



The difference of expert opinion on the forest-based ecotourism development in developed countries and Iran



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ARTICLE INFO

Keywords:
Ecotourism
Development
Forest
BOCR

ABSTRACT

Ecotourism development in a forest area includes many positive and negative aspects and requires a comprehensive study that can consider all simultaneously. Because of the inner and outer dependence or feedback links between the criteria in this research, the Analytical Network Process (ANP) based on the BOCR Model was used. Decision making and planning for the development of ecotourism is influenced by the attitude of experts towards development impacts. The question of this research was whether due to different environmental conditions in Iran, is it appropriate to follow ecotourism development patterns of developed countries? Given the different forest conditions in Iran, the weights of decision-making criteria for ecotourism development was significantly different for experts from Iran and developed countries. Weight difference for five sub-criteria, ECB2, ECB3, SOB4, ENC4 and, ENR2 were not significant, but for the rest of the sub-criteria were significant at 1% level. The results of comparing the mean weight values of the alternatives with an independent *t*-test indicated the difference was significant at 1% level. According to experts of the developed countries, ecotourism development with a weight of 0.927 and according to experts of Iran with a weight of 0.531 was prioritized.

1. Introduction

1.1. Iran's potentials for ecotourism development

Iran has over 1,648,000 square kilometers of land area, 1,880 km of the coastline in the Persian Gulf and the Oman Sea and 630 km of the coastline in the Caspian Sea. 14 different climates, the Alborz and the Zagros Mountains, several inland lakes, 20 islands in the Persian Gulf, 21 international wetlands, 9 biosphere reserves are part of the country's ability to develop ecotourism. Also, 320 mineral spas, 25 wildlife shelters, 9 million hectares of the protected area including 11 National Parks, 48 protected areas and 8 national natural sites, 285 forest parks, coral reefs, and numerous caves make up a vast array of Iranian natural attractions. The Hyrcanian forests are one of the last remnants of natural deciduous forests in the world. Widespread deserts, including Loot Desert as the unique area with no life in the world, the Shaddad Desert as the warmest desert in the world are other natural potentials in Iran. Iran, in addition, has the potential to make money through ecotourism because of its abundant natural attractions and the four-season climate. However, the tourism industry has been unsuccessful in Iran. Identification of potential areas for ecotourism and planning for these areas to interest people and create infrastructure for them is one of the

strategies for developing the ecotourism industry. Asadi (2011) showed that the ecotourism industry could be one of the most impressive forms of tourism in Iran. Despite all these potentials and raising demands for ecotourism in the world, Iran ecotourism's share in the global ecotourism market is low in spite of the vast range of attractions.

1.2. Ecotourism development positive effects

Among all forms of tourism, ecotourism is the representative of the most valuable form of development of sustainable tourism, because it is in close relation with natural resources and subcultures (Ștefănică and Vlavian-Gurmeza, 2010). Ecotourism development is may be followed by social, economic, and environmental benefits and costs (Zambrano et al., 2010). Ecotourism development is a way to make economical use of natural resources (Nyaupane and Poudel, 2011), which creates new jobs and economic opportunities (IUCN, 2012), (Jalani, 2012) including service jobs such as tour guide, hospitality, restaurant, and transport (Reimer and Walter, 2013). Also, the development of rural ecotourism improves social entrepreneurship and promotes the status of local businesses (Ahmad and Mara, 2014). The economic benefits of ecotourism development have a direct impact on the local people's support for the environment (Liu et al., 2014). Ecotourism development

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<https://doi.org/10.1016/j.landusepol.2020.104549>

Received 25 July 2019; Received in revised form 1 February 2020; Accepted 26 February 2020
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promotes the living standards, enriches various cultures, and improves regional infrastructure (Nyaupane and Poudel, 2011). Moreover, by improving access to information and greater participation of local people in various affairs, ecotourism can empower local people (Sutawa, 2012). Hence, ecotourism, as an alternative to the livelihood of local people, can protect forests (Eshetu, 2014), (Tang, 2015).

1.3. Ecotourism development negative effects

Despite the economic benefits, especially in developing countries, ecotourism development may be followed by unintended negative consequences for natural resources and wildlife (Zhou et al., 2013). Tourism has a close relationship with the environment; hence, if the assessment of environmental capability is properly done, it can modify the plans and prevent failures in sustainable tourism development (KianiSadr et al., 2019). An increased number of tourists in nature negatively changes the ecology (Martin, 2007). In forest areas, ecotourism development causes soil erosion and elimination of species, particularly herbaceous ones (Dixit and Narula, 2010). Human presence in forest areas can negatively affect their fauna and flora (Laudati, 2010), and increased transportation caused by ecotourism development may increase CO₂ content in the air (Buckley, 2004). Land-use change also exacerbates these negative effects (Laudati, 2010). However, it should be considered although ecotourism development can cause the socio-cultural promotion of local people, uncontrolled development may increase crimes and decline authentic cultures. Also, inflation of local prices, destruction of ancestral lands, value and behavioral changes and spread abnormalities and corruption are among the negative consequences of ecotourism development (Barkauskienė and Snieška, 2013).

