




Modeling tourists' environmental behaviors by structural equations: Towards tourism wise development in Birjand

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Article Info	Abstract
Article type: Research Article	<p>Many of the serious today's environmental problems are, directly or indirectly, caused by humans' irresponsible behavior. The current study, then, aimed at modeling the environmental behavior of tourists in destinations found in Birjand, Iran. The effects of independent constructs such as environmental perception (P), satisfaction (S), attitude (A), and active involvement (AI) on the dependent construct of the environmental behavior (EB) of tourists were investigated. The Partial Least Squares Structural Equation Modeling (PLS-SEM) was used via SmartPLS 3 software. According to the results, the reliability of the model, and Cronbach's alpha values of latent and observant variables were acceptable (EB=0.851, P= 0.898, S=0.920, A=0.852, AI= 0.903); the combined reliability (rho or CR) for constructs ranged between 0.874 and 0.931. The average variance extracted (AVE) for EB, P, S, A, and AI were measured at 0.385, 0.555, 0.530, 0.530, and 0.595, respectively. The correlation between latent variables, according to Fornell and Larker method showed that the A and AI constructs were more positively correlated with each other. As a whole, the results showed that perception has a significant and positive effect on the tourists' environmental behavior in natural and historical destinations. This is while no significant correlation was found between satisfaction, attitude, and active involvement. This research provided a scientific basis for tourism management and offered some suggestions that can be useful for formulating policies, and wise tourism development in the context of environmental protection in relevant administrative departments.</p>
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Introduction

To claim that environmental problems are solely caused by natural changes means to disrespect other influential factors that play important roles. In fact, many of these problems are directly or indirectly caused by humans' irresponsible behavior in the environment. In other words, man is

considered an influential factor and a victim of this crisis. Today, the main concern of international organizations and scholars is to prevent environmental problems and their upward trend. Many environmentalists believe that to find strategies that help reduce the effects of human-related problems, they have to move from physical and ecological

sciences to the teaching of the behavioral sciences and encouragement of people to engage in responsible environmental behaviors (Klößner, 2013; Tohmé, 1992). In other words, environmental problems cannot be solved exclusively by focusing on better technology development or advanced scientific methods.

Improving the process of environmental dilemmas caused by human activities then, seems to be dependent on the reforming of humane education and a change in man's attitude, vision, and knowledge of his conditions and the environment around him (Tohmé, 1992). Natural, geographical, social, cultural, and economic environments provide opportunities for various tourism activities. The intensity and weakness of tourism activities, however, are relatively affected by the available functions, facilities, and capabilities in each of these environments (Sayyedlipour and Eghbali, 2012).

Nevertheless, the truth is, there is still considerable ignorance of the connection between human activities and the living environment. The reason for that might be inaccuracy and inadequacy of available information, wrong attitudes towards the environment, lack of responsibility for the environment, and many other factors. In any society, according to the specific social and cultural conditions, people react to their environment and show certain behaviors (Budak et al., 2005). Tourists also decide to behave in a certain way or form their behavioral tendencies according to their knowledge and attitudes (Powell and Ham, 2008). It is, therefore, essential to examine these behaviors when planning policies to protect the environment. Many tourist destinations either lack relevant environmental protection systems, such as surveillance, entrance fees, and penalties, or have inappropriate strategies that are not adjusted to the increase of tourism demands (Wang et al., 2019).

In recent years, several theories have been proposed to examine the general pattern of social behaviors used in studies of specific human attitudes within environments, such as expectancy-value-theory (Fishbein and Ajzen, 1977), theory of reasoned action (TRA) (Fishbein, 1979),

the theory of planned behavior (TPB) (Ajzen, 1991), the norm-activation-theory (Schwartz and Howard, 1981), and value-belief-norm theory (VBN) (Stern, 2000). Also, motivational theories provide a broad framework for the exploration of behavior in general, and environmentally responsible behavior in particular (Chiu et al., 2014). With response to the rapid growth in environmental problems and its consequences over the past decades, there has been a lot of research around the world using different theories and frameworks to study ecological behavior.

Han et al., (2016) documented the importance of climate change and tourists' perceptions in planning tourists' environmentally responsible behavior. Based on the findings, the regression analysis of the data revealed that three determinants—i.e., moral responsibility for climate change, perceived value, and satisfaction—were statistically significant in inducing the intentions behind environmentally responsible behavior. It is worth mentioning that in the cited study the awareness of climate change did not have an impact on the behavioral intentions (Han et al., 2016).

Another study investigated the self-determined travel motivations of Chinese visitors and explored the association between their motivations and environmentally responsible attitudes and behaviors (Ma et al., 2018). On-site questionnaires were administered in two protected national forest areas in southern China. The findings for the travel motivations of visitors showed that “getting close to nature” has the highest importance.

