



Ecological Tourism Development in the Mountainous Regions and Historical Railway Network Capacities. Case Study: Tehran-Mazandaran Old Railway by Crossing the Alborz Mountain Range

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Abstract. Ecological tourism or ecotourism (in abbreviation) is a form of tourism intended to have a low impact on the environment and is based on the principles of sustainability in natural and historical areas with conservation characteristics. Railway tourism can be a form of ecological tourism that occurs in areas with presence of the railroad network, due to its novelty and to the proximity to natural and cultural heritage in the humid and rainy climate. This form of tourism can attract many tourists from all around the world. The methodology of this study is descriptive and analytical, and initially, characteristics and requirements have been explained with resources and library studies. The required infrastructures are the main base of tourism, one of the most significant of which, is the current situation of the transportation system (railway network). The main aim of this study is the introduction of railway tourism as a strategy for development of railroad settlements in north of Iran with ecological and sustainable tourism. As the second aim, the most significant criteria of the railway-tourism were extracted from theoretical foundation and in addition, they were prioritized based on the AHP (Analytic hierarchy process) method. Moreover, in order to understand the restrictions and main problems of the local people, interviews have been conducted. In the following section, Tehran – Mazandaran impassable mountainous railway has been introduced, which passes through the Alborz Mountains. This route has the majority of unrivalled natural and cultural attractions, traditional habitation, and rural settlements. Despite recent spatial changes in Iran, these regions remained original and traditional. Interestingly, the railway is the only accessible transport to some of these settlements, without destructive effect on the environment. As a result, the substantial criteria were specified, and the basic issues and limitations of the locals' life have been explained from survey and interviews. Consequently, a direct relationship has been detected between railway tourism and railroad habitation development in Tehran – Mazandaran railway that contains social, economic, physical and demographic studies. Eventually, it could be easily realized which railway-tourism has the lowest ecological impacts despite other types of tourism in natural and rural areas. Therefore, every kind of effort from researchers to authorities in this field could be helpful in order to protect our environment.

Keywords: Sustainable ecotourism, mountainous region, historical railway, Alborz mountain range, Railway-tourism

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Abstract. Le tourisme écologique ou écotourisme (en abréviation) est une forme de tourisme conçue comme à faible impact sur l'environnement et basée sur les principes de durabilité dans les zones naturelles et historiques avec des caractéristiques de conservation. Le tourisme ferroviaire peut être une forme de tourisme écologique qui peut se produire dans des zones où le réseau ferroviaire est présent. En raison de sa nouveauté et de sa proximité avec le patrimoine naturel et culturel dans le climat humide et pluvieux, cette forme de tourisme peut attirer de nombreux touristes du monde entier. La méthodologie de cette étude est descriptive et analytique et d'abord les caractéristiques et les exigences ont été expliquées avec des ressources et des études de bibliothèque. Les infrastructures nécessaires sont la base principale du tourisme, dont l'une des plus importantes est la situation actuelle du système de transport (réseau ferroviaire). L'objectif principal de cette étude est l'introduction du tourisme ferroviaire en tant que stratégie de développement des foyers d'habitation ferroviaire dans le nord de l'Iran avec un tourisme écologique et durable. Comme deuxième objectif, les critères les plus significatifs du tourisme ferroviaire ont été extraits du fondement théorique, en outre, leur priorité a été spécifiée par des experts au travers de la méthode AHP (Analyse Hiérarchique des Procédés). De plus, afin de comprendre les restrictions et les principaux problèmes de la population locale, des entretiens ont été menés. Ensuite, le chemin de fer de montagne infranchissable Téhéran - Mazandaran, qui traverse les montagnes d'Alborza, a été introduit. Cette route a beaucoup d'attractions naturelles et culturelles inégalées, des habitations traditionnelles et des établissements ruraux. Malgré les récents changements spatiaux en Iran, ces régions sont restées originales et traditionnelles. Fait intéressant, le chemin de fer est le seul moyen de transport accessible à certains de ces foyers d'habitation, sans effet destructeur sur l'environnement. En conséquence, les critères substantiels ont été spécifiés et les problèmes fondamentaux et les limites de la vie locale ont été expliqués à partir d'enquêtes et d'entretiens. Une relation directe a été détectée entre le tourisme ferroviaire et le développement de l'habitat ferroviaire le long de la voie ferrée Téhéran - Mazandaran qui contient des études sociales, économiques, physiques et démographiques. Finalement, on pourrait facilement se rendre compte que le tourisme ferroviaire a les impacts écologiques les plus faibles malgré d'autres types de tourisme dans les zones naturelles et rurales. Par conséquent, tous les efforts des chercheurs jusqu'aux autorités dans ce domaine pourraient être utiles afin de protéger notre environnement.

