Regional tourism axes identification using GIS and TOPSIS model (Case study: Hormozgan Province, Iran)

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Abstract

Purpose – This paper aims to identify and determine regional tourism axes in Hormozgan Province, Iran, as a region with significant potential

Design/methodology/approach – The research method is quantitative and uses the fuzzy accreditation tool and TOPSIS model; the identification, determination and ranking of regional tourism axes have been performed by analyzing the spatial distribution of tourism attractions in the GIS environment.

Findings – The results show that given the capacities of Hormozgan Province, at least 15 axes are recognizable. This paper highlights regional tourism planning as a tool for urban and rural socio-economic development in potential provinces such Hormozgan.

Originality/value – This study provides a number of practical implications for regional tourism development as follows: it identifies some of the most important potential axes in Hormozgan Province, which can be considered as investment areas in the national and regional tourism development strategy. The spatial results of this study could be embedded in all urban and rural developmental plans in the province. Tourism investment should shift its spatial concentration from the spot approach, especially islands and cities, to the axis approach while equipping those axes as comprehensive spatial strategic regional tourism plans. Sectoral tourism in each sector including sports, economy and nature could be planned as if sectoral institutions and organizations are going to develop their own tourism goals.

Keywords Regional tourism, Tourism planning, Hormozgan province, TOPSIS and GIS

Paper type Case study

Introduction

The tourism sector is ergo being called upon to explicitly integrate sustainability in its economic, social and environmental zdimensions than has been done previously (Adu-Ampong and Kimbu, 2019). In a globalized world, it is normal to find competition among nations and regions in their desire to gain an increasing number of tourists, and as tourism industries grow in relevance in national contexts (Barreira *et al.*, 2016), the competition is

becoming more intense between nations, regions and cities to be more attractive destinations for domestic and foreign tourists.

Regional tourism development, led by some regional tourism planning bodies, can best be defined as those projects involving multiple independent sites, with separate decision makers, who have agreed to work on common marketing strategies, for the benefit of all (Shields and Schibik, 1995). Regional tourism on a provincial scale is an emerging tourism planning ground that has drawn the attention of both academics and professionals in developing and potential countries. It consists of all tourism attractions in urban, rural and peripheral areas in a province that could be considered as a tourism planning system. Therefore, a regional tourism planning body may be associated with any location from a down-town historic district to a 26-county area (Shields and Schibik, 1995). Economically, this topic, called the third millennium trade, is one of the most profitable economic areas as it is believed that international tourism flows create the most dynamic economic exchanges that may occur between countries (Vellas and Lionel, 2005). According to the World Tourism Organization (WTO), international tourist arrivals grew by 7.0 per cent in 2017, the highest increase since the 2009 global economic crisis and well above UNWTO's long-term forecast of 3.8 per cent per year for the period 2010 to 2020. A total of 1,326 million international tourist arrivals were recorded in destinations around the world, some 86 million more than in 2016. International tourism receipts increased by 4.9 per cent in real terms (adjusted for exchange rate fluctuations and inflation) to reach US$1,340bn in 2017 (WTO, 2018).

In Asia, the significance of regional tourism, as a development tool at regional and local level, has been on the rise in recent decades (Mazumder et al., 2013). Many developing countries in Asia, which are successfully exploiting their natural resources for tourism purposes, have been able to increase their international receipts due to tourism development, and it is not surprising that tourism has become a significant export sector in these economies. This belief that tourism development causes long-term economic growth is known in the literature as the tourism-led growth hypothesis (Chingarande and Saayman, 2018).

Meanwhile, according to the WTO report, by attracting 4.7 million foreign tourists, Iran ranked 48th in 2013 for the first time since 1977 (WTO, 2014). With this in mind, the tourism industry in Iran must have an average annual income of US$10bn (equal to the income from the oil), but this is not the case, and now with an annual income of less than US$6bn, Iran is not even among the 50 top-rated tourist destinations in the world (WTO, 2018; Heidari et al., 2013). Besides, while the Middle East depicted signs of recovery in 2017 with a strong 13 per cent increase in income generated by international tourism (WTO, 2018), Iran's share has been insignificant; in 2017, the total contribution of travel and tourism to employment, including jobs indirectly supported by the industry, was 6.1 per cent of the total employment, and visitor exports generated IRR 150,859.0 (US$4.6bn), only 3.9 per cent of the total exports in 2017 (World Travel and Tourism Council, 2018). Therefore, Iranian tourism industry – despite enormous potentials – has faced a number of challenges including wide ranging nuclear related sanctions, negative imagery in the west and lack of effective management of resources (Khodadadi, 2016).

It seems that one of the obstacles in the effective management of resources is lack of equipped tourism axes in potential regions and the relevant planning and management for their development. Some of the major attractive attributes of the majority of tourist destinations include the availability of attractive beaches and landscapes associated with warm weather and sunshine, while coastal and marine tourism has also become one of the fastest-growing types of tourism (Barreira et al., 2016). Hormozgan has unique

characteristics in this regard, as well as various historical monuments, natural attractions and pleasant weather in cold seasons, which makes it a great potential in terms of regional tourism. Planning regional tourism axes through focusing on the identification, planning, equipping and exploitation of regional tourism axes would activate local capacities in all the villages and towns and would lead to the creation and promotion of a systematic and integrated view of regional development. The main objective of this paper is to identify, determine and rank tourism axes in Hormozgan Province to prepare one of the most important steps in sustainable regional tourism planning.