Vyver et al. (2018) drew on evolutionary models of environmental behavior to test whether appeals to self-interest can encourage drivers to turn off their engines at long wait stops. Asvatourian et al. (2018) studied the relationship between behaviors, attitude, and dietary intake and acknowledged that it is important to distinguish between intent-oriented and impact-oriented behaviors. Data from this study suggested that pro-environmental behaviors and attitudes tend to be relatively independent. Pro-environmental attitudes and knowledge about the environmental impact of food do not differ

between dietary patterns (Asvatourian et al., 2018). One research on the relationship of tourists' perceptions and relational quality with their environmentally responsible behaviors was conducted by He et al. (2018) in central China. The study confirmed the existence of: a) perceived employee quality in terms relationships with tourists' environmentally responsible behavior and; b) perceived employee quality in terms of environmental commitment and its relationship with tourists' environmentally responsible behavior (He et al., 2018).

One study of Wang and colleagues on tourists' responsible environmental behaviors used the Planned Behavior theory to construct the model, and adopted the structural equation model-multiple group analysis (SEM-MGA) to explore the moderating role of environmental interpretations of the attraction sites on the relationship between tourists' responsible environmental behavioral intentions and responsible environmental behaviors (Wang et al., 2018). Wang et al. (2018) believe that the tourists' environmental behavior is not the result of the interaction between situational factors of destination and individual tourists. In a subsequent study, Wang et al. (2019) explored the influence of other people's behavioral reference on tourists' responsible environmental behaviors using the multi-group analysis method of structural equation modeling. The results showed that tourists' attitudes towards environmental behavior, and subjective norms have a significant positive impact on their responsible environmental behavioral intentions; moreover, perceived behavioral control had a significant positive effect on their responsible environmental behavioral intentions and their responsible environmental behaviors. In the same vein, tourists' destination behavioral reference played a positive regulatory role in the tourists' environmentally-responsible behaviors and their intentions (Wang et al., 2019). Another recent study (Katz-Gerro et al., 2020) also investigated the role of environmental behavior among three participants. The goal of was to examine a model of intergenerational transmission of three categories of environmental behaviors, between parents and their children.

Considering the long history of Iranian cities and ancient social systems that existed in its urbanization, especially Birjand, a city in east of Iran, the present study aims to model the environmental behavior of tourists in this city, which contains tourist destinations and historical and natural attractions such as mosques, churches, temples, and markets. Historical contexts and their physical and cultural values explicitly reflect the urban identity. Therefore, historical contexts play an influential and prominent role in defining the identity of the city. At the same time, the life and growth of this historical context impede the anonymity and exhaustion of the city from the inside and limits its uncontrolled development (Movahhed, 2002; Shammai and Poorahmad, 2005). Some features such as historical antiquity, compact, and intertwined contexts characterize any historical context. The existence of a distinct historical context from other parts of the city adds to the importance and attraction of that city. Usually, the whole historical context of the town is considered as an attraction (Teimouri et al., 2014). In the current research, the historical context of Birjand is emphasized along with natural places and attractions. A review of the related literature revealed that the analysis of environmental behaviors in different locations has been studied in several ways. Due to the necessity of such investigations in Birjand to improve the environmental behaviors at tourism destinations, the present study was performed. This city is in the early stages of tourism development.

Materials and Methods

Study Area

Birjand, is the capital of South Khorasan Province and encompasses an area of 31704 square kilometers in eastern Iran, located about 500 km from the center of Khorasan Razavi, Sistan and Baluchestan, Kerman, and Yazd provinces. The city is bounded on the north by Qaen and Zirkuh, on the south by Khosf and Sarbisheh, on the west by Sarayan, and the east by Darmian and Sarbisheh. The city is located between 32⁰ 53' north latitude and 59⁰ 12' east longitude (Figure 1), on the northeastern edge of the Lut desert, surrounded by mountains. The

Lut Desert is recorded as a UNESCO World Heritage Site in Iran. From 1302 AH (before Tehran, the capital of Iran), it was the first city in Iran with an organized and piped water system, recognized as the first water distribution system in Iran. The Shokatiyeh School is in fact the third oldest school in Iran after Dar-Ol-Fonoon and Roshdiyeh in Tabriz, which adopted new

methods of teaching. Because of the strategic situation of the city, Birjand Airport was the third to be built in the country in 1312 AH after the Ghale-Morghhi and Boushehr airports. The United Kingdom and Russia's Vice-Consuls had worked in this city before the Second World War.