Mots-clés : écotourisme durable, région montagneuse, Infrastructure ferroviaire, chaîne de montagnes de l'Alborz, tourisme ferroviaire

1. Introduction

Heritage conservation has gained substantial popularity, meanwhile, in order to protect and fewer interventions and also economic and social development, ecotourism as the environmental tourism strategy has brought in the late 80's decade (Honey, 2008). Tourists usually are looking forward an environment in which, they could find their peace. Moreover, they would be fascinated by nostalgic places, which carry memories of the past. Accessibility and transportation play important roles in the tourism industry, which means transportation infrastructures and tourism are two inseparable aspects with the cross-effect. The Quality of the transportation infrastructures and facilities has the enormous influence on the number of tourists, which act as a gate for them (Bhati, Pryce and Chaiechi, 2014).

Railway as the transporter of people and goods was the basic stimulus for the development of cities after industrial revolution. Railways played a considerable role in economic, social, cultural and physical development; hence this has caused railways considered as the industrial heritage and tourism attraction. Rail routes (historical ones), those which have the noteworthy past, would develop the sustainable tourism, as one can observe in England. Meanwhile train is more safe, more comfortable and less expensive than other transports, it can be considered as one of the best means of transport for tourism industry (Halsall, 2001).

Tehran-Mazandaran railway is in the middle of the north to west route, which is the first implemented rail route in Iran. This route connected the Shahpoor port beside the Persian-gulf, to the Torkaman port in the coast of the Caspian-sea, finished in 1941. The case-study route could gain significant attraction due to the fact that it passes from the multi-climate and impassable mountainous and woodsy area, which contains variety of natural, cultural and rural attraction. The tourism railway starts from Tehran and passes Through the Alborz Mountain and also many tunnels and bridges during the way, which has enhanced the attraction twice (Farahbakhsh and Hanachi, 2015). The route finishes with the coast of the Caspian-sea in Mazandaran. These coasts and the north region of the Iran has attracted many tourists, in light of the humid and rainy climate. The large number of tourists influenced in the rate of occupation in the north region (Farahbakhsh and Hanachi, 2015).

In today's societies, the tendency to tourism has been increased among the people owing to improvement in welfare and development of transportation infrastructures. Railway-tourism which has not the so much history in Iran, has attracted significant numbers of tourists at the short time. The current railroad passes through the pristine and spectacular natural areas. However, the surrounding habitations approximately are empty of population or have few numbers of habitats, the local people situation significantly matters.

This research attempts to expose a strategy in ecological tourism field, to reduce the impacts in which the environment has been taken from tourism industry. Because, by neglecting these impacts, irreparable damage could threat the environment. Damages in which, their impacts may can be seen after a considerable time. Climate change, water shortage, deforestation and extinction of species are the most dangerous damages could happen by the mentioned threads.

Consequently, introducing the main criteria and recognition of most effective factors in railway-tourism and its effect on local community development, are the most important results of the research.

2. Literature review

Similar research in railway-tourism field rarely could be found, nevertheless still a few studies are in which ecotourism and railway related activities can be seen at the Table 1.

Table 1. Railway-tourism sub-criteria repetition by field studies

Research title	country	Study area	Key points	Reference
Effects of Turkish railway museums on cultural tourism	Turkey	Railway heritage	- explanation of the railway history and its value	Akbuluta and Eyup, 2011
Exploring the railway effect as the industrial heritage	Iran	Railway heritage	- Exploring the railway effect on tourism development - Railway as industrial heritage	Farahbakhsh and Hanachi, 2015
Train-tour a strategy in Iran Railway	Iran	Train-tour	- definition of the train-tour - Potential of the railway-tourism in Iran	Fakhraee et al., 2017
Sustainable ecotourism indicators with fuzzy Delphi method – A Philippine perspective	Philippines	ecotourism criteria	- Determination of difference between sustainable tourism and ecotourism - Explaining the 39 criteria for ecotourism	Ocampo et al., 2018

Source: authors

As it can be seen in Table 1, there are some of the most important studies, which are related to railway-tourism research area. The majority of them have noticed to the effect of railway industry on tourism industry which, easily could be understood. Initial research about the railway-tourism has started with railway heritage. Akbuluta & Eyup and Farahbakhsh and Hanachi have mentioned in their studies, which old railroads could be considered as new centre of attention for tourist owing to its attractiveness and history behind (Akbuluta and Eyup, 2011; Farahbakhsh and Hanachi, 2015). Lately the railway-tourism and train tour were defined by Fakhraee and et al, nonetheless there are substantial dimensions in which are ignored and neglected. Recently, Ocampo and et al has defined the criteria in ecotourism, but still there is a gap between railway and tourism to be completely understand the concept of railway-tourism. To this end, authors of this research has decided to fill this gap by define the criteria of the railway-tourism and its effect on the surrounding area development.

3. Methodology

To reach the main purpose of this study, theoretical-basis study, about the ecological tourism and reviewing some experiences from the Iran and some successful plans

throughout the world was explored. Then, Tehran-Mazandaran railway-tourism has been investigated. After studies and investigation, the main criteria of case-study's capacities by purpose of railway settlements development, have been extracted.

