# SWOT Analysis for Sustainable Tourism Development Strategies using Fuzzy Logic

**Conference Paper** · November 2017

CITATION
1

READS
9,217

**4 authors**, including:

Hamid Reza Feili
Karaj Branch, Islamic Azad University, Karaj, Iran
**66** PUBLICATIONS **192** CITATIONS
SEE PROFILE

Mojtaba Qomi
Islamic Azad University Karaj Branch
**18** PUBLICATIONS **23** CITATIONS
SEE PROFILE

Ghazaleh Azmoun
Islamic Azad University Karaj Branch
**1** PUBLICATION **1** CITATION
SEE PROFILE

3rd International Conference Of
Science & Engineering In the Technology Era
Denmark Copenhagen November 30, 2017

# SWOT Analysis for Sustainable Tourism Development Strategies using Fuzzy Logic

**Hamidreza Feili**
Assistant Professor, Department of Industrial Engineering, Karaj Branch, Islamic Azad University, Karaj, Iran (hrfeili@gmail.com)

**Mojtaba Qomi**
B.Sc., Department of Industrial Engineering, Karaj Branch, Islamic Azad University, Karaj, Iran (qomi.mojtaba@gmail.com)

**Sajedeh Sheibani**
B.Sc. Student, Department of Industrial Engineering, Karaj Branch, Islamic Azad University, Karaj, Iran (sj.sheibani@yahoo.com)

**Ghazaleh Azmoun**
B.Sc. Student, Department of Industrial Engineering, Karaj Branch, Islamic Azad University, Karaj, Iran (iamqazal@gmail.com)

## Abstract
Recently, tourism is a major source of income for many countries, and affects the economy of both the source and host countries, in some cases being of vital importance. Tourism brings in large amounts of income into a local economy in the form of payment for goods and services needed by tourists, accounting for 30% of the world's trade of services, and 6% of overall exports of goods and services. This research is done in Iran, and we get usage of SWOT approach and fuzzy logic for sustainable tourism development strategies. SWOT analysis is a commonly used tool for analyzing external and internal environments simultaneously in order to acquire a systematic approach and support for a decision situation. First, considering on the internal and external environment of the region, a list of strength (S), weaknesses (W), opportunities (O) and threats (T) will be recognized. Then experts will be questioned. After analyzing and calculating, each factor is given a weighted score. Finally, appropriate strategies are presented. Strategies are put in SO, WO, ST, and WT groups.

**Keywords:** SWOT, Sustainable tourism development, Fuzzy logic.

## Introduction

Sustainability and sustainable development (SD) related debates at local and global levels in the public sphere including education, law, policy making and political-social-economic negotiations have been argued from multiple points of view, are value-laden and represent the interests of many groups and communities (Painter-Morland et al, 2016; Curry, 2011; Hutchings, 2010; Gladwin et al, 1995; Cicmil et al, 2017; Feili et al, 2017a). There are wide areas for the sustainable development goals. One of them is focusing on tourism. Tourism can be domestic or international, and international tourism has both incoming and outgoing implications on a country's balance of payments. Today, tourism is a major source of income for many countries, and affects the economy of both the source and host countries, in some cases being of vital importance. Although many developing areas seek tourism as means of economic development, at an early stage, such areas often lack various forms of capital. Early-stage destinations are those at the development stage on Butler's tourist area lifecycle (Butler, 2004) and are often located in developing countries. They possess abundant tourism resources but lack proper capital to create value due to their low brand influence and early-stage development status. In some studies, these destinations have been referred to as emerging destinations located in rural settings, focusing on development and economic benefits and having male-dominant environments. Local governments often have crucial roles in planning, coordinating and regulating tourism development (Tosun, 2006; Zhang et al, 1999), but the role of the private sector is increasingly important and entrepreneurship has become a driving factor (Dana et al, 2014; Jaafar et al, 2011; Lordkipanidze et al, 2005; Zhou et al, 2017). Tourism in Iran is diverse, providing a range of activities from hiking and skiing in the Alborz and Zagros mountains, to beach holidays by the Persian Gulf and the Caspian Sea. The Iranian government has been making concerted efforts to attract tourists to the various destinations in the country and arrivals have increased during the past years. Kish Island alone attracts around 1 million visitors per year, the majority of whom are Iranian but also this its attractive for non-Iranian Muslim who like to have beach holiday with Islamic style that let men and women use separate beaches.

This research has been done in one of provinces of Iran. It is called Alborz. Alborz province is covered 5800 kilometer cube in the northern part of Iran and situated in the slides of central Alborz the range. Its weather is affected by Alborz the range and it has cold winter and moderate summer. Its southern part has common border with desert and it has got dry and hot weather.it has also many natural hills and mountains and deep valleys and wide meadows that attract so many visitors because of proper flora and green gardens. Karaj is considered as the central of province. Its population is nearly 1377450. It is considered as the fifth most populated city in Iran. Alborz counties are Karaj, Nazarabad, Taleqan, Fardis, Savojbolagh, and Eshtehard (Feili et al, 2017c).