Theoretical framework
Regional tourism system
Creation of a regional tourism system requires intervention of various levels of the government in tourism marketing and management at regional levels, as well as engaging local businesses in regional tourism activities (Macbeth *et al.*, 2004). The regional tourism system consists of both organizations and institutions (Edquist, 1997). However, it is essential to note that tourism is more than an economic activity (Dredge and Jenkins, 2003). It not only allows for substantial interaction of people but also demands a variety of services. To facilitate tourism, this sector requires facilities and inputs. Such requirements produce opportunities and challenges for the country offering tourism services. For these reasons, it is vital for the host country to effectively manage the growth of the tourism sector (Mazumder *et al.*, 2013). In doing so, there are two main factors influencing the tourism stream, which should be considered in any regional tourism planning:

(1) push factors,
(2) without which the decision to travel does not take place; and
(3) pull factors that are necessary when determining the destination to which the traveler will go (Morakabati, 2011).

The following are the main pull factors for a destination:
- geographic proximity to a market;
- accessibility to markets;
- availability of attractions;
- cultural links;
- availability of services;
- affordability;
- pro-tourism policies;
- peace and stability; and
- a positive image.

According to Leiper's Model, the traveler-generating region is the element that stimulates and motivates tourists to travel to a destination. The pull factors, on the other hand, energize the whole tourism system and, in this way, create a demand for traveling to a specific region or destination (Morakabati, 2011).

Tourism as a strategy for regional development
Tourism as a strategy for economic growth has been on the regional development agenda for some time. Peripheral and rural areas have frequently looked at it as a tool for promoting

local jobs and raising the level of economic welfare (Fleischer and Felsenstein, 2000). The tourism sector has been gaining prominence as a potential foundation for regional economies that lack traditional, primary and secondary activities but offer special natural, cultural and historical attractions (Haddad, 2013). Immediately after the Second World War, tourism started to be considered as an alternative industry to foreign exchange earnings in developed countries. Later, it became an economic development tool for developing countries (Mazumder et al., 2013).

It is widely accepted that tourism development has a positive impact on the local and regional economy, leading to increased production, income and employment, and it therefore fosters overall economic growth and development in a country (Chingarande and Saayman, 2018). Also, as is well-known, tourism is an economic activity with a high capacity to generate employment and to attract investments and foreign capital (Cortés-Jiménez, 2008, p. 127). This industry is often advocated as a means of diversifying economic conditions in rural and regional areas by providing alternative sources of employment and income generation in times of downturn in traditional industries such as in agriculture and forestry (Cox and Wray, 2011, p. 524).

There is a significant body of research confirming the positive economic (Dias-Sardinha and Ross, 2015; Eriksen and Ahmt, 1999; Kauppila and Karjalainen, 2012; Müller and Jansson, 2007), cultural (Wu and Pearce, 2013; Sharpley, 2002; Coccossis, 2008; Constantin and Mitrut, 2008) and social (Cohen and Cohen, 2012; Xue et al., 2017; Besculides et al., 2002) effects of tourism on regional development. Besides, diversification of a region's economy through tourism creates many career opportunities in terms of rural development (Jafarian et al., 2016; Kheiri and Nasihatkon, 2016; Su et al., 2018). Therefore, tourism has long been considered to be an effective catalyst for rural development and revitalization; it has been widely promoted and relied upon to address the social and economic challenges peripheral rural areas face (Ming Sua et al., 2019). From a regional tourism point of view, regional planning is an attempt to achieve the best spatial pattern for regional development using tourism strategies and therefore seeks to achieve goals with the help of a general system of national development (Dwyer et al., 2004). Tourism attraction in local and regional development has led local researchers and experts to focus on the role of tourism in the economic and social development of regions (Albalate and Germa, 2009).

In the case of Iran, tourism can play an important role in diversifying the rural economy and could be a means of stimulating national economic growth (through overcoming underdevelopment and improving local people's standards of living) in the country. It can also play a major role in empowering local people, developing human resources, diversification and economic growth and creating new employment opportunities (Swarbrooke and Horner, 1999; Higham, 2005). In addition, villages and small towns and their inhabitants are in two ways connected with tourism development streams: first, as rural environments which are favorable places for tourists, and in particular domestic tourists, to spend their leisure time, and second as means of trading local and traditional products and longer tourist stays, which gives tourists the opportunity to be familiar with local customs and host community's way of life (MoradiNejad, 2002).

Regional tourism planning and sustainability
The WTO defines sustainable tourism development (STD) as "development that meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future" (WTO, 2004). The WTO (2004) also indicates that the sustainable development of tourism should promote an optimal use of resources. Sustainable tourism is not a specific

form of tourism as such, but more an approach that can be used to make all types of tourism more environmentally, socially and economically beneficial (Carrillo and Jorge, 2017).