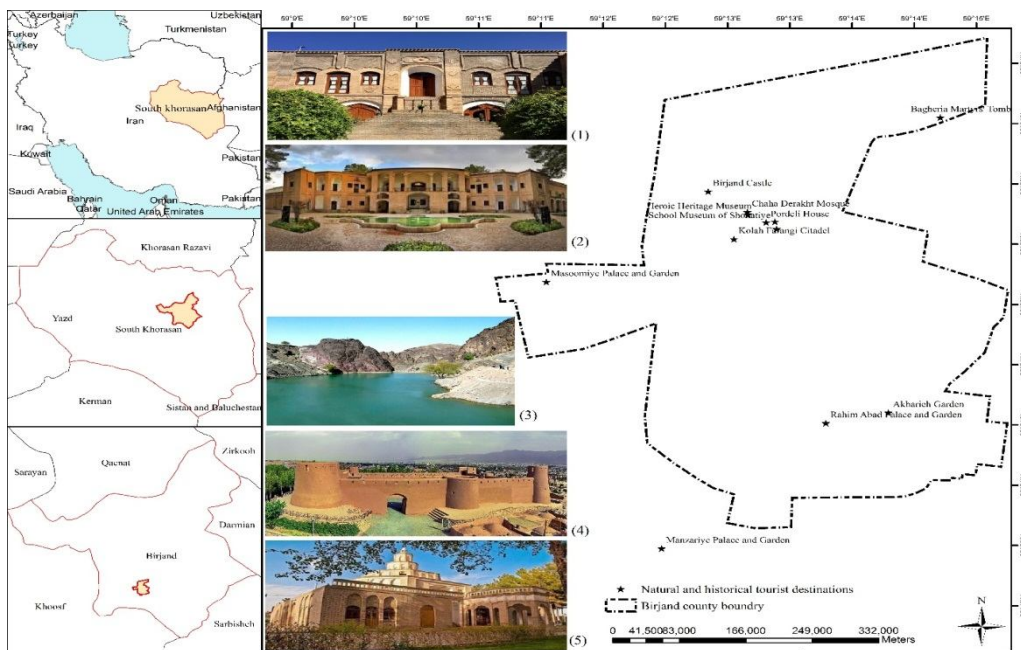


Figure 1. Location of the study area in the country province, and city. Photos of natural and historical tourist destinations 1) Rahim Abad Palace and Garden, 2) Akbarieh Garden, 3) Band-e Dareh Dam, 4) Birjand Castle, and 5) Kolah Farangi Citadel (The photos from websites respectively: <https://b2n.ir/f73914>, <https://b2n.ir/s62883>, <https://b2n.ir/q21731>, <https://b2n.ir/k82209>, <https://b2n.ir/u10820>).

According to the 2016 census, the population of Birjand has been 259,506. In general, the climate of the city is cold and dry. The temperature difference between night and day is high, the relative humidity is low, and rainfall is scarce. Also, during the last decade and especially after the dissolution of Greater Khorasan and the establishment of South Khorasan Province with Birjand as the capital, economic, social, and political changes as well as rapid growth of the city itself have led to drastic changes in the body of the city and the associated land uses (*Website of Department of Development, Management Administration of Cultural Heritage, Handicrafts and Tourism of Southern Khorasan*, 2019). Most of these changes,

which are reflected in the form of physical alterations and developments, have had adverse effects. There are several natural and historical tourist places in Birjand (Figure 1), such as the Historical Arg of Baharestan, Kolah Farangi Citadel, Akbarieh Garden, Rahim Abad Palace and Garden, Birjand Castle, Chahar Derakht Mosque, Pordeli House, Heroic Heritage Museum, Museum of Shokatiye, Shokat Abad Palace, Haji Abad Palace and Garden, Manzariye Palace and Garden, Band-e Dareh Dam, Amir Abad Palace and Garden, Masoomiye Palace and Garden, Bahlgerd Palace and Garden, Pantheon of Sultan Seyed Mohammad, Tomb of Seyed Ebrahimreza, and Tomb of the Martyrs of Sheikhan Valley (Bagheria Martyrs' Tomb).

Questionnaire Design and Data Collection

For the purpose of data collection, a questionnaire for measuring the environmental perception (P), satisfaction (S), attitude (A), active involvement (AI), and environmental behavior (EB) variables was used. This questionnaire was designed to investigate the effects of the four cited factors (the P, S, A, and AI) on tourists' environmental behaviors (Table 1). The specific indices of each variable represent all the factors that are categorized in the appendix a. The validity of the questionnaire was examined and confirmed by five experts and specialists in the tourism sector. Birjand welcomes nearly 42,000 tourists in the first half of the year ("Website of the department of Development, Management Administration of Cultural Heritage, Handicrafts and Tourism of Southern Khorasan," 2019). Considering the size of the statistical population in the tourist attractions of the city and the executive limitations of the research, the sample size used ($N=42000$, $d=0.08$, $p=q=0.5$) was estimated as 150, using the Cochran's equation for closed societies (Equation 1).

$$\text{Equation 1} \quad n = \frac{NZ^2pq}{Nd^2 + Z^2pq}, \quad 0.01 < d < 0.1$$

Thus, the questionnaires were distributed among 150 tourists that had visited the natural and historical tourist destinations of the city in the first six months of 1398 AH. In our research, the natural and historical tourist destinations of Birjand city included Kolah Farangi Citadel, Akbarieh Garden, Rahim Abad Palace and Garden, Birjand Castle, Chahar Derakht Mosque, Pordeli House, Heroic Heritage Museum, School Museum of Shokatiye, Shokat Abad Palace, Manzariye Palace and Garden, Band-e Dareh Dam, Amir Abad Palace and Garden, Masoomiye Palace and Garden, Tomb of Seyed Ebrahimreza, Charddeh Waterfall, Khajeh Khezr Historical Building, Tomb of the Martyrs of Sheikhan Valley (Bagheria Martyrs' Tomb), Ayati School and Giuk Waterfall. The respondents' answers were collected using a five-point Likert scale of agreement from very low (1), low (2), medium (3), high (4), to very high (5)

(Likert, 1932). The demographic information such as gender, age, education, and job title were listed in the questionnaires. The collected data were fed into the SPSS 13.0 statistical software.