One of the most important tools in editing strategy is SWOT technique. SWOT (also known as TOWS analysis, Dawes matrix) can be divided into two parts: the first part is SW, mainly used to analyze the internal conditions; the second part is OT, mainly used to analyze the external conditions (Feili et al, 2016b, 2017b). With this method, we can find out those factors to our advantage and worth promoting from the development status of tourism in Alborz, and avoid those unfavorable.

## Research methodology

### SWOT analysis

SWOT analysis is a commonly used tool for analyzing external and internal environments simultaneously in order to acquire a systematic approach and support for a decision situation (Kurttila et al, 2000; Kangas et al, 2003; Yüksel and Dağdeviren, 2007; Görener et al, 2012). SWOT analysis has its origins in the 1960s (Learned et al, 1965). In addition to this, the key tool used presently in planning the national sustainable development is Strengths, Weaknesses, Opportunities and Threat (SWOT) analysis, which originates from the business management literature and was adopted in the 1980s by public administration across such areas as regional development and municipal planning (Markovska et al, 2009). SWOT analysis is an important decision-making support tool, and is commonly used to systematically analyze the strategic situations and identify the level of organizations from their internal and external environments (Gao and Peng, 2011). Having identified

these factors strategies are developed which may build on the strengths, eliminate the weaknesses, exploit the opportunities or counter the threats (Dyson, 2004; Salar and Salar, 2014). SWOT analysis is valuable for the evaluation of management procedures in companies, projects and plans (Samolada and Zabaniotou, 2014). Though SWOT analysis emerged in the field of economic analysis, it has been extended to various research directions and increasingly applied in the context of environmental research. Nikolaou and Evangelinos (2010) use SWOT analysis to develop policy recommendations to industry for adopting environmental management practices. In the waste-to-energy sector, Samolada and Zabaniotou (2014) applied SWOT analysis for the comparison of two different applications of refuse derived fuel (RDF). Antonopoulos et al (2011) use SWOT analysis to evaluate application of new waste-to-energy technology. SWOT analysis has been applied for strategic evaluation of the whole industries as well. Lu and Lu (2013) used SWOT analysis to evaluate the potential of green energy industry development in Taipei. Regarding the application to entire networks of companies, Zhao et al (2009) performed a qualitative SWOT analysis of an industrial cluster of the Dalian Software Park in China. They determined the strategic position of the industrial cluster and indicated approaches for strengthening its competitiveness. The widespread use and applications of SWOT analysis indicate its usefulness and clarity for identification of system improvements (Beloborodko et al, 2015). Importantly, SWOT analysis allows for predicting future opportunities and threats, as well as quantifying effects of alternative management strategies (White et al, 2015). Although use of SWOT analysis in the fields of ecology and conservation has barely begun (see, e.g., Martínez and Casas Ripoll, 2002; Trujillo, 2005; Paliwal, 2006; Geneleti et al, 2007; Ganjali et al, 2014), the method has been widely used for strategic planning in business and industrial settings (Houben et al, 1999), hotel industry reform (Yu and Huimin, 2005), evaluating sustainability of commercial fisheries (Slaski et al, 2013), human resources management (Chermack and Kasshanna, 2007), and even for improving transportation safety (Arslan and Er, 2008).

## Fuzzy set theory

In his seminal work, Zadeh (1965) designed the fuzzy set theory (FST) as a mathematical way to quantify inherent fuzziness to deal with the uncertainty and vagueness of human thinking, which is constantly present in real-life problems. Since knowledge can be applied in a more natural way by using FST, complex decision-making problems can be simplified. Fuzziness can be defined as a type of imprecision that may be affiliated with sets in which there is no distinct transition from membership to non-membership (Bellman and Zadeh, 1970; Zadeh, 1965). Fuzzy sets are then characterized by a membership function, which assigns a grade of membership to each object, ranging between zero and one. In mathematical terms, a fuzzy set X of universe Y is defined by function $\mu_x(y)$, and can be expressed as follows (Zadeh, 1965):

$$\mu_x(y) : Y \rightarrow [0,1] \tag{1}$$

When applying FST, authors commonly use triangular fuzzy numbers (TFNs), due to their ability to effectively capture the vagueness in human's verbal assessments (Bevilacqua et al, 2006). A fuzzy number M on R is defined to be a TFN, if its membership function $\mu_M(x) : R \rightarrow [0,1]$ is equal to (Van Laarhoven and Pedrycz, 1983):

$$\mu_M(x) = \begin{cases} \dfrac{x-l}{m-l}, & l \le x \le m \\ \dfrac{u-x}{u-m}, & m \le x \le u \\ 0, & otherwise \end{cases} \tag{2}$$

In the equation above $l \le m \le u$, where l and u stand for the lower and upper bound of the support of fuzzy number M, respectively, and m for the modal value $(l \neq m \neq u)$. A TFN, as expressed by Eq. (2) will be denoted as $(l,m,u)$, see Fig. 1 (Rezaei et al, 2014).