In the meantime, there would be a question about the effect of the ecological railway tourism on local communities, thus this research's goal would be empirical and also an applied study. Also, the method is description and analysis of the railway-tourism characteristics and natural attractions of the mountainous region, for ecotourism prosperity and enhancing local occupation, which contains a less intervention in the environment with at least damaging implications. The method supposed documentary and library studies and also fieldwork. Firstly, criteria extracted from the two significant subjects: Railway heritages and ecotourism. Secondly, in the field-study a survey has done with the personal interview with specialists and authorities and also local community. Thirdly, conclusion was made by just experts' decision, by setting score to each criterion in order to choose the most effective criteria.

Therefore, Analytical Hierarchy Process (AHP) method is selected to prioritize the criteria. For this purpose, AHP questionnaire has been designed in which 20 experts and specialists (according to Table 1) used pairwise scoring to score the criteria and sub-criteria (according to Table 2), in order to specify the intensity of importance of each criteria. Finally, given scores have been calculated in Expert-choice software.

Table 2. Three groups of experts in survey

Experts' groups
Active specialist in tourism industry
Professors of tourism management field
Current authorities (local and governmental)

Source: authors

Table 3. Intensity of importance of pairwise comparison (Saaty, 1980).

Intensity of importance	Definition
1	Equal importance
3	Somehow more important
5	Much more important
7	Very much more important
9	Absolutely more important
2,4,6,8	Intermediate values

Source: authors

Using the experts' idea would not be enough to determine about planning the local settlements development. To this end, an open and simple interview has done with local people in order to perceive and understand the main obstacles and

significant limitations. The results extracted from the interview and the questionnaire play an effective role in final deduction.

4.The Theoretical-Basis of railway-tourism characteristics

4.1. The concept of tourism and ecotourism

World Tourism Organization has defined tourism as: All people's activities, which they do out of their environment at their leisure time in order to enjoy and do every relevant work in less than one year. Four effective factors in tourism industry regarding to Figure 1 are: tourist, host community (city, village), destination's features and facilities providers. These 4 factors must be integrated to have meaningful result (Farajirad and Aghajani, 2009). Nowadays, environmental conservation is getting crucial importance with the industrial development. Ecotourism is the best approach for responding this phenomenon. Ecotourism is a responsibility to preserve the environment against outer threats. The main purpose of this kind of tourism is protection from the natural and cultural heritage and also accompanied with profit to the local community economy (Reihanin et al., 2015; Scheyvens, 1999).

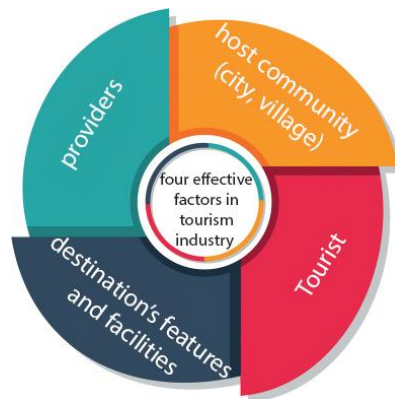


Figure 1: Four effective factors in tourism industry

Source: Farajirad and Aghajani, 2009

4.2. Railway-tourism capacities

The role of the railroad as the social, economic, political, cultural, historical and technical perspective of countries is not irrevocable. These features make railroads distinctive from the other means of transport. The long history and significant role in the development has caused the new identity for the railroad as the industrial heritage. Some of these routes are abandoned or less used after years, nevertheless, they can be used as the Railway-tourism, which could have considerable economic benefit. This process would be a kind of revitalization, which contains using of old

infrastructures, like the same way in the England, by having 7.9 million visitors in 2008 and nearly 80 million dollars income (Inhyuck and Grunwell, 2011).

Railway-tourism is one-of-a-kind form of tourism, which takes place in the pristine environment with scarce phenomenon and fantastic views by rail infrastructure. Tourists are able to visit the attraction inside or outside of the train, while they are using the tourism facilities. Train-tour is the third form of the train function, in addition passengers and goods transfer. In these trains, speed and time are 2 elements due to which the tour type could be different:

Based on the path: to see the natural sight and attractions during the way in train (low speed, long time).

Based on the destination: to visit historical and natural sites in the destination out of the train (higher speed, less time). (Fakhraee et al., 2017)

4.3. The connection between Railway-tourism and cultural, natural and rural heritage

Tourism is depended on surrounding area usage, for this reason, has positive and negative effect on environment. This connection is reciprocal not linear, which is one of the natural region's development items (Ghanbari and Abdi, 2018). The tourism could play a remarkable role in moderate the preservation of the natural areas such a regional park, because they are a part of the tourism attraction. Railway-tourism can conserve the historical places by increasing the number of visitors, which would catch more attention of authorities and public. Conservation and increasing of public's awareness in order to environment responsibility are the next advantages of the Railway-tourism. Other advantages are limitation of the construction area, considering species and biodiversity, increasing the sensibility of cutting down the trees, reducing the pollution, enhancing the infrastructure quality. Also, there are some negative effects, some of which are: population growth in the host regions, increasing the foot print in the natural area, increasing the risk of shortage of water supplies, building the second rural house and luxury villa by townspeople. All of the negative points could turn to the positive one by implementing limitation and prevention (Kheyroddin, Bridel and Ruegg, 2018).