1.4. Management and policy-making for ecotourism development

These positive economic, social, and cultural effects of ecotourism can persuade local people to support its development (Tuğba et al., 2011). Hence, proper planning in the field of sustainable ecotourism development can minimize the negative environmental effects and improve the conditions of natural resources through investment in conservation and forestry (Zambrano et al., 2010). Current strategies for tourism development in Iran are ineffective and a strategic approach to tourism development is absolutely essential and valuable (Golghamat Raad, 2019). Ecotourism development based on the capacity of each area will lead to the sustainable development of tourism (Joshi, 2014). All forest areas are not suitable for ecotourism development, and there should be some criteria for the identification and management of such areas (Dhami et al., 2014). It should be taken into account that the benefits of ecotourism development are not the same for everyone (Hsu-Cheng and Lin Jiun-Chuan, 2013) and ecotourism development cannot be the only way for the economic development of local communities (Coria et al., 2012). If ecotourism development is not managed properly, its negative effects will increase. Taking advantage of the experience of successful projects is the best way to achieve the most appropriate management practices (Coria and Calfucura, 2012). Proper management of ecotourism development will be achieved when all three aspects of natural resources, local communities, and tourists are considered simultaneously (Das and Chatterjee, 2015).

1.5. Choosing an effective decision making method

Understanding the relationship between ecotourism and the environment is of great importance due to the complexity of the interactions and environmental effects of tourism. Multi-criterion methods can be an effective tool for evaluating these relationships (Tang, 2015). According to the Table (1) there are many methods that can be used for MCDM.

The pairwise comparison methods are very useful to obtain the

weight of the different criteria and compare alternatives with respect to a subjective criterion. The Analytic Network Process (ANP) is a method that tries to solve the problem of the independence of the criteria. ANP allows for a representation of decision-making in a complex environment with a network structure (Lu et al., 2007). ANP is one of the most completed multi-criteria decision-making methods. This method was frequently used by the researchers for different purposes (Aragones-Beltran et al., 2010; Faraji Sabokbar et al., 2008). The network of attributes is shown in Fig. 1. In BOCR analysis, R (risk) represents factors that arise as a result of the development of the negative situation in the future while C (cost) represents factors that arise as a result of current loss or relatively predictable development of a negative situation.

The experience of ecotourism development varies in different parts of the world, and experts in each region have a special viewpoint for ecotourism development considering environmental, social, and economic conditions. The question of this research is whether due to different environmental conditions in the field of ecotourism development in Iran, it is appropriate to follow ecotourism development patterns in developed countries. The hypothesis of this research was that given the different forest conditions in Iran, the weight of decision-making criteria for ecotourism development is significantly different for experts from Iran and developed countries.

2. Material and methods

2.1. BOCR analysis

Due to the high inner and outer dependence or feedback links between the criteria in this research, Analytical Network Process (ANP) based on BOCR Model was used. In Super Decisions, we first created a top-level network that consists of a cluster containing the goal node and a second cluster containing the four merit nodes: Benefits (B), Opportunities (O), Costs (C) and Risks (R). There were three strategic criteria (Environmental, Socio-cultural and Economical) in the top-level network, which means that any weighting of the four merit nodes should be done concerning the strategic criteria. The BOCR nodes had sub-networks attached to them. Each sub-network was a decision network: it contains a cluster with the specific merit goal and a cluster with the two alternatives. Fig. 1 shows the complete model. At first, we rated each of the four BOCR merits. Second, we create and prioritize environmental, socio-cultural and economical strategic criteria for each of the BOCR, and finally, we created and prioritize the decision networks for each of these control criteria. To obtain the answer, we synthesized the priorities of the alternatives for opportunities, benefits, risks and then for costs. The alternatives were then prioritized. In this process, we used the reciprocals of the synthesized final priorities of the alternatives under costs and risks.

$$\frac{B_p * O_p}{C_p * R_p} \quad (1)$$

Where: B_p, O_p, C_p and R_p are the normalized overall priorities of the alternatives on benefits, opportunities, costs and risks respectively. As shown in Fig.2, in this research, after understanding the problem (a), first we identified alternatives, merits, strategic criteria and criteria (b). Then the model was developed based on inter-dependency (c,d) and the supermatrices for each criterion were obtained (e). Next, the questionnaires were made for paired comparisons within the clusters and their internal effects (g and h). Then the limited priorities were combined (i) and finally the preference of each criterion, strategic criterion, merits and, alternatives was determined. Outline of the BOCR is shown in Fig. 2.

2.2. Sampling and questionnaires developments

In this study, non-probability sampling (deliberate sampling) was used. Deliberate sampling is one of the non-probability sampling

Table 1
Multi-Criteria Decision-Making (MCDM) methods (Penadés Plà et al., 2016).