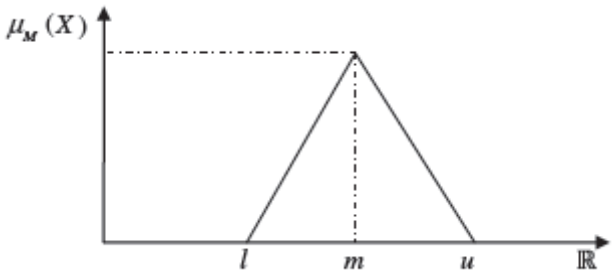


**Fig. 1. Membership function of a TFN**

In addition, Van Laarhoven and Pedrycz (1983) developed the following basic operations for TFNs $M_1 = (l_1, m_1, u_1)$ and $M_2 = (l_2, m_2, u_2)$, as formulated in Eqs. (3) – (7).
TFN addition:

$$M_1 \oplus M_2 = (l_1,m_1,u_1) \oplus (l_2,m_2,u_2) = (l_1 + l_2, m_1 + m_2, u_1 + u_2) \quad (3)$$

TFN subtraction:

$$M_1 \ominus M_2 = (l_1,m_1,u_1) \ominus (l_2,m_2,u_2) = (l_1 - l_2, m_1 - m_2, u_1 - u_2) \quad (4)$$

TFN multiplication, where $l_i, m_i, u_i$, are all positive real numbers:

$$M_1 \otimes M_2 = (l_1,m_1,u_1) \otimes (l_2,m_2,u_2) \cong (l_1 \times l_2, m_1 \times m_2, u_1 \times u_2) \quad (5)$$

TFN division, where $l_i, m_i, u_i$, are all positive real numbers:

$$M_1 \oslash M_2 = (l_1,m_1,u_1) \oslash (l_2,m_2,u_2) \cong (l_1 \div u_2, m_1 \div m_2, u_1 \div l_2) \quad (6)$$

TFN's reciprocal fuzzy number $\tilde{a}_{ji}$ can be obtained by using the following equation:

$$\tilde{a}_{ji} = \tilde{a}_{ij}^{-1} \cong \left(\frac{1}{u_{ij}}, \frac{1}{m_{ij}}, \frac{1}{l_{ij}}\right) \quad (7)$$

## Findings

First, internal factors will be reviewed. Its goal is recognizing weaknesses and strengths. In this research, 7 strengths, 7 weaknesses, and in whole 14 internal factors are recognized.
Then external factors will be reviewed. Its goal is recognizing opportunities and threats that are ahead of the subject under study. Here, 7 opportunities and 7 threats and in whole 14 external factors are recognized. Following there are strengths, weaknesses, opportunities and threats of this research.

## Strengths

1. The region weather and climate (S1)
2. Rich tourism resources (S2)
3. City government at all levels attach importance to the development of tourist attractions (S3)
4. Having good condition for external investment (S4)
5. Tourism economic potential (S5)
6. The region weather and climate (S6)
7. Tourism to bring vitality to the local economy (S7)

## Weaknesses

1. Lack of minimal amenities for visitors (W1)
2. Developmental severely damaged (W2)

3. Lack of tourism management (W3)
4. Being unknown even for many native people due to the lack of advertisements (W4)
5. Lack of health facilities (W5)
6. Surrounding cities with intense regional competition (W6)
7. Slow economic growth (W7)

## Opportunities

1. High research and educational potential (O1)
2. Development of tourist facilities as one of the strategies of ecotourism development (O2)
3. Utilizing the future income from tourism to enhance the area conservation level (O3)
4. Making effort to keep and emphasize on conserving native culture and prevention of the traditional context alteration (O4)
5. Government panoramic planning (O5)
6. Job creation and direct benefit generation for local community (O6)
7. Cultural exchange (O7)

## Threats

1. Lack of consideration to environmental impacts of executing projects such as resorts, hotels, etc. (T1)
2. Changes in the social structure of the area (T2)
3. Little foreign investment in the tourism sector (T3)
4. Tourism consumer fatigue (T4)
5. Inability to compete with the tourism areas in Tehran province (T5)
6. Lack of favorable circumstances for foreign tourists (T6)
7. Seasonal unsuitable distribution of visitors due to the climate conditions (T7)

## Calculating final weight of internal and external factors

In this stage, final weight of internal and external factors is determined by using the linguistic measurement scale (Table 1) and Fuzzy AHP method.

**Table 1. Linguistic values and mean of fuzzy numbers**

| Linguistic values | The mean of fuzzy numbers |
|---|---|
| Very high (VH) | (0.8, 1, 1) |
| High (H) | (0.6, 0.7, 0.8) |
| Medium (M) | (0.3, 0.45, 0.6) |
| Low (L) | (0.1, 0.2, 0.3) |
| Very low (VL) | (0, 0, 0.1) |

Analytic hierarchy process (AHP) (Satty, 1977, 1980, 1990, 1994) has been widely used as a useful multiple criteria decision making (MCDM) tool or a weight estimation technique in many areas such as selection, evaluation, planning and development, decision making, forecasting, and so on (Vaidya and Kumar, 2006).