Various scholars recommended that the success of STD is largely dependent on the policies, planning and management tools used (Farmaki, 2015; Mowforth and Munt, 2009; Ritchie and Crouch, 2003; Zhenjia, 2008). Given this emphasis, as Edgell *et al.* (2008) concluded, strategic tourism planning – a process aimed to optimize the benefits of tourism so that the result is a balance between the appropriate quality and quantity of supply and the proper level of demand, without compromising either the region's socio-economic and environmental developments or its sustainability – lies at the very heart of sustainable development. Besides, effective tourism planning (i.e. a systemized approach that does not simply let market forces prevail) is a prerequisite for destination resources to be sustainably managed and to ensure that inclusive decision-making takes place. In fact, integrated planning has been recognized as the most appropriate form of planning for STD (Farmaki, 2015; Sidayi and Rostami, 2012). Successful tourism planning does not depend as much on authority and resources of a "decision-making body" that, collaboratively or not, make decisions relating to tourism as on the willingness of target groups, who receive these decisions to accept and/or comply with them (Yuksel and Culha, 2017). According to Inskeep (1991), the planning process of STD consisted of seven steps including preparation, setting goals, examination of all elements, analysis and synthesis, formulation of plans and policies, formulation of recommendations and other implementations and monitoring applications (Inskeep, 1991). Therefore, exploitation of opportunities in the tourism industry, like any other activity, requires adoption of principled policies and plans for research and scientific management. The existence of diversity in destinations is a factor in tourism movement, which due to lack of proper planning causes the inequality of tourist destinations; the inequality created by mankind is the result of unbalanced development (Ziaee and Shojaei, 2010). Regional planning is an attempt to achieve the best spatial pattern for regional development with the development of tourism strategies, and therefore seeks to achieve goals using a general system of national development (Dwyer *et al.*, 2004). Tourism attraction in local and regional development has led local researchers and experts to focus on the role of tourism in the economic and social development of regions (Albalate and Germa, 2009). On the one hand, development of tourism services, in addition to highlighting regional originalities, has the consequence of maintaining and organizing originality as well as creating an optimal balance between the sources and their proper use for conservation, maintenance and development of natural and national resources, and on the other, it has economic benefits associated with it (Mikaeli, 2000). The ultimate goal is to consider tourism as an element of a comprehensive plan for regional development (Zargham Boroujeni and Javadi, 2010). STD in the regional planning process is considered a tool for promoting local employment, improving the general quality of life, and raising the level of economic well-being of a region (Fleischer and Felsenstein, 2000). To fulfill these qualities in a region, as Edgell *et al.* (2008) concluded, strategic tourism planning can act as a framework designed to provide directions for any tourism organization or destination, and it emphasizes quality, efficiency and effectiveness. And to realize regional development with the help of tourism development, they believe that strategic planning should ideally start at the local level and flow toward broad guidelines for use at different levels of government for destinations and communities to improve the quality of life of the local citizenry (Edgell *et al.*, 2008). Besides, just as having a strategic approach is vital regarding potential negative socio-economic and environmental impacts, so is understanding the impacts of tourism a critical part of STD and management to ensure optimal outcomes of tourism (Stylidis, 2017). One of the most transparent strategies for sustainable regional tourism development was proposed by

Inskeep (1991) with regard to the concept of regional management of tourism development. In this approach, tourism areas are viewed as integrated sets of attractions, for which governments have very strict oversight responsibilities in the region and can therefore regulate the interconnected functions of tourism development through zoning (Inskeep, 1991).

To sum up, the regional tourism literature refers to two categories of tourism areas and tourism axes. Regional tourism axes are important in this regard, as they connect potential tourist areas including small towns and villages with each other and render greater tourism growth capacities, through shielding them from economic and social isolation and giving them opportunities to develop local economies.

Methodology

Using the documentary methodology, the descriptive information of the region and its regional tourism capacities were prepared and projected through ArGIS 10.4.1 software. To identify regional tourism axes, three main layers including accessibility, spatial density of attractions and spatial distribution of urban and rural settlements were used. Therefore, accessibility to various types of transportation was examined by fuzzy method in the GIS environment. Fuzzy set theory embraces the membership function to operate over the range of real numbers (0, 1), reflecting the degree of certainty of membership instead of using crisp sets that only allow values of 0 or 1 (Brule, 1985; Espada *et al.*, 2017). Besides, the fuzzy technique provides an easily implementable and flexible method to handle multiple explanatory variables while limiting the uncertainty introduced by discretizing or binning variables (Kirschbaum *et al.*, 2016; Konstantinos and Assimakopoulos, 2006). So it was the most proper tool available to rank accessibility. For calculating spatial density of the tourism attractions, fuzzy overlay tool and Kernel density were used. The kernel method is one of the most commonly used and accurate methods in GIS to show the spatial accumulation of geographic phenomena. Then, spatial distribution of urban and rural settlements was calculated through the inverse distance weighted (IDW) tool. IDW is a method of interpolation that estimates cell values by averaging the values of sample data points in the neighborhood of each processing cell. This method has been expanded to allow users to define the expected degree of surface abruptness along thematic boundaries using a transition matrix (Patrick *et al.*, 1996). Finally, tourism axes in Hormozgan Province were prioritized through TOPSIS model. Numerous studies have used the TOPSIS method to solve MCDM problems (Dagdeviren *et al.*, 2009; Zarei *et al.*, 2016). According to this model, the best alternative would be the one that is nearest to the positive-ideal solution and farthest from the negative-ideal solution (Ertugrul and Karakasoglu, 2007). All these techniques and models were used to answer the following questions:

Q1. Does the spatial distribution of the historical and natural attractions of Hormozgan Province have the capacity to define any regional axes?

Q2. What will tourism axes be ranked based on the spatial focus of attractions and infrastructures in Hormozgan Province?

Findings

Hormozgan Province is one of the richest provinces in Iran due to having a wide range of tourist attractions, including historical and natural attractions, which gives this region a unique status for tourism development. This province is limited to the mountains on one side and to the sea and the long beaches on the other (Planning and Budget organization of

Hormozgan Province, 2011). Therefore, identifying its tourism capabilities in different historical, natural, scientific and economic axes was the main concern of the research with the help of GIS. To identify the regional tourism axes of Hormozgan Province, the following steps were taken.

First, access to various types of transportation, land, air and water transportation was investigated and the fuzzy method in GIS environment was used to rank the accessibility of different areas of the province.

In the second stage, after identifying the important links, the density and type of tourism elements regarding natural, cultural, artistic and human-made attractions were investigated using the Fuzzy Overlay Tool in GIS environment and axes with regard to their touristic importance in the province were extracted from the aggregate natural, health, sports, economic and historical tourism attractions in the province. By integrating them with the important communication paths, priority was given to each of the tourism axes.