Structural Equation Modeling

The present research used a qualitative-quantitative and applied approach. It is also considered as a descriptive-correlational research on the causal analytic type in terms of data collection.

In this paper, the effects of the exogenous or the independent constructs such as P, S, A, and AI on the endogenous or the dependent construct of the EB of tourists were investigated using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the SmartPLS 3 software (Ringle et al., 2015). In modeling structural equations, constructs are the latent variables such as EB, P, S, A, and AI indices. The observed variables are the indicators used for measuring these indices.

PLS-SEM approach is very flexible regarding the modeling properties (Hair Jr et al., 2016). Smart-PLS offers a path model that can describe the relationship between the variables and indicators and can form a vitally important point for a better understanding and clearer demonstration of the results. However, its weakness lies in the complexity of the phenomenon under the study which could not be demonstrated perfectly in the model. In fact, the weakness is related to the evaluation of the model since the evaluation has to be conducted on r-squares of the different dependent and mediating variables (Sander and Lee, 2015). It is accomplished using a two-step process that starts with an iterative estimation of the latent variables' scores (Assaker et al., 2012). First, it estimates an outer and inner weight using the PLS algorithm, according to which the outer weight depicts the relationships between latent variables and the outer variables. The inner weight demonstrates the linkages among endogenous and exogenous latent variables (Assaker et al., 2012). The method obtains the parameters of the measurement model (loading coefficients) and the parameters of the

structural model (path coefficients). It should be mentioned that the loading coefficients are estimated by least-squares regression, and the latter by ordinary least squares regression between latent variables. Values above the threshold 0.400 or 0.500 are acceptable (Garson, 2016). It also shows the factor loading coefficients of the indices (the values placed on the arrows between the constructs and their indices). These values determine the intensity of the relationship between a latent variable (constructs) and the observed variables (indices). Values above 0.400 confirm the reliability of the model in terms of factor loadings.

In other words, discriminant validity is acceptable when the average (AVE) for each construct is greater than the average variance extracted of that construct with other constructs (the square of the correlation between construct) (Fornell and Larcker, 1981). Validity assessment was applied using the Fornell-Larcker criterion in a matrix whose diagonal is the square values of AVE, and its other cells are the correlation coefficients between the constructs. Discriminant validity is acceptable if the diagonal numbers are more significant than their lower and left side values. The regarded criteria in the structural model were T-Values, R-square, impact size f-square, and Q-square. Finally, the results of the mean score comparison of the independent groups are addressed according to t-test. These groups included gender (men and women), age (<35 years and >35 years), and education levels e.g. academic education (bachelor, master, and doctorate) and non-academic education groups (diploma and under diploma).

Conceptualization of Variables

Behavior refers to the totality of observable physical movements and is in fact an action or activity that relates the actor to the environment around him. In other words, the behavior is a response to the motivation that is stimulated by the environment in a specific situation (Ritzer, 2002). If we intend to change people's behavior, we need to understand what determines their actions and decisions (Klößner, 2013). EB refers to the

individual behavior that can have an impact on the environment (Morren and Grinstein, 2016; Wang, Zhang, Cao, Duan, et al., 2019). EB is not solely determined, but predicted by the environmental awareness; the appreciated values might influence the specific behavior or commitment of the individual (Chiu et al., 2014). Therefore, it is assumed that the perceived value, satisfaction, attitude, and the person's active involvement would positively influence environmental behavior.

Perceived value, then, is an estimated comparison of the supply-and-demand components of a service (He et al., 2018). Chiu et al (2014) declared that perception value is commonly conceptualized as the personal evaluation of the characteristics of travel products, such as service quality, price, emotions, and social factors.

Satisfaction is an overall affective response to a product or service (Petrick, 2004). It is the cognitive difference between expectations and actual performance after experiencing the service (Chiu et al., 2014; Merli et al., 2019), and in fact, an excellent predictor of repurchase or revisit intentions (Petrick, 2004). Generally, tourist satisfaction influences the intention to revisit a destination and share positive word-of-mouth (He et al., 2018); it can also affect the behavior of ecological conservation.

Attitude is a predisposition to act in a certain way; in fact, attitude reflects personal factors (Karami and Mansoorabadi, 2008). Having attitude towards a behavior refers to the degree to which an individual evaluates the advantages or disadvantages of that behavior (Ajzen, 1991; Wang et al., 2019) i.e., the balancing between positive and negative attributes of an object (Karami and Mansoorabadi, 2008). The environmental attitudes may be determined not only by economic and technological advancements but also by culture and direct experiences of severe environmental problems (Ogunbode, 2013).

Active involvement represents the degree to which an individual engages in a particular activity (Lee, 2011). It refers to how a person perceives something as being important (Chiu et al., 2014). Permanent active involvement appears when there is congruence between personal needs, goals,

and values and the attributes of an activity (Kyle et al., 2007). In terms of tourism behavior, differences in involvement regularly arise from differences in individual cognitions and the stimulation generated by the traveling activity (Chiu et al., 2014).