MCDM Group	MCDM Method	Reference
Scoring methods	Simple additive weighting (SAW)	Podvezko (2011)
Distance-based methods	Complex proportional assessment (COPRAS)	Podvezko (2011)
	Goal programming (GP)	Balletero (2007)
	Compromise programming (CP)	Opricovic and Tzeng (2004)
	Technique for order of preference by similarity to ideal solution (TOPSIS)	Podinovski (2016)
Pairwise comparison methods	Multicriteria optimization and compromise solution (VIKOR)	Podinovski (2016)
	Data envelopment analysis (DEA)	Görener (2012)
	Analytic hierarchy process (AHP)	Bana e Costa and Chagas (2004)
	Analytic network process (ANP)	Bana e Costa and Chagas (2004)
Outranking methods	Measuring Attractiveness by a Categorical Based Evaluation Technique (MACBETH)	Behzadian et al. (2010)
	Preference ranking organization method for enrichment of evaluations (PROMETHEE)	Govindan and Jepsen, 2016
	Elimination and choice expressing reality (ELECTRE)	Sarabando and Dias (2010)
Utility/Valuate methods	Multi-attribute utility theory (MAUT)	Shahin (2005)
	Multi-attribute value theory (MAVT)	Shahin (2005)

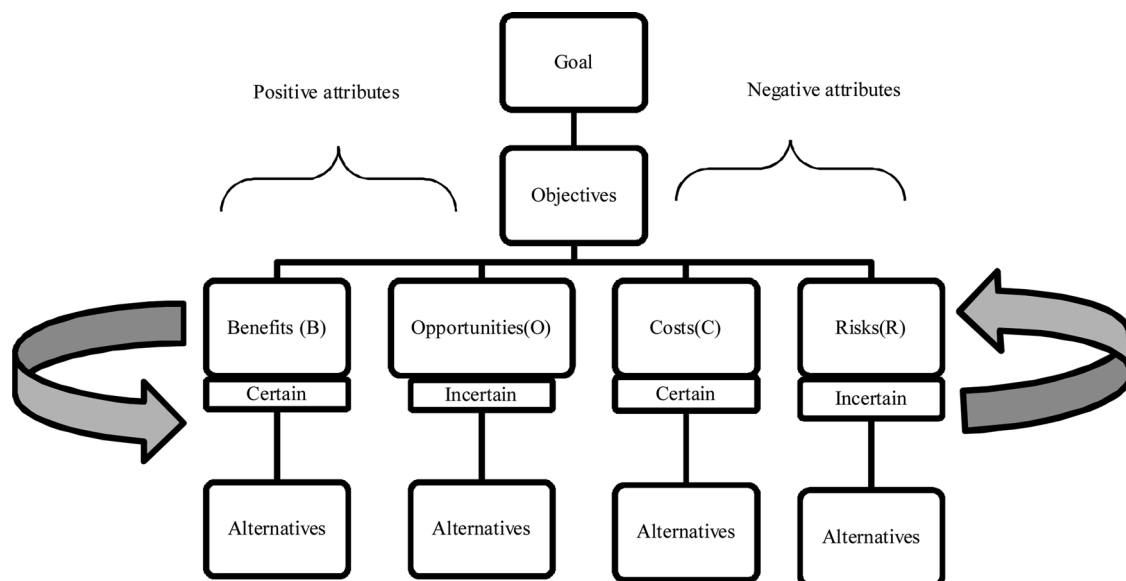


Fig. 1. Network of attributes.

methods in which individuals are selected as a class or category of researcher subject and are unselected at random. According to the objectives of the study, criteria affecting prioritization of research alternatives through library studies were identified and completed by a questionnaire and approved by experts. Questionnaires included (A) criteria selection and validation questionnaires (B) criteria prioritization and (C) alternatives prioritization questionnaire. To prioritize options, control criteria, criteria and, sub-criteria a paired comparison questionnaire was prepared and answered by experts through the interview method. Questionnaires were designed based on Saaty's 9-point scale for pairwise comparison in BOCR model. This scale is introduced in the Table 2.

2.3. Panel of experts

BOCR is a method that obtains data through surveys, and the results are dependent on panel selection. For this research, the panel was selected from two groups of experts. The first group of experts was selected from the experts of developed countries and the second group of experts from Iran. Professional backgrounds of professors were reviewed before the panel selection. Based on the history of researches, 60 experts from each group were invited to collaborate. For the first group, 34 experts and for the second group, 37 experts responded correctly to the questionnaires. In order to unify the number of questionnaires, three questionnaires were dropped randomly from the

second group. All experts were used to prepare the decision model and determine the components of the model. All components of the model were sent to experts and finalized after numerous reviews.

2.4. Alternatives

According to the definition given to the experts, two alternatives were chosen for the decision model. The development of ecotourism was a multilateral development involving economic, social and environmental indicators. To be done sustainably. This requires strong economic and management infrastructure. The second option (continuation of the current situation) was to increase the number of forest tourists in the same environment as is currently being done in Iran and in developed countries.

2.5. Statistical comparison tests

Independent Samples *t*-test was used to compare the values of the means from two samples of Iranian experts and developed countries. The independent samples *t*-test is a parametric test and compares the means of two independent groups to determine whether there is statistical evidence that the associated population means are significantly different.