In the third stage, to explain the relationship between the important tourist axes in the province and the spatial distribution of the population, densely populated areas were identified using the IDW Tool in GIS and the relationship between the layers was determined. Finally, all the layers of access, tourist attractions density, and urban and rural settlements were overlaid and the final rankings of tourism axes were determined.

The rating method and results of the TOPSIS output which were obtained from the GIS software were categorized according to the following criteria:

(0-0.2 = very inappropriate; 0.2-0.4 = inappropriate; 0.4-0.6 = average; 0.6-0.8 = appropriate; 0.8-1.1 = very suitable).

In Table I, Hormozgan Province's level of access to communication axes (land, air, rail and shipping ports). Accordingly, land paths are divided into four main types of freeways, grade 1 road, grade 2 roads and secondary routes. Initially, access to any type of road was analyzed separately in GIS software, and then each of the layers was identified using weighting and overlaps in GIS.
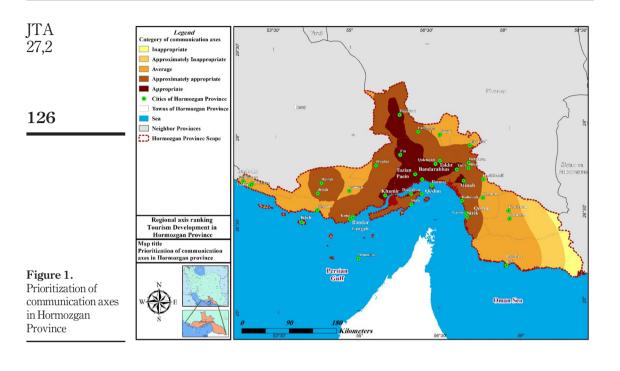
In the next section, access to railroads as means of transportation in the province was analyzed. The railroads start from Bandar Abbas, pass through the cities of Taziane Paeen and Fein and through Hajibabad, and finally exit the province. With the help of GIS software, access to different areas of the province was investigated. Next, the availability of airports in Hormozgan Province was examined. Among the 11 airports located in the province, 4 airports of Bandar Abbas, Qeshm, Kish and Bandar Lengeh are used as international airports for tourism. Furthermore, Hormozgan's access to shipping ports to move passengers to the islands of the province was also examined. Finally, access to communication axes was assessed after combining the four layers of GIS, namely the land, air, rail, and shipping layers and using the Fuzzy Overlay Tool (Figures 1 and 2).
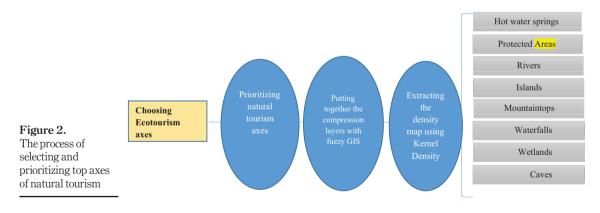
Prioritization of the main axes of ecotourism in the province

Nature-based tourism is a form of cultural service defined as "the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development,
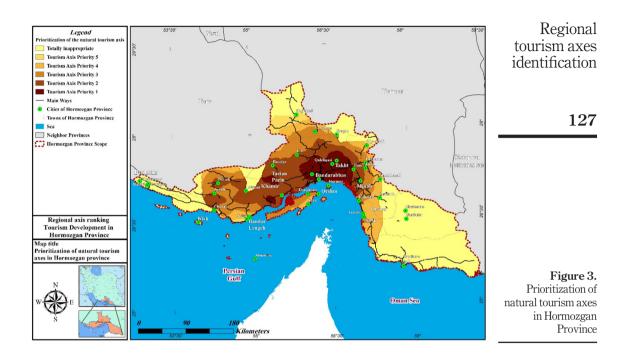
Land road types	Coefficient in GIS
Freeways	10
Grade 1 Roads	7
Grade 2 Roads	3
Secondary Routes	1

Table I.
Weighting of
different types of
land roads in GIS
software

Figure 1.
Prioritization of communication axes in Hormozgan Province

Figure 2.
The process of selecting and prioritizing top axes of natural tourism

reflection, recreation, and aesthetic experiences" (Kim *et al.*, 2019). To determine important axes of tourism in the natural part of tourism, elements including the location of waterfalls, wetlands, rivers, natural springs and important mountains, caves, islands and protected areas were studied. Next, using the fuzzy method in GIS software, the distribution of each of these elements was obtained. The number zero was assigned to the worst access status and the number one also indicated the best access status (Figure 1). After reviewing all the elements of tourism in the natural sector by overlaying the relevant layers and also considering the priorities of communication axes in the province, the natural tourism axes were ranked based on their priorities, which is presented in Figure 3 and Table II.
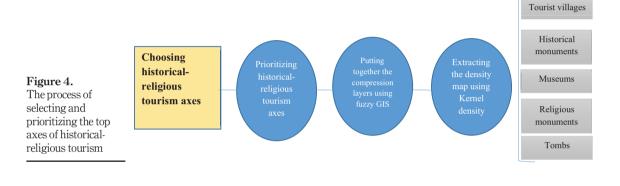
Figure 3.
Prioritization of
natural tourism axes
in Hormozgan
Province

Rankings	Names	Ecotourism score
1	Bandar Abbas-Takht	0.98
2	Bandar Abbas-Taziyan Paeen	0.97
3	Bandar Abbas-Minab	0.96
4	Bandar Abbas-Fin	0.93
5	Bandar Abbas-Khamir	0.93
6	Bandar Abbas-Bandar lengeh	0.91
7	Chark-Blask	0.91
8	Tyrez-Dehbarz	0.90
9	Bandar Abbas-Haji Abad	0.89
10	Minab-Siric	0.88
11	Qeshm	0.87
12	Koustak-Sanderk	0.81
13	Bandar lengeh-Chark	0.81
14	Siric-Jask	0.38
15	Charak-Parsian	0.12

Table II.
Prioritization of
natural axes in
Hormozgan province

Prioritization of top-level historical-religious tourism areas
To find the most important tourism axes in the historical-religious section, tourism elements including tourist villages, historical monuments, museums, religious buildings and tombs were investigated and their distribution was obtained using the Fuzzy Method in GIS software. The number 0 represents the worst access status and number 1 indicates the best access status (Figures 4 and 5).