4.4. Railway-tourism criteria extraction

Considered sub-criteria in field of interaction between railway-tourism and railway settlements are chosen from the railway heritages and ecotourism studies, in view of the numbers they have been repeated. These sub-criteria are classified in 5 wider groups, called main criteria, which are: local communities' development, environmental conservation, tourism economy, tourism management, infrastructures capability. Chosen criteria are combination between positive and negative factors,

which have the most efficiency with railway-tourism. The positive sub-criteria by increasing and the negative ones by decreasing must cause the development in rural settlements beside the railway. The repetition of the criteria based on several researchers could be seen at Table 4.

Table 4. Railway-tourism Sub-criteria repetition by field studies

Researchers	Stefan Gossling	Regina Scheyvens	Abhishek Bhati	Oliver Kruger	Inhyuck Steve Ha	Stefan Saggel	Morteza Farahbakhsh	David A. Halsall
Criteria								
Physical Intervention	•	•						•
Public perception	•	•	•	•				
Local Occupation	•			•	•			•
Biodiversity Preservation	•	•		•	•	•	•	
Damage measurement to nature	•	•		•	•	•		•
Investment's amount				•				
Financial benefits			•	•			•	•
Effective Planning	•		•		•			
Stakeholders' collaboration	•		•		•			•
Old infrastructures reuse			•		•		•	•
New infrastructures			•					

Source: authors

The definitions of each sub-criteria are:

Physical Intervention: This sub-criterion is related with the amount of unconventional and irrelevant in the physical form of host areas (Gossling, 1999).

Public perception: How much publicity and agreement could have been gained in the local communities (Bhati, Pryce and Chaiechi, 2014).

Local Occupation: The rate of occupation and job opportunities in the local communities, which has the great influence in the rural sustainable development (Hass and Grunwell, 2011).

Biodiversity Preservation: Is the complex of activities, which consists of woods and grasslands conservation against of predictable dangers by people, in addition species preservation against extinction (Gossling, 1999).

Damage measurement to nature: measuring the damage and rate of pollution and other disadvantages to the nature (Scheyvens, 1999).

Investment's amount: Investment's amount in tourism should be significant reasonable, which could be provided by government, people or private sector (Inhyuck and Grunwell, 2011).

Financial benefits: This sub-criterion specifies the financial profits of the one activity against its loss (Bhati, Pryce and Chaiechi, 2014).

Effective Planning: A productive and flexible planning is the primary part of every practical action (Gossling, 1999).

Stakeholders' collaboration: This subject contains attracting considerable number of experts such as authorities, investigators, and different organs (Bhati, Pryce and Chaiechi, 2014).

Old infrastructures reuse: using the capacity of Remained and abandoned equipment and building from the past (Farahbakhsh and Hanachi, 2015).

New infrastructures: new infrastructures implementation depends on the capacity of the specified region, and what are the priorities and necessities (Farahbakhsh and Hanachi, 2015).

The AHP hierarchy of criteria and sub-criteria basis to the goal is showed in Figure 2.

These criteria will be used for the analysis of the railway-tourism capabilities in rural settlement development reinforcement.

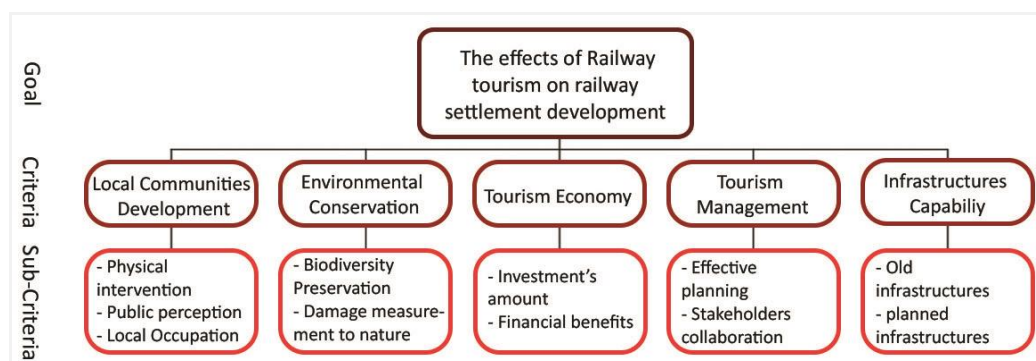


Figure 2. Goal, criteria and sub-criteria of the railway-tourism effects on railway settlement

Source: authors

4.5. Railway-tourism world experiences

Ecological tourism based on railroad has just a few samples throughout the world due to its special conditions. Looking at some practical experience would have some lessons to learn and important points to notice. In the following some of the most significant experience has been mentioned.

European Federation of Museum and Tourist Railways (FEDECRAIL)

The FEDECRAIL activity has started since 1994 in Brussels. This organization joined the other European countries in order to conserving the railway historical heritage.