Fuzzy logic has been proposed (Zadeh, 1965, 1973, 1994, 1996, 1997) as an analytical approach to integrate uncertainty into decision-making models. A number of methods have been developed to handle fuzzy comparison matrices. Chang (1992, 1996) proposed an extent analysis method, which derives crisp weights for fuzzy comparison matrices. We used Chang's method (extent analysis method) in this research. Da-Yong Chang (1992, 1996) introduces a new approach for handling fuzzy AHP, with the use of triangular fuzzy numbers for pairwise comparison scale of fuzzy AHP, and the use of the extent analysis method for the synthetic extent values of the pairwise comparisons (Feili et al, 2016a, 2017a, 2017c).

The comments of experts has been used for this research. Based on experts comments and studying the questionnaire, for each factor, a specific prioritized numeral value in scale of others is achieved. According to these values, pairwise comparisons is done. Next, the weight of each factor is calculated.

Using scale of pairwise comparison (Table 2), we can form the triangular fuzzy numbers of pairwise comparisons. Pairwise comparisons for strengths are represented on Tables 3.
In this paper, "strengths and weaknesses", also "opportunities and threats", have the same weight. The sum of all weights should equal 1.0 (including "strengths and weaknesses", also "opportunities and threats").

**Table 2. Scale of pairwise comparison (Chang's method)**

| Definition | Triangular fuzzy scale | Triangular fuzzy reciprocal scale |
|---|---|---|
| Equally important | (1, 1, 1) | (1, 1, 1) |
| Weakly important | (2/3, 1, 3/2) | (2/3, 1, 3/2) |
| Moderately important | (3/2, 2, 5/2) | (2/5, 1/2, 2/3) |
| Strongly important | (5/2, 3, 7/2) | (2/7, 1/3, 2/5) |
| Absolutely important | (7/2, 4, 9/2) | (2/9, 1/4, 2/7) |

**Table 3. Factors pairwise comparison matrix for strengths**

| S | S1 | S2 | S3 | S4 | S5 | S6 | S7 |
|---|---|---|---|---|---|---|---|
| S1 | (1, 1, 1) | (2/3, 1, 3/2) | (2/3, 1, 3/2) | (3/2, 2, 5/2) | (2/5, 1/2, 2/3) | (1, 1, 1) | (3/2, 2, 5/2) |
| S2 | (2/3, 1, 3/2) | (1, 1, 1) | (3/2, 2, 5/2) | (5/2, 3, 7/2) | (2/3, 1, 3/2) | (2/3, 1, 3/2) | (2/3, 1, 3/2) |
| S3 | (2/3, 1, 3/2) | (2/5, 1/2, 2/3) | (1, 1, 1) | (2/3, 1, 3/2) | (3/2, 2, 5/2) | (2/5, 1/2, 2/3) | (2/3, 1, 3/2) |
| S4 | (2/5, 1/2, 2/3) | (2/7, 1/3, 2/5) | (2/3, 1, 3/2) | (1, 1, 1) | (2/5, 1/2, 2/3) | (2/5, 1/2, 2/3) | (3/2, 2, 5/2) |
| S5 | (3/2, 2, 5/2) | (2/3, 1, 3/2) | (2/5, 1/2, 2/3) | (3/2, 2, 5/2) | (1, 1, 1) | (2/7, 1/3, 2/5) | (1, 1, 1) |
| S6 | (1, 1, 1) | (2/3, 1, 3/2) | (3/2, 2, 5/2) | (3/2, 2, 5/2) | (5/2, 3, 7/2) | (1, 1, 1) | (2/3, 1, 3/2) |
| S7 | (2/5, 1/2, 2/3) | (2/3, 1, 3/2) | (2/3, 1, 3/2) | (2/5, 1/2, 2/3) | (1, 1, 1) | (2/3, 1, 3/2) | (1, 1, 1) |

$$W_S' = (0.711, 0.905, 0.546, 0.397, 0.617, 1, 0.365)^T$$
$$W_S = (0.157, 0.199, 0.120, 0.088, 0.136, 0.220, 0.080)^T$$
$$W_S/2 = (0.079, 0.099, 0.060, 0.044, 0.068, 0.110, 0.040)^T$$

Next, the weight of other factors (W, O, T) is calculated. Effectiveness score by using Table 1 is calculated. The results are shown on Tables 4-7.

