3 | R4 | R5 | R6 | R7 |
|----|----|----|----|----|----|----|----|
| R1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| R2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| R3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| R4 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| R5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| R6 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| R7 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |

Table 9. The final structural reachability matrix
 Source: Authors own creation

| | R1 | R2 | R3 | R4 | R5 | R6 | R7 |
|----|----|----|----|----|----|----|----|
| R1 | 1 | 1 | 1* | 1* | 0 | 0 | 1 |
| R2 | 1 | 1 | 1 | 0 | 0 | 0 | 1* |
| R3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| R4 | 0 | 1 | 1* | 1 | 0 | 0 | 1 |
| R5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| R6 | 0 | 1* | 1 | 1 | 1 | 1 | 1* |
| R7 | 0 | 1* | 1 | 1 | 0 | 0 | 1 |

Table 10. The Level of Indicators
 Source: Authors own creation

| code | Input | Output | Co | Level |
|------|-------------|-------------|-----|-------|
| R1 | 1,2,3,4,7 | 1,2 | 1,2 | 1 |
| R2 | 1,2,3,7 | 1,2,3,4,6,7 | 2,3 | 3 |
| R3 | 2,3 | 1,2,3,4,6,7 | 2,3 | 3 |
| R4 | 2,3,4,7 | 1,4,6,7 | 4,7 | 2 |
| R5 | 5 | 5,6 | 5 | 2 |
| R6 | 2,3,4,5,6,7 | 6 | 6 | 1 |
| R7 | 2,3,4,7 | 1,4,6,7 | 4,7 | 2 |