Main goals of the federation:

- Upgrading the reconstruction and exploitation of the European railway heritage
- Encourage the exchange of ideas across national and cultural borders and promote cooperation between museums and tourism railway organizations, including museums in the field of railway heritage.
- Advising and assisting similar organizations
- Study and solving the problems in the reconstruction and exploitation of the old railway heritage

26 of 43 EU² countries are members of this organization. The organization protects 650 railway museums and railways.

Since 2007, the organization has recruited young employees to work in various parts of the organization. It holds an annual conference in field of museums and tourist railways on topics such as the protection and preservation of Europe's rail heritage, regional reconstruction, safety, financing, environmental protection, and more.

Members from 16 countries took part in the FEDECRAIL survey which was intended to cover economic, cultural and social perspectives on the significance of railways represented by the European Federation. Austria, Belgium, Denmark, Estonia, France, Germany, Italy, Latvia, Luxemburg, Netherlands, Portugal, Spain, Switzerland and Great Britain took part. The statistics come up with more than 20 million visitors per year for those responding. By some distance most, 11 million, were counted in Great Britain, followed by France with 3.7 million and Germany with 2.2 million and then Austria with 1.4 million visitors. Some of the information about the FEDECRAIL are shown in the Table 5 (https://www.fedecrail.org/en/index_en.html).

Table 5. Railway-tourism characteristics of some of the FEDECRAIL

Country	England	France	Germany	Austria	Switzerland	Netherlands	Belgium
Feature							
Railroad numbers	179	95	80	35	36	29	9
Passengers(million)	11	3.7	2.2	1.4	0.12	0.70	0.16
Railroad length (KM)	890	1200	1300	1100	150	160	70
Number of trains	866	150	320	320	120	91	16

Source: authors

Odontotos rack railway in Greece

This railway passes 22350 meters aside from the Diakopto seaside until Kalavryta mountainous village, has built in 1896 and also has been registered in

² European union

UNESCO³ for historical value. Odontotos has attracted many visitors each year, because of marvellous attraction in there, such as: Vouraikos cave (beautiful natural area) with valuable protected area and. Helmos-Vouraikos national park, which is the part of Geopark, has been registered in UNESCO. Part of the Greece vineyards are in this route. An adventurous journey with sidewalk capability were implemented from 1896 for passengers. Rocks and valleys during the journey (Figure 3) have increased the attraction of the route (<https://ensirmo.gr/en/>).

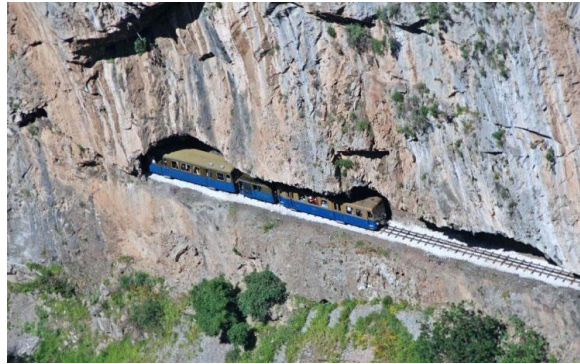


Figure 3. Odontotos rack railway.

Source: <https://odontotos.com/index-en.htm>

Darjeeling Himalayan railway in India and Bernina Express railway in Switzerland

In addition, discussed successful case studies in Greece and Europe Union, there are two more remarkable routes in Switzerland (Figure 4) and India (Figure 5), which has been registered in UNESCO. These railways were built in the late 19th and early 20th century. Having unique and marvelous natural area, various historical places, passing alongside the ancient cities, has attracted the visitors throughout the world.



Figure 4. Bernina Express railway

Source: <https://en.wikipedia.org/wiki/>



Figure 5. Darjeeling Himalayan railway

Source: <https://www.gosahin.com/places-to-visit>

³ The United Nations Educational, Scientific and Cultural Organization is a specialized agency of the United Nations based in Rome.

4.6. Railway-tourism in Iran

First railway-tourism tour in Iran was inaugurated in 2013 and named Golden Eagle". After that Tehran-Savadkooh railway-tourism was launched in 2014 with 200 passengers capacity by name of "3 Golden Line". The other railway-tourism of Iran are Tehran-Jolfa, Tehran-Badrood, Tehran-Kashan and Tehran-Rasht (Fakhrai, 2017).

Tehran-Mazandaran railway-tourism (case study)

The case study's tour has 286 km length, has started in 2017. This railway includes the one-day trip toward the Shirgah woods in Mazandaran province. Crossing through the variety of attraction (Figure 6), different types of plants for the different climates, scenic landscapes and adventurous journey with crossing the mountains and traditional settlement beside the railroad (Kheyroddin, Abbaspour K. and Rahsaz, 2019).