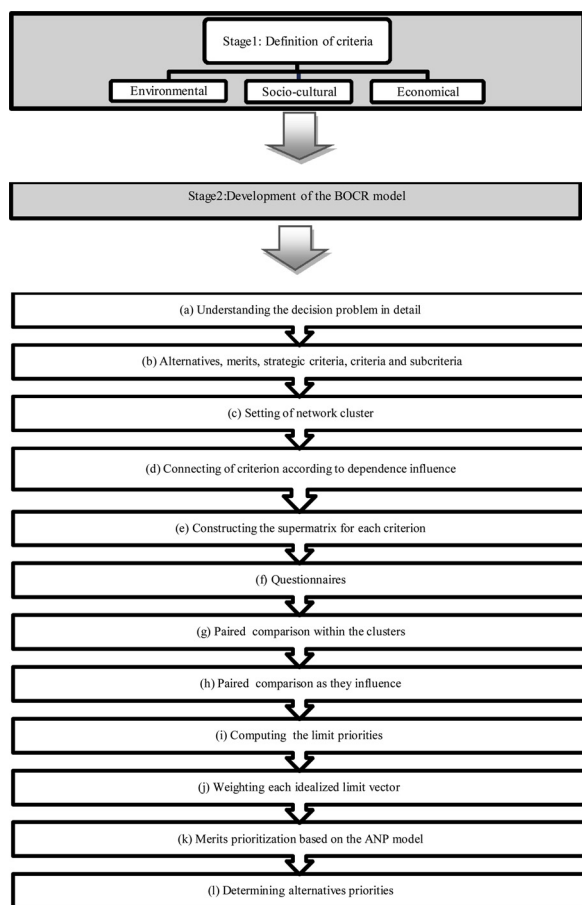


Fig. 2. Outline of the BOCR.

3. Results

The results of the determination of benefits, costs, opportunities, and risks of the development of ecotourism in forests, according to experts, as shown in Tables 3–6, there were 55 important criteria for evaluating the effects of ecotourism development. Developed model in *Super Decisions* software including three control criteria: socio-cultural, environmental, and economic. The model of ecotourism development effects is shown in Fig. 3–5. As can be seen, the benefits, opportunities, costs, and risks clusters include sub-criteria under control criteria. As shown in Figs. 3–5, according to the experts, the model includes two alternatives, four merits, three control criteria, and 39 sub-criteria.

3.1. Weights of strategic criteria

Comparison of the weights of the strategic criteria revealed that the panel of Iran considers economic strategic criterion (weight = 0.386) as the most important strategic criterion followed by socio-cultural and environmental strategic criteria. However, developed countries panel

Table 2
Meaning of the 1-9 scale (Saaty, 1977).

The left part of the 1–9 scale		Preference terms	Preference terms	The right part of the 1–9 scale
The values between 1/9 and 1, excluding 1, which refer to the non-preferred relations	1/9	Absolutely non-preferred	Absolutely preferred	9 The values between 9 and 1, excluding 1, which refer to the preferred relations
	1/7	Very strongly non-preferred	Very strongly preferred	7
	1/5	Strongly non-preferred	Strongly preferred	5
	1/3	Moderately non-preferred	Moderately preferred	3
Equal relation	1	Equally non-preferred	Equally preferred	1 Equal relation

Table 3
Weights of strategic criteria.

Strategic criteria	Developed countries panel	Iran
Economical	0.343	0.386
Socio-cultural	0.276	0.343
Environmental	0.381	0.271

Table 4
Weights of BOCR.

Merits	Developed countries panel	Iran
B	0.301	0.241
O	0.251	0.203
C	0.203	0.282
R	0.245	0.274

believe that environmental strategic criterion, weighing 0.381, is the most important strategic criterion and economic and socio-cultural strategic criteria are next in ranking with weights of 0.343 and 0.276, respectively.

3.2. Weights of BOCR

As shown in Table 4, according to the developed countries panel, the benefits and opportunities of ecotourism development had higher weights while its costs and risks weight less than the ones considered by the panel of Iran. The results proved that the developed countries panel has a more optimistic approach towards ecotourism development, which might be due to the successful experience of ecotourism development in the developed countries.

3.3. Global weights of sub-criteria related to the Benefits

As shown in Table 5, the increase in job opportunities (weight = 0.040) is more important for the developed countries panel compared to the panel of Iran (weight = 0.030). The panel of Iran believed that ecotourism development empowers local communities, and thus, they have considered higher weight for this sub-criterion. The three sub-criteria related to environmental benefits are weighted by developed countries panel as 0.044, 0.053, and 0.018, respectively which are higher than weights of 0.027, 0.029, and 0.010 assigned by the panel of Iran to these sub-criteria, respectively.

3.4. Global weights of sub-criteria related to the Opportunities

The weights for the economic and social opportunities sub-criteria assigned by the developed countries panel show no difference with the ones assigned by the panel of Iran. However, the weight of the development of eco-friendly infrastructures sub-criterion is double the one decided by the developed countries panel. Moreover, the weight of improvement of relations between local communities and executors of governmental plans sub-criterion (weight = 0.026), in the opinion of Iranian experts panel is more than developed countries panel (Table 6).

Table 5
Sub- criteria related to the Benefits.