**Table 4. Reviewing strengths from the viewpoint of experts**

| S | Weight | Linguistic evaluations | Effectiveness score | Final fuzzy score | Final defuzzy score | Rank |
|---|---|---|---|---|---|---|
| S1 | 0.079 | M | (0.3, 0.45, 0.6) | (0.024, 0.036, 0.047) | 0.041 | 3 |
| S2 | 0.099 | VH | (0.8, 1, 1) | (0.079, 0.099, 0.099) | 0.098 | 1 |
| S3 | 0.060 | L | (0.1, 0.2, 0.3) | (0.006, 0.012, 0.018) | 0.015 | 6 |
| S4 | 0.044 | L | (0.1, 0.2, 0.3) | (0.004, 0.009, 0.013) | 0.011 | 7 |
| S5 | 0.068 | M | (0.3, 0.45, 0.6) | (0.020, 0.031, 0.041) | 0.036 | 4 |
| S6 | 0.110 | H | (0.6, 0.7, 0.8) | (0.066, 0.077, 0.088) | 0.081 | 2 |
| S7 | 0.040 | M | (0.3, 0.45, 0.6) | (0.012, 0.018, 0.024) | 0.021 | 5 |

**Table 5. Reviewing weaknesses from the viewpoint of experts**

| W | Weight | Linguistic evaluations | Effectiveness score | Final fuzzy score | Final defuzzy score | Rank |
|---|---|---|---|---|---|---|
| W1 | 0.091 | VH | (0.8, 1, 1) | (0.073, 0.091, 0.091) | 0.09 | 3 |
| W2 | 0.051 | L | (0.1, 0.2, 0.3) | (0.005, 0.010, 0.015) | 0.012 | 6 |
| W3 | 0.100 | H | (0.6, 0.7, 0.8) | (0.06, 0.07, 0.08) | 0.505 | 1 |
| W4 | 0.094 | H | (0.6, 0.7, 0.8) | (0.056, 0.066, 0.075) | 0.069 | 4 |
| W5 | 0 | L | (0.1, 0.2, 0.3) | (0, 0, 0) | 0 | 7 |
| W6 | 0.117 | VH | (0.8, 1, 1) | (0.094, 0.117, 0.117) | 0.115 | 2 |
| W7 | 0.047 | M | (0.3, 0.45, 0.6) | (0.014, 0.021, 0.028) | 0.024 | 5 |

**Table 6. Reviewing opportunities from the viewpoint of experts**

| O | Weight | Linguistic evaluations | Effectiveness score | Final fuzzy score | Final defuzzy score | Rank |
|---|---|---|---|---|---|---|
| O1 | 0.103 | M | (0.3, 0.45, 0.6) | (0.031, 0.046, 0.062) | 0.053 | 3 |
| O2 | 0.142 | H | (0.6, 0.7, 0.8) | (0.085, 0.099, 0.114) | 0.105 | 2 |
| O3 | 0 | VL | (0, 0, 0.1) | (0, 0, 0) | 0 | 7 |

| | | | | | | |
|---|---|---|---|---|---|---|
| O4 | 0.042 | L | (0.1, 0.2, 0.3) | (0.004, 0.008, 0.013) | 0.010 | 5 |
| O5 | 0.014 | M | (0.3, 0.45, 0.6) | (0.004, 0.006, 0.008) | 0.007 | 6 |
| O6 | 0.124 | VH | (0.8, 1, 1) | (0.099, 0.124, 0.124) | 0.122 | 1 |
| O7 | 0.075 | M | (0.3, 0.45, 0.6) | (0.022, 0.034, 0.045) | 0.039 | 4 |

**Table 7. Reviewing threats from the viewpoint of experts**

| T | Weight | Linguistic evaluations | Effectiveness score | Final fuzzy score | Final defuzzy score | Rank |
|---|---|---|---|---|---|---|
| T1 | 0.049 | L | (0.1, 0.2, 0.3) | (0.005, 0.010, 0.015) | 0.012 | 7 |
| T2 | 0.102 | H | (0.6, 0.7, 0.8) | (0.061, 0.071, 0.082) | 0.075 | 1 |
| T3 | 0.070 | M | (0.3, 0.45, 0.6) | (0.021, 0.031, 0.042) | 0.036 | 4 |
| T4 | 0.048 | M | (0.3, 0.45, 0.6) | (0.014, 0.022, 0.029) | 0.025 | 5 |
| T5 | 0.070 | VH | (0.8, 1, 1) | (0.056, 0.070, 0.070) | 0.069 | 2 |
| T6 | 0.091 | H | (0.6, 0.7, 0.8) | (0.055, 0.064, 0.073) | 0.067 | 3 |
| T7 | 0.070 | L | (0.1, 0.2, 0.3) | (0.007, 0.014, 0.021) | 0.017 | 6 |

## Strategies

In this step, strategies will be introduced. They are in four groups. Types of strategies explained below are developed (Aslan et al, 2014).