Findings

Sample Description and Reliability

According to Table 2 and with regard to the structural equation modeling, the reliability of the model, or Cronbach's alpha values of latent and observant variables were acceptable (EB=0.851, P= 0.898, S=0.920, A=0.852, AI= 0.903); the combined reliability (rho or CR), which is more appealing than Cronbach's alpha (Vinzi et al., 2010) for these constructs was between 0.874 and 0.931, with a minimum of 0.700. The average variance extracted (AVE) for EB, P, S, A, and AI were measured at 0.385, 0.555, 0.530, 0.530, and 0.595, respectively, reaching a minimum of 0.500.

The correlation between latent variables,

according to Fornell and Larker method in Table 3, shows that the A and AI constructs are more correlated with each other. Although the correlation between EB and P is high, it is negligible due to the small distance from the diameter of the matrix.

Parameters of Measurement and Structure of the Models

Factor loadings and path coefficients were estimated, according to Figure. 2 Also, the path coefficients obtained from the PLS-SEM implementation were placed on the arrows located between the constructs shown in Figure. 2.

The significant results of the paths in the proposed model are addressed in Table 4. Each row of this table shows the development of a hypothesis (a relation in a structural model). According to this table, P has significantly affected EB at 99% significant confidence level. No significant correlation was found for other paths in this model, (their T values fall between 0.143 and 0.940).

Table 1. The designed questionnaire

Construct	Code	Indices
EB (environmental behavior)	EB 1	I try to choose natural environments for traveling in the city and around it.
	EB 2	I try to choose man-made places (monuments and city parks) for city traveling.
	EB 3	I avoid animal abuse (cats, birds, etc.) during tourism.
	EB 4	If I see animal abuse in urban tourism, I will react about it.
	EB 5	I try to share my photos and videos taken from tourism areas in media.
	EB 6	I avoid picking flowers and destroying plants during tourism.
	EB 7	I will not ruin places even if I didn't enjoy visiting them.
	EB 8	I avoid polluting the soil and running water during tourism, and at least I don't waste it.
	EB 9	I avoid destructing landscape architecture (such as writing memorials, engraving, gluing something to them, etc.)
	EB 10	In case of availability, I will use public transport to get to the tourist areas.
	EB 11	I usually pay attention to educational and warning signs and messages in tourist places.
	EB 12	I am interested in studying about preserving and not destroying the environment of urban tourism areas.
P (perception)	P 1	I believe in protecting and preserving natural places for the enjoyment and peace.
	P 2	I believe in protecting and preserving historic sites for the enjoyment and peace.
	P 3	I have the right to live with all creatures, including humans, animals and plants.
	P 4	I believe that animals should have legal rights.
	P 5	I believe to protect the nature in its intangible aspects, such as the beauties and services that water, soil and air provide to human beings.
	P 6	I believe that keeping animals in captivity should be carried out in scientifically sound manner and normally it's not right.
	P 7	I believe that I will be held responsible to God for the acts that destroy the environment.

	P 8	I believe that nature and natural assets are valuable per se, not just when they are used by man in tourism.
	P 9	I believe that spending part of the revenue to visit the tourist areas is useful and necessary.
S (satisfaction)	S 1	Here I was introduced to other cultures through other tourists.
	S 2	The social space of this place is suitable for leisure time.
	S 3	Tourism management in this place is in line with the demand and needs of tourists.
	S 4	I am satisfied with the hygiene of this place.
	S 5	The buildings in this place are commensurate with its nature.
	S 6	Due to the location, noise pollution in the city has decreased.
	S 7	Ways to get to this place are short and easily-found.
	S 8	I enjoy the tranquility of nature and the scenery of this place.
	S 9	The safety of tourists in this place is desirable.
	S 10	Good condition of amenities and services of this place is effective in attracting more tourists.
	S 11	Because of this place, empathy has grown within the tourism community.
	S 12	Because of the location, empathy has increased between the host community and the tourist community.
A (attitude)	A 1	In my opinion, the criticism and suggestions of the tourists should be easily presented to the tourism authorities.
	A 2	In my opinion, intervention and destruction in nature has unpleasant consequences.
	A 3	In my opinion, integration of indigenous and modern technologies can solve the environmental problems in tourism areas.
	A 4	In my opinion, urban tourism` income should be used to improve and expand tourism areas.
	A 5	In my opinion, reducing the use of disposable containers in tourism will reduce waste production.
	A 6	In my opinion, tourism is causing economic boom in the region.
	A 7	In my opinion, preserving the natural environment in the tourism area is more important than creating accommodation for tourists.
AI (active involvement)	AI 1	In my opinion, tourists should ask the officials for the welfare facilities in the tourism area.
	AI 2	In my opinion, there should be proper training of citizens on the protection of the environment by the authorities.
	AI 3	In my opinion, virtual media can play important role in introducing tourism areas, the importance of their protection and promoting tourism culture.
	AI 4	In my opinion, children and adolescents in the tourist area should be encouraged to conserve nature.
	AI 5	In my opinion, internet should be used for tourism information.
	AI 6	In my opinion, it is necessary to participate in tourist organizations to improve tourism in the region.
	AI 7	In my opinion, ethical messages about environmental protection need to be prepared and shared among tourists every time they visit the tourist areas.
	AI 8	In my opinion, every tourist should collect their own waste in the tourist areas at the end of the visit.