After reviewing all the elements of tourism in the historical-religious section by overlaying the relevant layers and also considering the priorities of communication axes in the province of Hormozgan, the historical-religious tourism axes were ranked considering their priorities (Table III; Figure 5).

Prioritization of the top economic-sports-scientific tourism axes
Getz (2007) categorizes event tourism into business events which are indicated by MICE (meetings, incentives, conventions and exhibitions), sports and festivals (including other community events) (Pookaiyaudom, 2017). He argued that events comprise a key element
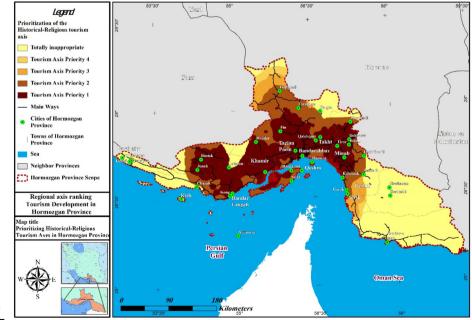

Figure 4.
The process of selecting and prioritizing the top axes of historical-religious tourism

Figure 5.
Prioritization of historical-religious tourism axes in Hormozgan Province

Rankings	Names	Historical-religious tourism
1	Bandar Abbas-Fin	0.96
2	Bandar Abbas-Minab	0.95
3	Chark-Bastak	0.93
4	Tyrooz-Dehbarz	0.93
5	Bandar Abbas-Bandar lengeh	0.92
6	Bandar Abbas-Haji Abad	0.92
7	Bandar Abbas-Taziyan paeen	0.92
8	Bandar Abbas - Khamir	0.92
9	Bandar Abbas-Takht	0.91
10	Minab-Siric	0.91
11	Qeshm	0.89
12	Kouhstak-Sanderk	0.83
13	Bandar lengha-Chark	0.82
14	Siric-Jask	0.34
15	Charc-Parsian	0.12

in both the origin area (i.e. events are an important motivator of tourism) as well as within the destination area (i.e. events feature prominently in the development and marketing plans of most destinations). Also, events are animators of destination attractiveness but more fundamentally as key marketing propositions in the promotion of places given the increasingly global competitiveness to attract visitor spending (Getz and Page, 2016). One of the most important latent qualities of tourism is to determine the main axes in economic, sporting and scientific tourist sections. Therefore, areas associated with scientific tourism (universities, scientific and research parks), sports tourism (stadiums and sports camps), economic tourism (sales centers, recreational centers and industrial towns) and free economic zones were determined using the Fuzzy Tool in GIS software, and the distribution of each of these elements of tourism was found (Figure 6). The number zero indicates the worst access status and number one shows the best access status (Table IV).

After reviewing all the elements of tourism in the economic, sports, and scientific field by overlaying the relevant layers and also considering the priorities of communication axes in Hormozgan, the economic, sports, and scientific tourism axes were prioritized, as is depicted in Figure 7 and Table IV.
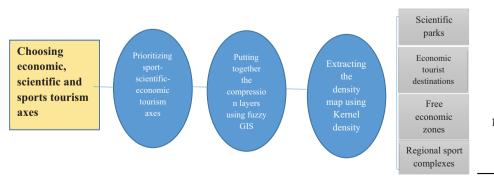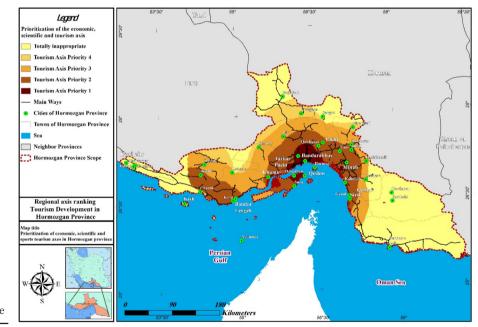

Figure 6.
The process of
selecting and
prioritizing the top
economic-sport-
scientific tourism
axes

Rankings	Names	Economic-scientific-sports tourism
1	Bandar Abbas-Taziyan paeen	0.98
2	Bandar Abbas-Takht	0.94
3	Bandar Abbas-Khamir	0.93
4	Minab-Siric	0.91
5	Bandar Abbas-Minab	0.91
6	Qeshm	0.88
7	Bandar Abbas-Fin	0.87
8	Charak-Bastak	0.86
9	Tyrooz-Dehbarz	0.85
10	Bandar lengha-Charak	0.84
11	Bandar Abbas-Bandar lengeh	0.84
12	kouhstak-Sanderk	0.83
13	Bandar Abbas-Haji Abad	0.79
14	Siric-Jask	0.38
15	Charc-Prsian	0.12

Table IV.
Prioritization of economic, scientific and sports tourism axes in Hormozgan province

Figure 7.
Prioritization of economic-sport-scientific tourism in Hormozgan Province

Prioritization of tourism axes in Hormozgan province

After integrating the layers of tourism areas of the province in terms of natural tourism, historical and religious tourism, and sports, economics and science tourism, the most important tourism axes in each section were identified based on their rankings, which is shown in Table V and Figure 8.