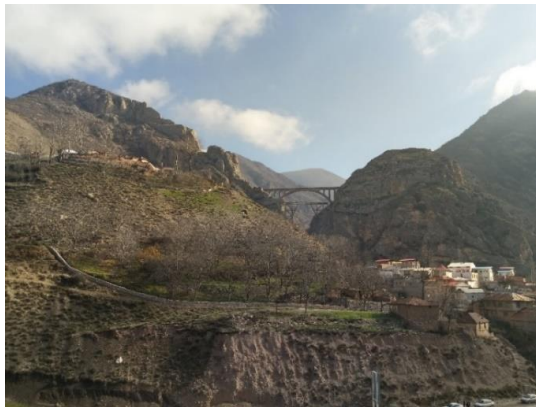


Figure 6. Veresk bridge scene from Veresk village, Mazandaran, Iran

Source: authors

4.7. Relation between Iran and world experiences of railway-tourism

Regarding to the world experiences of railway-tourism, there are some mutual characteristics between them, which are: mountainous and woodsy position of these routes, variety of cultural, natural and rural attraction, special tours planning with the same purpose, historical value of the railway, low pace train in order to enjoy sightseeing, plenty of bridges and tunnels.

5. Tehran-Mazandaran mountainous railway and cultural, natural and rural tourism development capacities

Tehran-Mazandaran railway has gained a lot of popularity, in light of historical value and crossing the scenic landscapes. The construction of the north railways started in

1927 and lasted 10 years, by “Reza shah Pahlavi⁴”. The length of the whole route is 382 km, which connected the Tehran to Gorgan. This route contains 35 stations, 1500 bridges, 95 tunnels (Tehran-North railway, 2018).

The route traverses through different climates. Crossing from semiarid climate of Semnan to approach the humid and rainy climate of Mazandaran. There are some places in the middle of the way, which railway is the only accessibility for them. Part of the mountainous region of Tehran-Mazandaran has specified for case study due to the research main purpose, which has emphasized on railway-tourism. Thus, the case study area has been chosen from Simindasht to Shirgah station in view of geographical limitations and political borders, shown in the Figure 7.

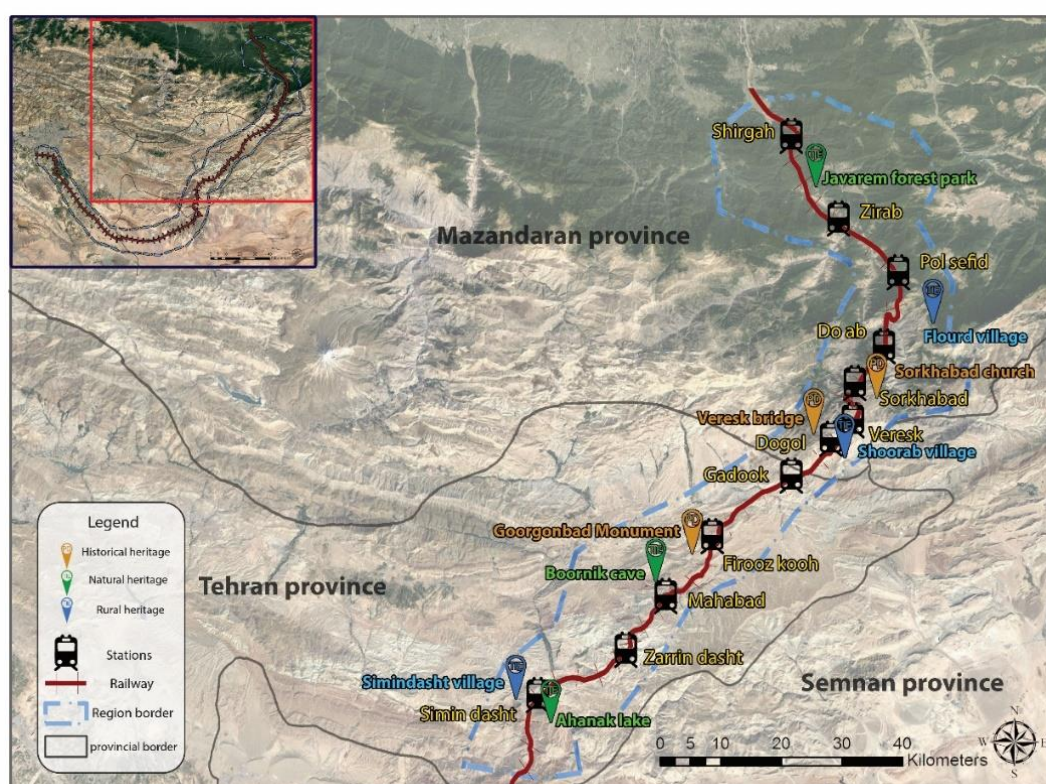


Figure 7. Tehran-Mazandaran railway-tourism area.

Source: authors

Feasibility of tourism capacities of Tehran-Mazandaran railway




In light of various attractions, the attractions have been classified in 3 different groups, which are natural attractions, historical attractions and rural attractions. Each attraction has been introduced briefly in below tables.

⁴ First shah of Pahlavi dynasty of Iran in 1925-1941.