Table 2. Reliability and convergent validity of construct

Construct/ indicator	Cronbach's alpha (CA)	combined reliability		Average Variance Extracted (AVE)
		rho	CR	
EB	0.851	0.874	0.878	0.385
P	0.898	0.901	0.918	0.555
S	0.920	0.931	0.931	0.530
A	0.852	0.895	0.887	0.530
AI	0.903	0.918	0.921	0.595

The abbreviations are environmental perception (P), satisfaction (S), attitude (A), active involvement (AI), and environmental behavior (EB).

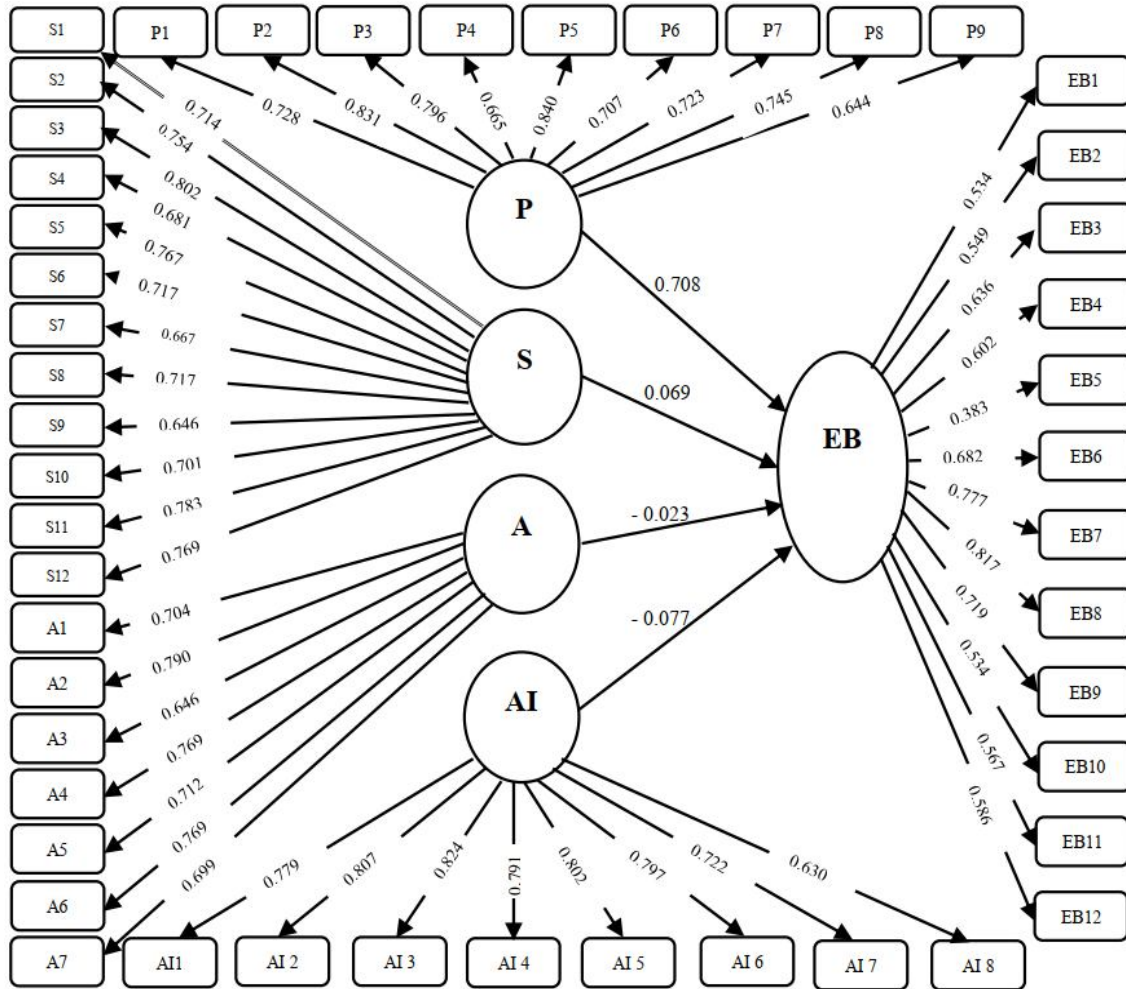


Figure 2. Factor loadings (construct with index) and path coefficients (construct with construct). The abbreviating the construct are environmental perception (P), satisfaction (S), attitude (A), active involvement (AI), and environmental behavior (EB).

The cross-loading method compares the correlations between the indices of a construct with that construct and the correlations between the indices of a construct with other constructs. In this method, discriminant validity is acceptable if the correlation of an index with the relevant construct is higher than other constructs (Hair Jr et al., 2016). In the present study, the analysis of cross-loadings showed that the studied indices were more correlated with their construct than other constructs (Table 5). In this analysis, cross-loadings were achieved through correlating the loadings of each index with all the latent variables. If the loading of each index is higher for its designated

construct than for any of the other constructs, it can be inferred that the model's constructs differ sufficiently from one another; so the discriminant validity of the model is problematic.