Rankings	Axis names	Natural tourism	Economic-scientific-sports tourism	Historical-religious tourism	Outcomes
1	Bandar Abbas-Taziyan Paeen	0.97	0.98	0.92	0.98
2	Bandar Abbas-Takht	0.98	0.94	0.91	0.97
3	Bandar Abbas-Minab	0.96	0.91	0.95	0.96
4	Bandar Abbas-Khamir	0.93	0.93	0.92	0.95
5	Bandar Abbas-Fin	0.93	0.87	0.96	0.94
6	Charak-Bastak	0.91	0.86	0.93	0.92
7	Minab-Siric	0.88	0.91	0.91	0.92
8	Tyrez-Dehbarz	0.90	0.85	0.93	0.92
9	Bandar Abbas- Bandarlenghe	0.91	0.84	0.92	0.91
10	Qeshm	0.87	0.88	0.89	0.91
11	Bandar Abbas-Haji Abad	0.89	0.79	0.92	0.89
12	Bandar lengha-Charak	0.81	0.84	0.82	0.85
13	Kouhstak-Sanderk	0.81	0.83	0.83	0.84
14	Siric-Jask	0.38	0.38	0.34	0.37
15	Charac-Parsian	0.12	0.12	0.12	0.12

Table V.
Prioritization of
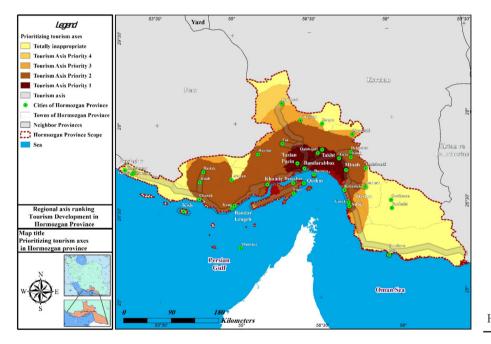tourism axes in
Hormozgan province

Figure 8.
Prioritization of
tourism axes in
Hormozgan Province

Analysis of the relationship between the top axes of regional tourism and the urban and rural spatial distribution of the province

To analyze the relationship between the top axes of regional tourism and the urban and rural spatial distribution of the province, the population of cities and villages of Hormozgan Province was entered into GIS software. Then, using the IDW Tool, the concentration of

population in the province was examined (Figure 9). It is evident that most of the development is concentrated in the capital city of the province (Bandar Abbas City), while the eastern and western parts of the province are less developed comparatively.

Due to the over-concentration of population in Bandar Abbas City, Figure 10 of the spatial distribution of Hormozgan Province population was drawn excluding this city. Figure 10 illustrates that the eastern areas of the province are not in a desirable condition in terms of population concentration. The other areas of the province, however, are relatively in a more favorable position in this regard.

Finally, the impact of the top regional tourist axes on the development of settlements in the province was identified, which is depicted in Figure 11.

Discussion

In every regional tourism system, pull and push factors determine the success or failure of the system. Iran does not create the necessary pull factors to turn latent demand into effective demand (Morakabati, 2011). Pull factors can be divided into endogenous pull factors including geographical position, access to markets and availability of attractions, and exogenous pull factors (management factors), which include positive image, tourism policy making, tourism service providing and peace and stability. Iran seems to have failed in these factors due to lack of national and regional tourism planning strategy. It has also failed to create a positive image of the country internationally due to international negative image (Khodadadi, 2018; Jalilvand and Samiei, 2012; Roque and Forte, 2019; Buda and McIntosh, 2013), fundamental weaknesses in tourism marketing (Jalilvand and Samiei, 2012; Seyfi *et al.*, 2018) and low priority of the tourism industry in the national economy (Khodadadi, 2018; Nematpour and Faraji, 2018). In the case of Hormozgan, this failure is even more evident in spite of the existence of endogenous pull factors, as identified in the
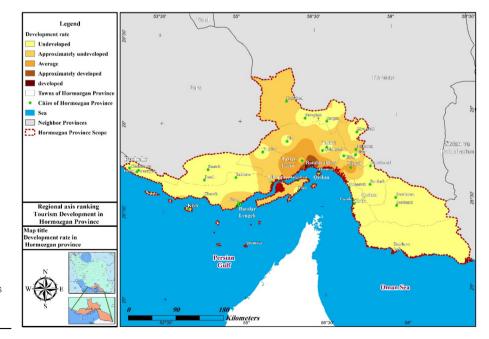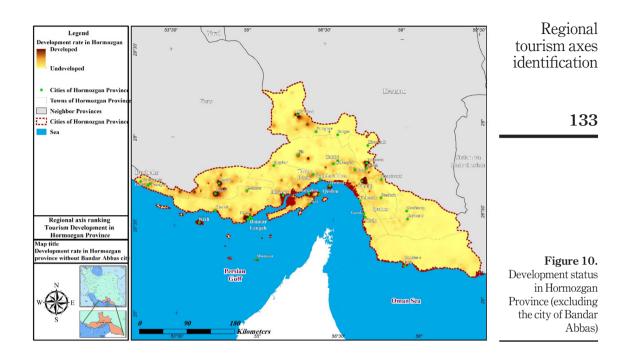