5.1. Natural attractions

There are plenty of natural attractions owing to multi-climate region. They start with the temperate climate of Tehran and continues to semiarid climate of Semnan to humid and rainy climate of Mazandaran. There are specific attractions in every climate, which are displayed in Table 6.

Table 6. Natural attractions in Tehran-Mazandaran railway




Attractions and their positions	Attractions' characteristics	Picture
Ahanak lake: 5km to simindasht station	Contains 4 little ponds 5000 meters area Diving capability due to depth of lake	 Figure 8. Ahanak lake
Martian mounts: in the middle of the Bonekoooh and Simindasht station	A geological phenomenon due to soil and salt type and the soil erosion Arid climate phenomenon	
Boornik Cave: 26 km to Firoozkoooh station	4 th longest cave in Iran 6 meters height and 10*15 dimension of the cave gate	 Figure 9. Boornik Cave
Veresk waterfall: 2.9 km to Veresk station	Situated between 2 mountains, Atabak and Nizkoooh Divided into 2 different waterfalls	
Shoormast lake: 7.2 km to Polsefid station	Only natural lake in the Savadkoooh county Situated in the height, with overlooking to Polsefid city Accessibility by just a dirt road, surrounded with plants and trees	 Figure 10. Javarem forest park
Javarem forest park: 6.5 to Zirab station	Equipped for the temporary accommodation With bike road in the park	

Source: authors

5.2. Historical and cultural attractions

There are considerable numbers of historical places at the vicinity of Tehran-Mazandaran route, thus there will be a collection of different attraction throughout the path. Some of the most important of them are displayed in Table 7.

Table 7. Historical and cultural attraction in Tehran-Mazandaran railway




Attractions and their positions	Attractions' characteristics	Picture
Historical buildings of Bonekooh station: at the vicinity of the Bonekooh station	With initial equipment of building the railroad Build about 600 years ago With marvellous building design	
Goorgonbad Monument: 200meters to Firoozkooh station	Recorded in national heritages Amazing architecture	Figure 11. Goorgonbad Monument
Sorkhabad Church: 1.8km to Sorkhabad station	Recorded in national heritages Built by Christian workers during the railway road building	
Firoozkoh Imam zadeh of Ismaeel: 1 km to Firoozkooh station	Decorated with mirror in roof and walls The main building has reconstructed during the years	Figure 12. Sorkhabad Church
Veresk bridge: 1 km to Veresk station	Finished in 1936 by Danish company 110meters height with the ground Built by local materials	
		Figure 13: Veresk bridge

Source: authors

5.3. Rural attractions

Rural settlements have the significant value as the other attraction. Villages of this path have particular features. All of the villages have local products with vitality in village areas, but they suffer from economic and water supply problems. Some of the most important villages are displayed in Table 8.

Table 8. Rural attraction in Tehran-Mazandaran railway

Attractions and their positions	Attractions' characteristics	Picture
Simindasht: 550meters to Simindasht station	Without any public space, the only public space are the streets and alleys. People wear special traditional clothing	
Shoorab: 7.8km to Gadook station	Situated temporary market in village to sell the local products Scenic views Only 12households living there	
Arfadeh: 8.2km to Sorkhabad station	Nearby the Arfakooch Mount with 2800 height	
Veresk: 550meters to Veresk station	Situated in mountainous area At the vicinity of 2 rivers Nearby the Veresk bridge and Veresk waterfall	
Harandeh: 20km to Firoozkooh station	With less than 500 persons population Potato is the main product of the village's farmers Beautiful landscape to woods	
Felord: 11km to polsefid station	Largest village in the Savadkooh county With plenty of recreational areas due to its scenic sights	

Source: authors

Figure 14. Shoorab village

Figure 15. Veresk village

Figure 16. Felord village

6. Results - Analysis of the railway-tourism effects on rural settlements in mountainous area

After basic research in field studies of railway heritage and ecological tourism, and also case study introduction, the results have been analyzed.

In order to be aware of the grade importance of criteria and sub-criteria, which are extracted from the section of theoretical foundations, and also to be prioritization over the study area, they should be evaluated by experts' sights. In this regard, the importance of the criteria in relation to one another should be evaluated, in order to determine the priority of the development of the region during submitting proposals for the study area. In-depth, interviews were also conducted to find out the desire of local people for the presence of tourists and their ideas on the development of their regions.

Experts set the scores to the criteria and sub-criteria from 1-9, according to El Saaty table (Saaty, 1980). Firstly, the criteria have given points with binary comparison. Secondly, sub-criteria from each main criterion have given point also in the same way as criteria. Eventually, the final weight of each sub-criteria has been reached by multiplication of each sub-criteria's weight to main criteria's weight, which has been calculated by Expert-choice software, shown in the Table 9.