The reliability and validity of the final model was performed by bootstrapping and obtaining R-square and T values. The R-square value of the dependent construct of EB was 0.67, which indicates the strong relationship between the independent and dependent constructs. T values higher than 1.96 and 2.57 show the correctness of the relationship between the construct at 95% and 99% confidence level, respectively (Davari and Rezazadeh, 2014).

Table 3. Matrix of discriminant validity according to the Fornell-Larcker method

Construct/ Construct	P	AI	S	EB	A
P*	0.745				
AI	0.632	0.771			
S*	0.421	0.452	0.728		
EB*	0.673	0.377	0.321	0.620	
A	0.675	0.811	0.486	0.426	0.728

*Discriminant validity is acceptable if the diametrical numbers are greater than their lower and left side values

Table 4. Estimation of P and T values of path coefficient for the tourist EB model

	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
AI -> EB	-0.081	0.136	0.564 ^{ns}	0.573
P > EB	0.703	0.109	6.497**	0
A -> EB	0.005	0.161	0.143 ^{ns}	0.887
S -> EB	0.087	0.073	0.940 ^{ns}	0.348

** Significant at 99% confidence level
ns No significant difference

Table 5. Discriminant validity according to cross-loadings

	EB 1	EB 2	EB 3	EB 4	EB 5	EB 6	EB 7	EB 8	EB 9	EB10	EB11	EB12
P	0.417	0.327	0.399	0.364	0.171	0.436	0.605	0.553	0.551	0.188	0.386	0.339
AI	0.224	0.148	0.195	0.178	0.066	0.192	0.335	0.301	0.393	0.096	0.221	0.266
S	0.135	0.25	0.105	0.179	0.213	0.194	0.168	0.156	0.208	0.343	0.381	0.256
EB	0.534	0.549	0.636	0.602	0.383	0.682	0.777	0.817	0.719	0.444	0.567	0.586
A	0.284	0.191	0.235	0.172	0.108	0.26	0.424	0.358	0.36	0.14	0.205	0.242
	P1	P2	P3	P4	P5	P6	P7	P8	P9			
P	0.728	0.831	0.796	0.665	0.84	0.707	0.723	0.745	0.644			
AI	0.394	0.45	0.457	0.458	0.555	0.426	0.516	0.487	0.434			
S	0.248	0.293	0.179	0.241	0.43	0.276	0.36	0.364	0.431			
EB	0.479	0.5	0.531	0.466	0.551	0.564	0.401	0.45	0.522			
A	0.446	0.487	0.438	0.394	0.645	0.472	0.616	0.572	0.465			
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
P	0.349	0.326	0.264	0.244	0.308	0.202	0.265	0.384	0.364	0.286	0.277	0.303
AI	0.336	0.274	0.246	0.251	0.349	0.218	0.276	0.497	0.502	0.288	0.301	0.33
S	0.714	0.754	0.802	0.681	0.767	0.717	0.667	0.717	0.646	0.701	0.783	0.769
EB	0.343	0.304	0.213	0.183	0.206	0.122	0.22	0.234	0.229	0.172	0.207	0.203
A	0.296	0.297	0.284	0.314	0.356	0.252	0.332	0.491	0.513	0.344	0.327	0.421
	A1	A2	A3	A4	A5	A6	A7					
P	0.484	0.498	0.411	0.503	0.509	0.509	0.515					
AI	0.629	0.687	0.517	0.574	0.544	0.575	0.579					
S	0.448	0.303	0.351	0.311	0.236	0.297	0.486					
EB	0.376	0.306	0.235	0.346	0.26	0.275	0.328					
A	0.704	0.79	0.646	0.769	0.712	0.769	0.699					
	AI1	AI2	AI3	AI4	AI5	AI6	AI7	AI8				
P	0.53	0.455	0.555	0.495	0.485	0.452	0.465	0.369				
AI	0.779	0.807	0.824	0.791	0.802	0.797	0.722	0.63				
S	0.381	0.345	0.339	0.264	0.383	0.383	0.458	0.218				
EB	0.303	0.222	0.313	0.348	0.366	0.26	0.264	0.143				
A	0.655	0.633	0.754	0.608	0.63	0.583	0.581	0.561				

The *T* and *P* values, and the results of the structural equation model are reported in Table 4. Also, the magnitude of the effect of f-square was obtained through the implementation of the PLS Algorithm, which signifies the intensity of the relationship between the constructs of the model based on R-square. If these values are 0.02, 0.15, and 0.35, then they reflect the small, medium, and

considerable impact of one construct by another, respectively. In the present study, the construct intensity of the EB with P, AI, S, and A was 0.481, 0.004, 0.007, and 0.000, respectively, which means a large effect of perception and a smaller impact of other constructs. The Q-square statistic obtained by blindfolding shows the predictive power of the model. The values of 0.02, 0.15, and 0.35

indicate the weak, medium, and strong predictive power of the model, respectively (Hair Jr et al., 2016). The Q-square criterion was obtained for the constructs EB, P, AI, S and, A, respectively as 0.385, 0.425, 0.392 and, 0.327, which indicate that the power of prediction is acceptable as these constructs have positive value.