Figure 9.
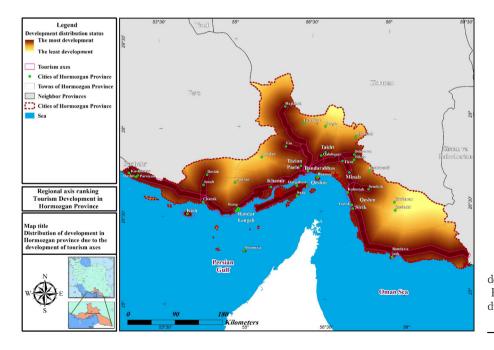Development status in Hormozgan Province

form of 15 cultural, natural and historical tourism axes. Furthermore, as Cox and Wray (2011) pointed out, tourism could act as a means of diversifying economic conditions in rural and regional areas, and this is of paramount importance for oil-based vulnerable economies such as Iran, in general, and Hormozgan Province, as one of the deprived regions in the country in particular. Historically, governments in Iran, despite all the potential for tourism and its role in diversification and economic, cultural and social growth (Dias-Sardinha and Ross, 2015; Müller and Jansson, 2007; Cohen and Cohen, 2012; Xue et al., 2017), have not paid enough attention to this industry as a catalyst for rural and regional development. Moreover, although there have been some promising perspectives since Iran's nuclear deal in 2015, improvement of the relations with the West and easing of international sanctions (Khodadadi, 2016), Iran's tourism industry has suffered significantly over the past three decades as a consequence of such issues as negative image in the tourism generating markets, political tensions as a result of Iran's nuclear program and poor management (Khodadadi, 2016).

From the perspective of sustainable development, some shortcomings still exist in the country's regional tourism planning and management including those steps Inskeep (1991) refers to for STD. Moreover, as Macbeth et al. (2004) argued, regional tourism as a system requires a comprehensive, multi-dimensional engagement involving the regional and local government as well as the public and private sectors; the country and the province cannot meet these requirements. In Hormozgan Province, there is no engagement because of deficiencies in planning and shortcomings in the management system such as regional organizations and institutions, local and provincial stakeholders' engagement as well as negative image of the country in the international tourism market. Nevertheless, in the regions like Hormozgan province with great potentials for tourism, the identification of the attributes of a destination, which help to explain its selection by tourists for vacation, is central to developing appropriate policies for maintaining or improving the popularity of the destination (Barreira et al., 2016). However, tourism in Hormozgan Province is in its primary stage, and this may provide suitable groundworks for sustainable tourism planning since some severe problems due to mass and unplanned tourism have not still happened as in some most visited destinations (Yuksel and Culha, 2017). In such destinations, satisfying the needs of present tourists and protecting and enhancing opportunities for the future of the region through localized and participatory sustainable tourism planning and management are easier than mass-tourist dominated destinations without sustainable tourism platforms, as emphasized by Ming Sua et al. (2019), Asmelasha and Satinder (2019) and UNWTO (2005). Such a planning and management in Hormozgan Province, which many scholars such as Edgell et al. (2008), Yuksel and Culha (2017) and Ruhanen (2004) have proposed, is necessary and one of the most important tools for this kind of planning is GIS and techniques like Fuzzy and TOPSIS model due to their capabilities in detecting spatial pattern of tourist attractions, identifying potential axes and prioritizing them based on accessibility, spatial agglomerations and population centers.

In the present study, regional tourism axes were identified, as one of the most important steps of regional tourism planning. As a result, 15 axes were identified and depicted in regional maps according to three classifications of tourism attractions including natural, economic-scientific-sports and historical-religious attractions. Every axis has its own potentials and tourism possibilities based on its location and neighborhood with tourism attractions. However, four hot spots were identified in this study including Bandar Abbas-Taziyan Paeen, Bandar Abbas-Takht, Bandar Abbas-Minab and Bandar Abbas-Khamir as the highest priorities for regional tourism development (Table V and Figure 8). Bandar Abbas, as the center of the province, is the starting point of all four axes due to concentrated

population, socio-economic opportunities and embracing various historical, natural and economic attractions. Creating tourism infrastructures in these axes would lead to prosperity of tourism in the region and creation of new tourist-oriented job opportunities in the small towns and rural areas and increased welfare among households involved in the tourism activities. Besides, it seems that although there are some essential infrastructures like airport and proper harbors along the shores, equipping them with travel accommodations is vital since they could provide tourists with residential accommodation facilities and guide them to visit other axes in the province. The latter is especially important in eastern areas of the province where there are cold spots. Some axes like Bandar Abbas-Takht and Bandar Abbas-Taziyan Paeen, which are ranked as top axes in terms of ecotourism capabilities, are also capable of developing health tourism due to the existence of hot water springs and pristine nature along the axis. Also axes like Bandar Abbas-Fin and Bandar Abbas-Minab have considerable capabilities for developing tourism activities in villages and prosperity of historic-religious sites. There are a large number of small cities and villages along these axes that can take advantage of developing and equipping these axes as this would connect them to the growth stream in the province including investment in regional transportation network and regional employment infrastructures. In terms of economic-sports-scientific tourism, Bandar Abbas-Taziyan Paeen and Bandar Abbas-Takht have great potentials in terms of established universities, exhibition spaces, scientific and research parks and sports camps, which are mainly concentrated in Bandar Abbas. Besides, these two axes are the shortest of all the axes and this is a competitive advantage for them to absorb more tourists because of accessibility and concentration of tourist attractions in terms of economic-sports-scientific tourism.

The relationship between the top axes and the spatial distribution of cities and villages is also important for developing domestic tourism considering accessibility requirements. Using the IDW tool, it is found that Bandar Abbas is the most populated city and other cities such as Kish Island, Haji Abad, Kong, Minab and Bastak are the next populated places with considerable distance from the main city. However, some of the identified axes have embraced these cities along their paths including Charak-Bastak, Tyrez-Dehbarz and Bandar Abbas-Haji Abad; they have significant historical-religious attractions. Furthermore, most of the identified axes,10 out of 15, lie along coastlines and need to be paid close attention as mass tourism-sensitive ecosystems and, at the same time, as one of the most important tourist capabilities in Hormozgan.