Merits	Control criteria	Code	Criteria	Developed	Iran
Benefits	Economic	ECB1	The Increase in Job Opportunities	0.040	0.030
		ECB2	Improvement of the Livelihood of Local people	0.030	0.029
		ECB3	Development of Regional Infrastructures	0.033	0.035
	Socio-cultural	SOB1	Increase of Educational Opportunities	0.014	0.012
		SOB2	Improvement of Positive Social Interactions	0.013	0.009
		SOB3	Empowerment of Local Communities	0.025	0.035
		SOB4	Local People Contribution	0.028	0.027
	Environmental	ENB1	Development of Conservation Programs for Natural Resources	0.044	0.027
		ENB2	Improvement of Local People's Motivation to Maintain Natural Resources	0.053	0.029
		ENB3	Development of Environmental Studies	0.018	0.010

3.5. Global weights of sub-criteria related to the costs

The importance of the increase in household expenses, increase of unstable jobs, allocation of local facilities to tourists, the prevalence of social behaviors conflicting with regional traditions, increase of traffic and air pollution sub-criteria for the panel of Iran was significantly higher than the developed countries panel. However, the weight of change of ecosystem integrity sub-criterion in the developed countries the panel is perceptibly higher than the panel of Iran (Table 7).

3.6. Global weights of sub-criteria related to the risks

As shown in Table 8, the panel of Iran believed that the sub-criteria of non-use of regional strength to develop other industries, impose pressures higher than the social carrying the capacity of the region, expansion of security problems, reduction of animal species diversity and reduction of plant species diversity are higher importance whereas, the developed countries panel believed that increase of the likelihood of a fire and impose pressures higher than the ecological carrying the capacity of the region gained more weight.

3.7. The results of statistical comparison tests

Results of sub-criteria statistical analysis showed that for five sub-criteria, ECB2, ECB3, SOB4, ENC4, and ENR2 were not significant, but for the other 34 sub-criteria were significant at 1% level Table 9. In fact, there are about 87 % of the difference of opinion that is a considerable amount.

3.8. The sum of the sub-criteria weights for each control criterion under each merit

As shown in Fig. 6, the panel of Iran believed that EnR, EnO, EcO, and EnB. Studying the weight of the sub-criteria show that the developed countries panel frequently consider the combined weight of the benefits and opportunities sub-criteria to be higher than other sub-criteria whereas the panel of Iran often believed that the combined weight of the costs and risks sub-criteria must be higher, except for the environmental risks, which the developed countries panel believed in

Table 6
Sub- criteria related to the Opportunities.

Table 4Merits	Control criteria	Code	Criteria	Developed	Iran
Opportunities	Economic	ECO1	Increase of Investment in the Region	0.035	0.040
		ECO2	Market Boom of Handicrafts and Local Products	0.034	0.025
		ECO3	Allocation of Further Regional Budget	0.017	0.013
	Socio-cultural	SOO1	Prevention of Migration	0.050	0.045
		SOO2	Adjustment of Social Inequalities	0.017	0.024
	Environmental	ENO1	Development of Eco-friendly Infrastructures	0.050	0.025
		ENO2	Further Financial Support on Natural Resources Protection	0.020	0.015
		ENO3	Improvement of Relations between Local Communities and Executors of Governmental Plans	0.026	0.015

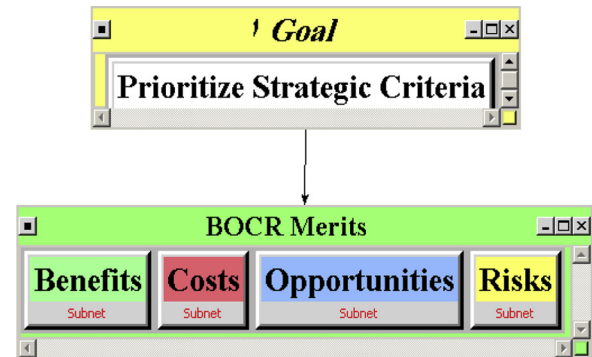


Fig. 3. The cluster of BOCR merits.

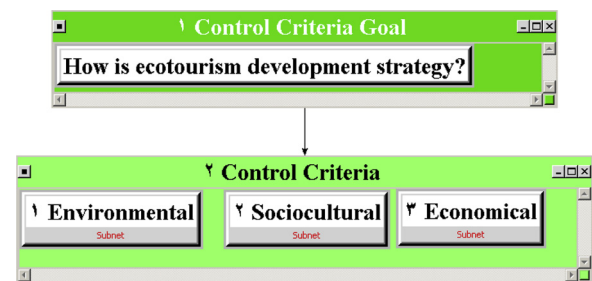


Fig. 4. Part of the model that is relevant to control criteria of benefits.

accepting significantly more weight.

3.9. The final weight of the alternatives

Fig. 7 shows that both panels prefer ecotourism development, But in the panel of developed countries, the weight difference of alternatives is greater. In fact, the panel of developed countries puts more emphasis on the development of ecotourism in forest areas.

The results of comparing the mean weight values of the alternatives with an independent t-test indicated the difference of alternatives between the two panels was significant at 1% level (table10).