Table 9. Final weights of criteria and sub-criteria

Criteria	Local Communities Development			Environmental Conservation		Tourism Economy		Tourism Management		Infrastructures Quality	
Weight	0/347			0/273		0/107		0/184		0/89	
Sub-Criteria	Physical Intervention	Public perception	Local Occupation	Biodiversity Preservation	Damage measurement to nature	Investments amount	Financial benefits	Effective planning	Stakeholders collaboration	Old infrastructures reuse	New infrastructures
Weight	0/163	0/297	0/540	0/4	0/6	0/6	0/4	0/4	0/6	0/75	0/25
Final	0/160	0/204	0/122	0/107	0/62	0/063	0/042	0/072	0/108	0/052	0/017
Weight Rank	2	1	3	5	8	7	10	6	4	9	11

Source: authors

Local communities' development, environmental conservation and tourism management are most effective criteria by experts' opinion. And also, the most important sub-criteria are public perception, physical intervention, and local occupation, which means the local communities have most important role on railway-tourism quality. In addition, they will be influenced the most by the railway-tourism activity. effects could be negative and positive depends on the sub-criteria's essence. For instance, public perception is the positive sub-criteria owing to the fact that with increasing local dwellers would be the improvement in tourism and vice

versa. But physical intervention is a negative sub-criterion, due to the fact that by increasing it there will be negative impact on rural settlement development. About the other sub criteria, the interaction between biodiversity preservation and rural settlement development is direct. Effective planning and attracting stakeholders are two crucial topics in tourism management, so that, an inefficient management could have the serious implication on local communities and environment. The final weights of each sub-criteria displayed in Figure 17.

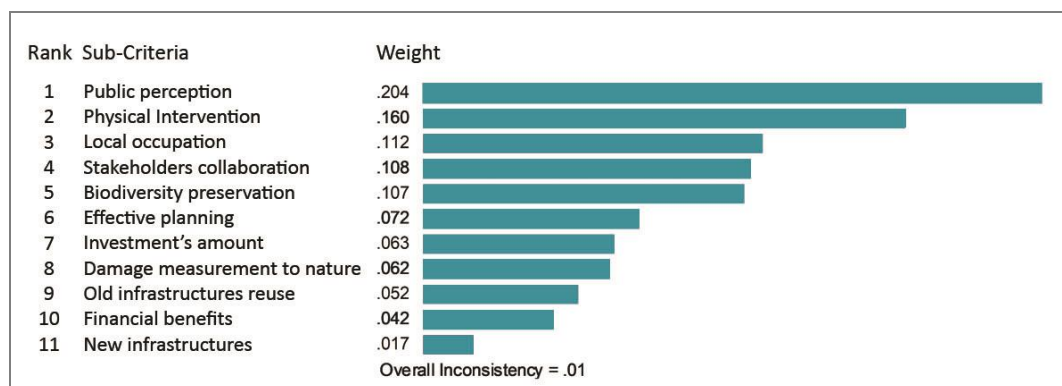


Figure 17: Sub-criteria priorities

Source: authors

In the interview with dwellers of rural settlements about railway-tourism influence on their life, 90% of them were absolutely satisfied about this and mentioned the positive effect of railway-tourism on their occupation. Some of their offers about the railway-tourism development was 1st, the development should follow the principles of the environmental consideration in order to reducing the destructive impacts on the environment. As the 2nd they emphasized on implementing a local permanent market to have easier sale. 3rd request was about the quality of accessibilities, which enhancing the path's quality would make movement easier than now. Solvation of the water shortage issues was the 4th demand, on the grounds that, their major job is agriculture and animal husbandry, which are the most related job to the water. One of most important complaint as the 5th request was the lack of investigation on illegal and irrelevant construction of the townspeople. They insist to pay more attention on this problem.

7. Conclusions

Attraction and increase of the tourism in unique natural area does not always lead to a positive consequence and environmentally sustainable balance. An inefficient management could cause the irreparable damages. Tehran-Mazandaran railway is one of the unrivalled regions in unique natural areas. This area has many capacities

for tourism development, which could consider these capacities for enhancing the occupation and financial profits, actually by local product sales. The railroad is the striking infrastructure for leading and managing the tourist, in order to have fewer negative impacts on the environment. Take this into account, despite the common type of tourism, every kind of development in railway-tourism could be accompanied by less ecological implications.

With gaining the criteria from the field studies, axis of the research has specified. Meanwhile, in the first step, railway-tourism can be evaluated as the effective subject in local communities' development. These trends depended on different situation could be productive or destructive, which means all criteria must be considered simultaneously. Improving positive indicators and reducing negative one's are incredibly helpful. The railway-tourism will highly productive when: 1 - Benefits of local people are considered 2 - Environmental conservation is contemplated 3 - There are significant financial resources 4 - Management is efficient and 5 - Infrastructures are in the best position.

By knowing the effective criteria of railway-tourism on development, there would be some other questions regarding the future of the railway-tourism and its development:

- What can be the effects of rail-based ecotourism of the Tehran-Mazandran railway on the development of adjacent areas?
- What programs can be offered for this region to attract more tourists with considering protection the environment simultaneously?
- What institution (MPO) is in charge of railway tourism planning at the regional and national scale?
- What are the capacities of railway-tourism in other parts of Iran?

Along with other questions, this will be our next research preoccupation.

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