- SO – "Strategies that use strengths to maximize opportunities"
- WO – "Strategies that minimize weaknesses by taking advantage of opportunities"
- ST – "Strategies that use strengths to minimize threats"
- WT – "Strategies that minimize weaknesses and avoid threats"

## SO strategy

1. Planning for the development of transportation in the region
2. Using other potential regions for developing other types of ecotourism
3. Taking advantage of the future income of the tourism industry to enhance the area conservation level

## ST strategy

1. Development of informing activities in the media
2. Establishing facilities and conditions required to attract foreign tourists by relevant companies
3. Reducing negative views about the insecurity of the region

## WO strategy

1. Providing accommodation for overnight and long stays
2. Allocating budget to establish infrastructures
3. Improving and enhancing tourism products

## WT strategy

1. Using professional managers in variety parts of tourism and implementations of short and long term plans related to ecotourism
2. Environmental education with respect to hotel and accommodation constructors, and tourism operators to lessen environmental impacts
3. Infrastructure development harmonized with population increase caused by tourist visits

## Conclusion

Recently, tourism is a major source of income for many countries, and affects the economy of both the source and host countries, in some cases being of vital importance. This research is done in Iran (Alborz province), and we get usage of SWOT approach and fuzzy logic for sustainable tourism development strategies. One of the most important tools in editing strategy is SWOT technique. Vulnerability threshold of tourism management in Alborz is high and needs reviewing and presenting suitable policy.

Using calculated priorities of SWOT factors could be developed a management approach or supported for a critical decision. Additionally, this study's results can be used for the constitute of a set of appropriate strategy alternatives for organization.

We believe that quantitative SWOT analysis provides an effective decision-making tool not only for evaluating and selecting reintroduction areas, but also for identifying area specific management strategies for improving and maintaining area and site suitability. Even if only one area/site is available for a given reintroduction, SWOT analysis can nevertheless be invaluable for maximizing efficiency and effectiveness of pre- and post- reintroduction management and thus, increasing probability of success (Ferraro and Pattanayak, 2006; White et al, 2012; White et al, 2015).

## References

Antonopoulos, Ioannis S. and Karagiannidis, Avraam. and Elefsiniotis, L. and Perkoulidis, George. and Gkouletsos, Athanasios. (2011). Development of an innovative 3-stage steady bed gasifier for municipal solid waste and biomass. Fuel Processing Technology, 92(12), 2389-2396.

Arslan, Ozcan. and Er, Ismail Deha. (2008). SWOT analysis for safer carriage of bulk liquid chemicals in tankers. Journal of Hazardous Materials, 154(1-3), 901-913.

Aslan, Imran. and Çınar, Orhan. and Özen, Üstün. (2014). Developing Strategies for the Future of Healthcare in Turkey by Benchmarking and SWOT Analysis. Procedia - Social and Behavioral Sciences, 150, 230-240.

Bellman, Richard E. and Zadeh, Lotfi A. (1970). Decision making in a fuzzy environment. Management Science, 17(4), 141-164.

Beloborodko, Anna. and Romagnoli, Francesco. and Rosa, Marika. and Disanto, Carmen. and Salimbeni, Riccardo. and … and Blumberga, Dagnija. (2015). SWOT analysis approach for advancement of waste-to-energy cluster in Latvia. Energy Procedia, 72, 163-169.

Bevilacqua, M. and Ciarapica, F. E. and Giacchetta, G. (2006). A fuzzy-QFD approach to supplier selection. Journal of Purchasing and Supply Management, 12(1), 14-27.

Butler, Richard. (2004). The tourism area life cycle in the twenty-first century. In A. A. Lew, C. M. Hall, & A. M. Williams (Eds.), A companion to tourism (pp. 159-169). Oxford, UK: John Wiley & Sons, 2008.

Cicmil, Svetlana. and Gough, Georgina. and Hills, Sarah. (2017). Insights into responsible education for sustainable development: The case of UWE, Bristol. The International Journal of Management Education, 15(2), 293-305.

Chang, Da-Yong. (1992). Extent Analysis and synthetic Decision. Optimization Techniques and Applications, vol. 1, World Scientific, Singapore, p.352.

Chang, Da-Yong. (1996). Applications of the extent analysis method on fuzzy AHP. European Journal of Operational Research, 95(3), 649-655.

Chermack, Thomas J. and Kasshanna, Bernadette K. (2007). The use and misuse of SWOT analysis and implications for HRD professionals. Human Resources Development International, 10, 383-399.

Curry, Patrick. (2011). Ecological ethics (2nd ed.). Cambridge: Polity Press.

Dana, Léo-Paul. and Gurau, Calin. and Lasch, Frank. (2014). Entrepreneurship, tourism and regional development: A tale of two villages. Entrepreneurship & Regional Development, 26(3-4), 357-374.

Dyson, Robert G. (2004). Strategic development and SWOT analysis at the University of Warwick. European Journal of Operational Research, 152(3), 631-640.

Feili, Hamidreza. and Asadollahi, Fatemeh. and Qomi, Mojtaba. and Nazari, Alireza. and Eslami Nosratabadi, Mehran. (2016a). Analysis of methods for preventing from frostbite the trees for achieving sustainable development using FAHP and TOPSIS techniques. 3rd International Conference on Research in Science and Technology, July 9th 2016, Berlin, Germany.

Feili, Hamidreza. and Farmahini Farahani, Farhoud. and Khajenasiri, Sogol. Mohseni, Mohammad Hossein. and Qomi, Mojtaba (2016b). Analysis of date fruit packing for achieving sustainable development using TOPSIS and SWOT techniques. 4th International Conference on Engineering and Humanities, 20th and 21th of July 2016, Odessa, Ukraine.