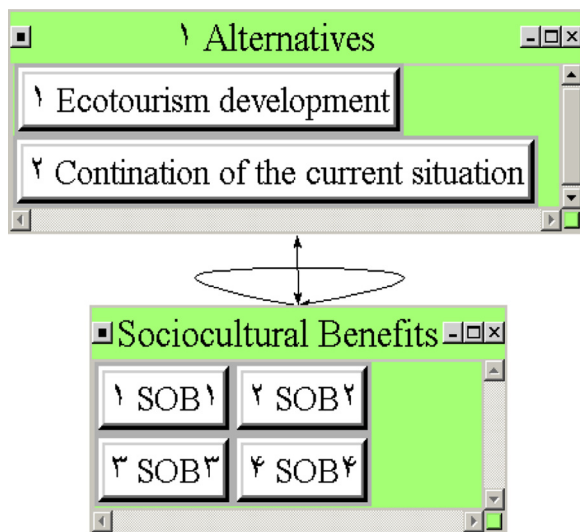


Fig. 5. Part of the model that is relevant to socio-cultural benefits.

4. Discussion

4.1. Benefits

The results show that the increase in job opportunities is one of the economic benefits of ecotourism development, whose weight in the developed countries panel is significantly higher than in the panel of Iran. Development of regional infrastructures is one of the economic benefits of ecotourism development, with both panels believing it to be important. The importance is specifically vital for remote forest areas, which fundamentally have limited infrastructural facilities, and it may lead to numerous economic and social benefits. Stronza (2010) concludes that the ecotourism development have direct economic efficiency and improves natural resources protection motivation. Experts consider the empowerment of local communities as one of the socio-cultural benefits of ecotourism development in forest areas. Research results show that the panel of Iran considers this criterion to be of higher importance. Another socio-cultural benefit of local people contribution is that this may have considerable impacts on regional development and natural resources protection (Situmorang and Mirzanti, 2012) studied an appropriate method for ecotourism development and focused on regional ecotourism potentials including human, culture, and governmental support. They found that the development of ecotourism regions should be accompanied by the empowerment of local communities based on training, social entrepreneurship and, culture preservation programs. Social entrepreneurship may lead to social changes for better welfare and education. The results of developed countries panel show that the environmental benefits are among the most important benefits of ecotourism development, and they have

assigned a significantly higher weight to these benefits. According to the experts' opinions, ecotourism development leads to the development of natural resources protection programs and increases local people's motivation to preserve them. It also expands environmental studies (Wunder, 2000) showed that economic activities are necessary for natural resources protection, and economic benefits can be considered as intensives motivating local people to contribute in protective and supportive plans (Stronza, 2007) and (Brandt et al., 2012) conclude that ecotourism development in forest regions plays a crucial role in their protection.

4.2. Opportunities

As Table 4 shows, an increase in investment is the most important economic opportunity resulted from ecotourism development. Opportunities regarding market boom of handicraft industries, local products, and local budget allocation are next in ranking. One of the positive effects of ecotourism development is the protection and propagation of local cultures (Reimer and Walter, 2013). The results showed that local people would have little tendency to migrate to larger cities with the development of ecotourism in forest areas. They believed that this issue was the most important socio-economic opportunity resulted from ecotourism development. Our results also showed that ecotourism development leads to the reduction of social inequalities. Tang (2015) Concluded that the improvement of the social welfare of indigenous communities is one of the positive effects of ecotourism. Development of eco-friendly infrastructures is considered one of the environmental opportunities. The important point is that the weight considered by the panel of Iran for this issue is double the weight considered by the panel of Iran. Improvement of the relations between local communities and executors of governmental plans is among the opportunities of ecotourism development that is very important. On the other hand, the panel of Iran is more pessimistic about receiving further financial support on natural resources protection.

4.3. Costs

The increase of household expenses perceived by the panel of Iran specifically exceeds the ones considered by the developed countries panel. Generally, this issue is one of the costs for ecotourism development. After that, the land cost increase is important that will incur ((Barkauskienė and Snieška, 2013) also introduced inflation of local costs and destruction of ancestral lands as the consequences of ecotourism development. Experts believe that the allocation of local facilities to tourists may be considered as the most important socio-cultural cost of ecotourism development in forest areas. The panel of Iran believes that the weight of this cost is much higher and consider it more important than the ones in the developed countries panel. Expansion of social behaviors conflicting with regional traditions is more important for the experts of the panel of Iran. The experts of both panels believe that land-use change is the environmental cost of ecotourism

Table 7
Sub-criteria related to the Costs.

Merits	Control criteria	Code	Criteria	Developed	Iran
Costs	Economical	ECC1	Increase of Household Expenses	0.028	0.050
		ECC2	Endangerment of Agricultural Jobs	0.010	0.009
		ECC3	Increase of Unstable Jobs	0.006	0.020
		ECC4	Increase of Land Price	0.025	0.030
	Socio-cultural	SOC1	Allocation of Local Facilities to Tourists	0.045	0.069
		SOC2	The prevalence of Social Behaviors Conflicting with Regional Traditions	0.009	0.024
	Environmental	ENC1	Increase of Water Pollution	0.010	0.012
		ENC2	Soil Erosion	0.006	0.009
		ENC3	Change of Ecosystem Integrity	0.020	0.015
		ENC4	Change of Land Use	0.029	0.024
		ENC5	Increase in Traffic and Air Pollution	0.012	0.019

Table 8
Sub- criteria related to the Risks.