As Drius *et al.* (2019) emphasized, both tourism and other human activities have to consider their dependence on coastal ecosystem services, and collaborate at the technical and political level to reach a compromise to preserve natural resources in the long term. Axes like the Siric-Jask, Kouhstak-Sanderk, Bandar Abbas-Khamir and Charac-Parsian axes have been trapped along the coast and, if equipped, they can benefit from coastal tourism prosperity along the coast. In addition, the coastal tourism can be expanded upon these axes to divert the tourism pressure from land to the sea. The coastlines of Hormozgan Province have very sensitive ecosystems; as Lakshmi and Shaji (2016) argued, coastal areas are transitional areas between the land and sea, characterized by rich biodiversity and include some of the most fragile ecosystems on earth, like mangroves and coral reefs. Thus, diversion of tourism pressures from land to the sea, while maintaining the fragile features of land-based attractions, could boost coastal tourism, which has not grown in the province, and could provide opportunities for its development and equipment. Additionally, acting in the frame of STD the authorities in the province should introduce some laws to clamp down on certain tourist behaviors that may harm fragile ecosystems along the coastlines. Finally, identified regional tourism axes could help to render greater tourism growth in the region

providing all cities and villages with job opportunities and accelerating local economic and socio-cultural development.

Conclusion

This study was focused on regional tourism capabilities of Hormozgan Province and how they could be identified and prioritized in the form of regional tourism axes. To answer two research questions, using the GIS and TOPSIS Model, the major regional tourism axes were identified and prioritized through the Kernel Density Analysis based on the spatial accumulation of tourism attractions. According to the results, the combination of the GIS analysis and TOPSIS model is highly recommended in regional tourism studies due to its accuracy in identifying spatial accumulation of regional potential for tourism as they could be prioritized based on various local and regional indicators. The results show that spatial distribution of historic, cultural and natural attractions of Hormozgan Province has the capacity to render at least 15 major regional tourism axes based on their access to the main communication paths. However, all the axes lack the basic tourism requirements in terms of accommodations, tourism facilities and, more importantly, a bad image of the country in the international tourism market. Nevertheless, the province has some important pull factors and tourism assets deserving identification, planning and equipment. Bandar Abbas-Takht in ecotourism, Bandar Abbas-Fin in historical-religious tourism and Bandar Abbas-Taziyan Paeen in economic-sports-scientific tourism were identified as top axes in the province. It is worth noting that regarding the result in Figures 3, 5 and 7, spatial distribution of historical-religious tourist attractions in the province is wider than economic-sports-scientific and ecotourism attractions. To provide more details, there are 50 historic castles, eight historic caravanserais, 30 various temples and shrines that are distributed throughout the province while most of the economic-sports-scientific facilities are concentrated in Bandar Abbas city. Ecotourism attractions like caves, hot water springs and tourist villages are mostly concentrated in north of Bandar Abbas and west of the province. As a result, Bandar Abbas-Fin and Bandar Abbas-Haji Abad axes, stretching to the mountainous hinterland of the province, are more important due to embracing most of the ecotourism attractions especially tourist villages in the north of the province. Nevertheless, most of the identified axes lie along the coastlines of the province and care needs to be taken in planning and mobilizing their potentials considering their fragile biodiversity and ecosystem. Axes like Bandar Abbas-Bandar lengeh, Qeshm, Siric-Jask, Kouhstak-Sanderk and Kouhstak-Sanderk are among the coastal axes with a fragile ecosystem and a special care should be taken in every step of tourism development in establish tourism infrastructures like hotels, motels, restaurants and other tourist facilities and tourists' activities.

According to the findings of the present study, while tourism has a great potential in the province and in the country, which is renowned for its diversity of attractions, tourism development suffers from negative image of the country in the international tourism market and is constrained by several factors that limit the industry's contribution to economic growth (Zamanifarahani, 2010). Tourism in Iran and Iranian tourism policies are more a consequence of the country's political economy than explicit planning. As a result, Iran's present share of tourism is as low as 1/800th of the global tourism industry (Chianeh *et al.*, 2019). Jalilvand and Samiei (2012) found that visitors had concerns about physical, financial, and psychological risks when they were visiting tourist attractions in the country. Nonetheless, subsequent deal on Iran's nuclear program (reached on 14th of July, 2015) has led to softening of nuclear-related international sanctions and brought much needed relief to a struggling tourism industry in the country (Khodadadi, 2018). The findings also suggest

that integrating tourism planning with regional planning through a strategic tourism development process in regions which possess regional potential and natural and socio-cultural tourism attractions is an important step toward promoting tourism-based regional development. This integration will boost small towns and villages' socio-economic conditions by moving them out of geographic and economic isolation, providing them with tourist-oriented job opportunities and connecting them to the main regional economic streams such as labor force, goods and services streams at a regional scale. The results confirm that identification and prioritization of tourism axes is a preparatory step based on Inskeep's (1991) seven steps of STD. Other steps also need to be taken in terms of policy making and placing formal regional management and planning system in a national planning framework.

Finally, this study presents a number of practical implications for regional tourism development as follows:

- It identified some of the most important potential axes in Hormozgan Province which can be considered as plausible areas in the national and regional tourism development strategy.
- The spatial results of this study could be embedded in all urban and rural developmental plans in the province.
- Tourism investment should shift its spatial concentration from the spot approach, especially islands and cities, to the axis approach while equipping those axes in the framework of comprehensive spatial strategic regional tourism plans.
- Preparing tourism investment packages in the form of axis-oriented ones is highly recommended.
- Sustainability in tourism development should be regarded as a main concept of any strategic and action plan in the region.

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