Feili, Hamidreza. and Qomi, Mojtaba. and Aghababaei Moornani, Babak. and Karami Neshat, Parisa. and Laghaei, Farzad. (2017a). Prioritization of methods for preventing apple scab disease for the sustainable development goals using fuzzy AHP. 3rd International Conference on New Ideas in Management Economics and Accounting, August 27, 2017, Berlin, Germany.

Feili, Hamidreza. and Qomi, Mojtaba. and Keyhanpour, Kiana. and Beytarzadeh, Mina. and Daneshzadeh, Soha. (2017b). SWOT analysis to improve planting and packaging of peanut. 2nd International Conference on Modern Approaches in Science, Technology and Engineering, July 9, 2017, Paris, France.

Feili, Hamidreza. and Qomi, Mojtaba. and Tarhsaz, Mohammad. and Koliayi, Hani. and Hashemi, Kiarash. (2017c). Locating athletic spaces using fuzzy AHP for the sustainable development goals. 2nd International Conference on Innovation in Engineering, Sciences and Technology Development, October 14, 2017, Amsterdam, Netherlands.

Ferraro, Paul J. and Pattanayak, Subhrendu K. (2006). Money for nothing? A call for empirical evaluation of biodiversity conservation investments. PLoS Biology, 4(4), 482-487.

Ganjali, Saeed. and Shayesteh, Kamran. and Ghasemi, Ali. and Mohammadi, H. (2014). Environmental and strategic assessment of ecotourism potential in Anzali Wetland using SWOT analysis. Caspian Journal of Envionmental Science, 12, 155-164.

Gao, Chang-Yuan. and Peng, Ding-Hong. (2011). Consolidating SWOT analysis with nonhomegeneous uncertain preference information. Knowledge-Based Systems, 24(6), 796-808.

Geneleti, Davide. and Bagli, Stefano. and Napolitano, Paola. and Pistocchi, Alberto. (2007). Spatial decision support for strategic environmental assessment of land use plans: a case study in southern Italy. Environmental Impact Assessment Review, 27(5), 408-423.

Gladwin, Thomas N. and Kennelly, James J. and Krause, Tara-Shelomith. (1995). Shifting paradigms for sustainable development: Implications for management theory and research. Academy of Management Review, 20(4), 874-907.

Görener, Ali. and Toker, Kerem. and Uluçay, Korkmaz. (2012). Application of Combined SWOT and AHP: A Case Study for a Manufacturing Firm. Procedia - Social and Behavioral Sciences, 8th International Strategic Management Conference, 58, 1525-1534.

Houben, G.and Lenie, K. and Vanhoof, K. (1999). A knowledge-based SWOT-analysis system as an instrument for strategic planning in small and medium sized enterprises. Decision Support Systems, 26(2), 125-135.

Hutchings, Kimberly. (2010). Global ethics - an introduction. Cambridge: Polity Press.

Jaafar, Mastura. and Abdul-Aziz, Abdul Rashid. and Maideen, Siti Aishah. and Mohd, Siti Zaleha. (2011). Entrepreneurship in the tourism industry: Issues in developing countries. International Journal of Hospitality Management, 30(4), 827-835.

Kangas, Jyrki. and Kurttila, Mikko. and Kajanus, Miika. and Kangas, Annika. (2003). Evaluating the management strategies of a forestland estate-the S-O-S approach. Journal of Environmental Management, 69(4), 349-358.

Kurttila, Mikko. and Pesonen, Mauno. and Kangas, Jyrki. and Kajanus, Miika. (2000). Utilizing the analytic hierarchy process (AHP) in SWOT analysis – a hybrid method and its application to a forest-certification case. Forest Policy and Economics, 1(1), 41-52.

Learned, Edmund P. and Christensen, C Roland. and Andrews, Kenneth R. and Guth, William D. (1965). Business Policy: Notes for Analysis, Homewood, III, Dow Jones-Irwin.

Lordkipanidze, Maia. and Brezet, Han. and Backman, Mikael. (2005). The entrepreneurship factor in sustainable tourism development. Journal of Cleaner Production, 13(8), 787-798.

Lu, Shyi-Min. and Lu, Ching. (2013). Strategy analysis for the development of a green energy industry: a Taipei case study. Journal of Cleaner Production. In press, available online 6 September 2013.

Markovska, Natasa. and Taseska, Verica. and Pop-Jordanov, Jordan. (2009). Swot analyses of the national energy sector for sustainable energy development. Energy, 34(6), 752-756.

Martínez, Jesús. and Casas Ripoll, Diego. (2002). Recursos ambientales: identificación de problemas ybúsqueda de soluciones (aplicaciones metodológicas a las playas de sol y baño). Gran Canaria, España: Servicio de Publicaciones de la Universidad de lasPalmas de Gran Canaria.

Nikolaou, Ioannis E. and Evangelinos, Konstantinos I. (2010). A SWOT analysis of environmental management practices in Greek Mining and Mineral Industry. Resources Policy, 35(3), 226-234.