Merits	Control criteria	Code	Criteria	Developed	Iran
Risks	Economical	ECR1	Non-use of Regional Strengths to Develop other Industries	0.038	0.056
		ECR2	Profit Outflow by Non-native Investors	0.046	0.050
	Socio-cultural	SOR1	Change of Traditional Lifestyle of Local People	0.011	0.014
		SOR2	Impose of Pressures Higher than the Social Carrying Capacity of the Region	0.037	0.049
		SOR3	Expansion of Security Problems	0.018	0.031
	Environmental	ENR1	Reduction of Animal Species Diversity	0.013	0.019
		ENR2	Increase of Destruction of Natural Ecosystems	0.025	0.022
		ENR3	Increase of the Likelihood of a Fire	0.031	0.018
		ENR4	Impose of Pressures Higher than Ecological Carrying Capacity of the Region	0.024	0.016
		ENR5	Reduction of Plant Species Diversity	0.038	0.056

Table 9
The difference between the mean weight values of the sub-criteria in terms of Iranian experts and developed countries at 1% level.

Code	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
ECB1	2.960	66	.004	0.0074	0.0025
ECB2	.914	66	.364	0.0019	0.0021
ECB3	-1.022	66	.310	-0.0024	0.0023
SOB1	4.377	66	.000	0.0024	0.0006
SOB2	7.764	66	.000	0.0044	0.0006
SOB3	-3.563	66	.001	-0.0077	0.0022
SOB4	-7.741	66	.461	-0.0016	0.0021
ENB1	21.629	66	.000	0.0166	0.0008
ENB2	16.360	66	.000	0.0288	0.0018
ENB3	12.769	66	.000	0.0087	0.0007
ECO1	-8.879	66	.000	-0.0050	0.0006
ECO2	13.401	66	.000	0.0077	0.0006
ECO3	8.003	66	.000	0.0046	0.0006
SOO1	8.791	66	.000	0.0049	0.0006
SOO2	-9.752	66	.000	-0.0072	0.0007
ENO1	51.421	66	.000	0.0252	0.0005
ENO2	10.275	66	.000	0.0050	0.0005
ENO3	8.835	66	.000	0.0110	0.0012
ECC1	-15.919	66	.000	-0.0209	0.0013
ECC2	2.865	66	.006	0.0011	0.0004
ECC3	-10.165	66	.000	-0.0149	0.0015
ECC4	-6.179	66	.000	-0.0065	0.0010
SOC1	-18.448	66	.000	-0.0229	0.0012
SOC2	-14.404	66	.000	-0.0144	0.0010
ENC1	-5.924	66	.000	-0.0023	0.0004
ENC2	-4.232	66	.000	-0.0025	0.0006
ENC3	3.579	66	.001	0.0038	0.0011
ENC4	1.234	66	.222	0.0020	0.0016
ENC5	-6.515	66	.000	-0.0066	0.0010
ECR1	-16.871	66	.000	-0.0202	0.0012
ECR2	-2.824	66	.006	-0.0035	0.0012
SOR1	-4.211	66	.000	-0.0026	0.0006
SOR2	-14.548	66	.000	-0.0130	0.0009
SOR3	-10.451	66	.000	-0.0131	0.0013
ENR1	-6.422	66	.000	-0.0072	0.0011
ENR2	0.639	66	.525	0.0009	0.0015
ENR3	6.271	66	.000	0.0127	0.0020
ENR4	3.486	66	.001	0.0059	0.0017
ENR5	-9.486	66	.000	-0.0233	0.0025

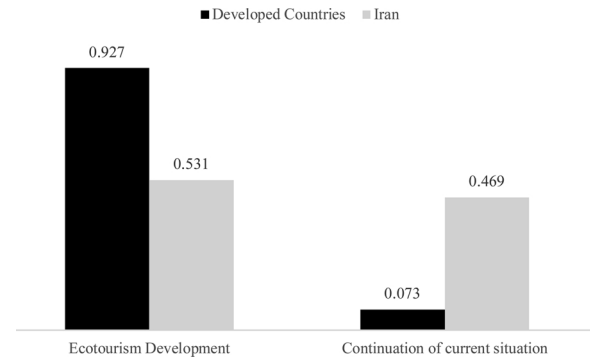


Fig. 7. The final weight of the alternatives.

development in forest areas. Change in ecosystem integrity ranked second in the order of importance with the developed countries panel considers. However, (Barkauskienė and Snieška, 2013) proved that ecosystem integrity is among the advantages of ecotourism development.

4.4. Risks

The panel of Iran believes that non-use of regional strength to develop other industries is the economic risk which may occur with the development of ecotourism. The panel of Iran also believed that socio-cultural risks are highly important. Research results showed that impose of pressures higher than the social carrying the capacity of the region is the socio-cultural risk followed by expansion of security problems. Residents had a high sensitivity to social and cultural issues (Ramchurjee and Suresha, 2013). Reduced plant species diversity is considered the most important the environmental risk with the panel of Iran, considering it significantly more important. Increase of destruction of natural ecosystems and increase of the likelihood of a fire may occur due to ecotourism development (Joshi, 2014) believes that acceptance of ecotourism based on environmental carrying capacity will lead to sustainable tourism development and non-compliance with the carrying capacity of ecotourism development may increase the risk of biodiversity endangerment.