Painter-Morland, Mollie. and Sabet, Ehsan. and Molthan-Hill, Petra. and Goworek, Helen. and de Leeuw, Sander. (2016). Beyond the curriculum: Integrating sustainability into business schools. Journal of Business Ethics, 139(4), 737-754.

Paliwal, Ritu. (2006). EIA practice in India and its evaluation using SWOT analysis. Environmental Impact Assessment Review, 26(5), 492-510.

Rezaei, Jafar. and Fahim, Patrick B.M. and Tavasszy, Lori. (2014). Supplier selection in the airline retail industry using a funnel methodology: Conjunctive screening method and fuzzy AHP. Expert Systems with Applications, 41(18), 8165-8179.

Saaty, Thomas L. (1977). A scaling method for priorities in hierarchical structures. Journal of Mathematical Psychology, 15(3), 234-281.

Saaty, Thomas L. (1980). The Analytic Hierarchy Process, New York: McGraw-Hill.

Saaty, Thomas L. (1990). The Analytic Hierarchy Process. McGraw-Hill, Pittsburgh, PA, USA.

Saaty, Thomas L. (1994). How to make a decision: the analytic hierarchy process. Interfaces 24, 19-43.
Salar, Menekse. and Salar, Orkide. (2014). Determining pros and cons of franchising by using SWOT analysis. Procedia - Social and Behavioral Sciences, 122, 515-519.
Samolada, M C. and Zabaniotou, Anastasia A. (2014). Energetic valorization of SRF in dedicated plants and cement kilns and guidelines for application in Greece and Cyprus. Resources, Conservation and Recycling, 83, 34-43.
Slaski, R. J. and Maguire, S. and Al-Mahmood, A. (2013). European Maritime and Fisheries Fund 2014-2020 United Kingdom SWOT and needs assessment analysis. Dumfries, UK: Epsilon Resource Management Limited. 114 pp.
Tosun, Cevat. (2006). Expected nature of community participation in tourism development. Tourism Management, 27(3), 493-504.
Trujillo, A. M. (2005). Evaluation of the suitability of the karst region of north-centralPuerto Rico for the reintroduction of the Puerto Rican parrot (Amazona vittata). Thesis, University of Puerto Rico, Mayagüez, Puerto Rico.
Vaidya, Omkarprasad S. and Kumar, Sushil. (2006). Analytic hierarchy process: An overview of applications. European Journal of Operational Research, 169(1), 1-29.
Van Laarhoven, Peter. and Pedrycz, Witold. (1983). A fuzzy extension of Saaty's priority theory. Fuzzy Sets and Systems, 11(1-3), 229-241.
White, Thomas H. Jr. and Collar, Nigel J. and Moorhouse, Ron J. and Sanz D'Angelo, Virginia. and Stolen, Eric Douglas. and Brightsmith, Donald J. (2012). Psittacine reintroductions: Common denominators of success. Biological Conservation, 148, 106-115.
White, Thomas H. Jr. and de Melo Barros, Yara. and Develey, Pedro F. and Llerandi-Román, Iván C. and Monsegur-Rivera, Omar A. and Trujillo-Pinto, Ana M. (2015). Improving reintroduction planning and implementation through quantitative SWOT analysis. Journal for Nature Conservation, 28, 149-159.
Yu, Larry. and Huimin, Gu. (2005). Hotel reform in China: a SWOT analysis. Cornell Hoteland Restaurant Administration Quarterly, 46(2), 153-169.
Yüksel, İhsan. and Dağdeviren, Metin. (2007). Using the analytic network process (ANP) in a SWOT analysis - A case study for a textile firm. Information Sciences, 177(16), 3364-3382.
Zadeh, Lotfi A. (1965). Fuzzy sets. Information and Control, 8(3), 338-353.
Zadeh, Lotfi A. (1973). Outline of a new approach to the analysis of complex system and decision processes. IEEE Transactions on Systems, Man and Cybernetics, Part B: Cybernetics, 3(1), 28-44.
Zadeh, Lotfi A. (1994). Why the success of fuzzy logic is not paradoxical, IEEE Expert, 9(4), 43-45.
Zadeh, Lotfi A. (1996). Fuzzy logic = computing with words. IEEE Transactions on Fuzzy Systems, 4(2):103-111.
Zadeh, Lotfi A. (1997). Toward a theory of fuzzy information granulation and its centrality in human reasoning and fuzzy logic. Fuzzy Sets and Systems, 90(2), 111-127.
Zhao, Weilin. and Watanabe, Chihiro. and Griffy-Brown, Charla. (2009). Competitive advantage in an industry cluster: The case of Dalian Software Park in China. Technology in Society, 31(2), 139-149.
Zhang, Hanqin Qiu. and Chong, King. and Ap, John. (1999). An analysis of tourism policy development in modern China. Tourism Management, 20(4), 471-485.
Zhou, Lingxu. and Chan, Eric. and Song, Haiyan. (2017). Social capital and entrepreneurial mobility in early-stage tourism development: A case from rural China. Tourism Management, 63, 338-350.