4.5. Ecotourism development

Stronza (2007) studied two ecotourism projects in Brazil and Peru. Both projects proved that ecotourism development improves natural resources protection. Reviewing 251 papers on ecotourism, (Kruger, 2005) realized that ecotourism development, together with planning, appropriate management, and local contribution, might maintain species diversity. According to the research results, the maximum differences were found on environmental benefits, environmental opportunities, economic costs, socio-cultural costs, and socio-cultural risks, respectively. Generally, the developed countries panel was highly

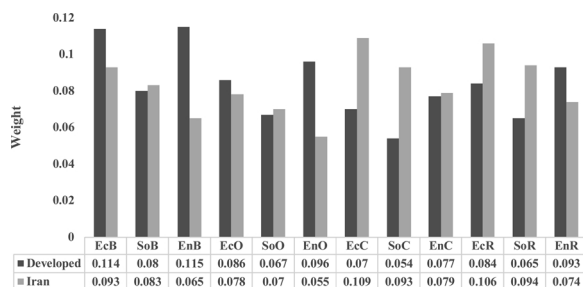


Fig. 6. The sub-criteria weights for each control criterion under each merit.

Table 10

The difference between the mean weight values of the alternatives in terms of Iranian experts and developed countries at 1% level.

	Levene's Test for Equality of Variances		t test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Ecotourism Development	43.205	.000	21.403	65	.000	.39264	.01834
Current Situation	57.177	.000	-20.531	65	.000	-.38146	.01858

optimistic about environmental benefits and environmental opportunities, and the panel of Iran was more pessimistic about economic costs, socio-cultural costs, economic risks, and socio-cultural risks (Zhou et al., 2013) studied ecotourism intensives for development and suggested that ecotourism may have unwanted negative consequences in regards to wildlife protection in protected areas despite economic advantages, especially the panel of Iran. Finally, the global demand for ecotourism is increasing. The high weight of environmental risks indicate that if suitable planning is not provided for development with consideration of all protective and supportive aspects of natural resources, the richness of (animal and plant) species diversity will be threatened (Bhuiyan et al., 2011) studied the issues and strategies of ecotourism development in the Malaysian restored forest areas. They pointed out that ecotourism should be planned in natural areas according to their specific biological, environmental, and cultural conditions (Joshi, 2014) also concluded that acceptance of ecotourism based on the environment carrying capacity would lead to sustainable tourism development. On the other hand, ecotourism development leads to understanding the value of the environment and may promote responsive environmental behavior of tourists (Chiu et al., 2014).

5. Conclusion

The results show that ecotourism development in a forest area has many positive, and negative aspects and an appropriate decision cannot be made about it without a comprehensive study. Economic, social, cultural, and environmental problems should be taken into consideration. Understanding the relationship between ecotourism and environment is important due to the complexity of interactions and environmental effects of tourism. Multi-criteria methods may be an effective tool for evaluating these relationships (Tang, 2015). On the other hand, research results show that environmental conditions and experts' experiences in ecotourism affect the final results of decision-making results. Since the economic, social, cultural, and environmental conditions the panel of Iran are different from the ones of the developed countries, the importance of benefits, opportunities, costs, and risks of ecotourism development in forest areas varies. The benefits and environmental opportunities are more important in the developed countries, and the managers in this field might have been able to achieve good results on ecotourism development. On the other hand, economic and social costs are more important in Iran. Since natural resources are endangered in the panel of Iran due to the absence of an alternative for local people livelihood, diversifying people's livelihood may minimize pressure on natural resources. Ecotourism is introduced in this context as an economic activity, which both diversifies livelihood of people and provides sustainability of natural resources management (Eshetu, 2014). Such differences will make the development strategy in the forest areas of the panel of Iran to be different from the one in the developed countries. The significance of this research lies in the fact that the results prove that it would be impossible to make the right decision on ecotourism development in forest areas from a one-dimensional economic, social, and environmental point of view. Concerning the various aspects of ecotourism development, it is predicted that a successful ecotourism development would practically require the inclusive cooperation of different organizations including local governments, the contribution of local people and NGOs. According to the

results of this study, it is recommended to determine the ecological range of forest areas for the development of ecotourism due to the significant weight of environmental risks, so that the influx of tourists into these areas will not damage the ecosystem and remain stable. It is suggested that an appropriate approach for the strategic development of ecotourism in the forested areas of Iran be determined taking into account all economic, social and environmental aspects and based on the principles of sustainable development. It is also suggested to establish suitable areas for centralized and extensive ecotourism development in Iran's forested areas taking into account economic, social and environmental criteria and by precise multi-criteria decision-making methods.

Acknowledgments

This study was supported by grant No. 31/dr/19 from Urmia University.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.landusepol.2020.104549>.

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