The t-test results showed that the EB in the group of young (M=46.61, STD=8.04) and the elderly (M=51.52, STD=8.71), is significant ($P=0.006$, $t(138)=2.805$). However, we found no significant difference between any of the studied variables in terms of gender and education levels in the groups (Table 6).

Table 6. P value of independent groups according to t-test

Variable	Independent groups	EB	P	S	A	AI
Gender	Men (Mean ± STD)	47.62±10.08	39.17±6.50	44.66±11.63	29.85±5.79	34.29±6.48
	Women (Mean ± STD)	47.50±6.76	39.10±5.80	44.53± 9.45	29.50±4.24	34.15±5.36
	P value	0.928	0.943	0.945	0.677	0.892
Age	< 35 (Mean ± STD)	46.61±8.03	38.59±=6.31	43.74± 9.89	29.14±5.09	33.70±6.19
	> 35 (Mean ± STD)	51.52±8.70	41.40±4.55	48.14±12.02	31.81±3.77	36.33±3.57
	P value	0.006**	0.031	0.048	0.012	0.036
Education	Academic (Mean ± STD)	47.83±6.80	38.96±5.83	45.09±9.22	29.39± 4.36	34.28±5.27
	Non-academic (Mean ± STD)	47.70±9.49	39.27±6.35	44.18±11.37	29.87± 5.44	34.15±6.33
	P value	0.823	0.770	0.608	0.577	0.897

** Significant at 99% confidence level

Discussion and Conclusion

This present study was based on a model that examines the environmental behavior of tourists incorporating four constructs of perception, satisfaction, attitude, and active involvement. The results of the study showed that tourists’ perception has a positive impact on the occurrence of responsible behavior in natural and historical tourist destinations of Birjand. Contrary to the research hypothesis, satisfaction, attitude, and active involvement did not exert any significant and positive effect on the environmental behavior of tourists. The results of this study are consistent with the results of Chen and Tsai (2007), according to which tourist perception has an impact on tourists’ behavior. Also, these results converge with previous studies in the region which conducted a regression analysis (Jahanishakib and Bakhshi, 2020) and showed the impact of tourists' perception and satisfaction on environmental behavior. In these studies, the satisfaction coefficient index in the behavioral model was lower than perception. This is while the findings of the current study confirmed that satisfaction does not significantly affect the environmental behavior of tourists (Table 4). This result can be due to the high distribution of responses as well as the high

standard deviation of tourist satisfaction (STDEV=0.073) compared to the average satisfaction (M = 0.087) among the respondents. In other words, some tourists were satisfied with the services and the available facilities in the study area while others were not, and expected more.

When tourists become aware of the benefits and importance of tourist places and develop a high perception, they supposedly become more interested in environmental issues; thus, their environmentally responsible behavior will increase. The results of the study were indicative of the positive effects of perception and coincided with the results of Davis et al., (2011). The findings were also in line with other researchers’ results (Higham and Carr, 2002; Lee and Moscardo, 2005; Orams, 1995). One of the major findings of the present investigation was that we found no significant relationship between attitude and environmental behavior. As some researchers have also argued, a higher score on environmental attitudes only reflects an ecological orientation. Some barriers might overshadow the strong relationship between new environmental paradigms (such as attitude) and presumed behaviors (Ojedokun and Balogun, 2010). In this case, in order to design attitudinal change strategies and

strengthen environmental behaviors through boosting self-esteem and self-awareness, researchers suggest consulting experts in the field of human sciences that generally deal more with attitudinal issues, such as environmental psychologists, social psychologists, etc. In conclusion, according to the responses collected from the tourist community of Birjand, tourists' perception is the key to the occurrence of environmentally responsible behavior.

Firstly, based on the results we suggest reconsidering the high perception of tourists in the tourist areas and natural attractions of Birjand as an opportunity to create tourists' sensitivity to the environment. Tourists' sensitivity and understanding of the tangible and intangible benefits of the environmental features will hopefully increase the motivation to learn more and demand education. In turn, this knowledge enables the recognition of the value of environmental behaviors.

Second, strengthening tourists' attitudes by focusing on publicity and education about environmental behavior is supported by the opinions of experts in the field of environmental education. Although urban tourism is one of the influential industries worldwide, not all tourists pay much attention to the issue of environmental protection. As the tourists' level of awareness increases, so does their active involvement in the target areas, and their responsibility. Besides, active involvement emphasizes the role of psychological aspects, which indirectly affect environmentally responsible behaviors by increasing the apprehended importance of this variable in tourism management. Therefore, to strengthen the responsible behavior of tourists and create an attitude and encourage active involvement, more attention should be paid to educational and promotional measures by relevant organizations.

Third, it is necessary to consider services and facilities for tourists in urban tourism

designs. Tourism management organizations should pay more attention to improving infrastructures and renovating public environmental facilities and ecotourism residences. By creating services at the desired level and within the norms of society, tourists can feel more satisfied, which in turn leads to more responsible behavior (He et al., 2018). It seems that tourists' environmental behaviors in Birjand were more dependent on introverted variables, such as personal perception and sense of contentment in the ancient culture than receiving services, education, and motivation induced by the tourism management systems. Due to the limitations of the research and the reduction in the number of tourists in Birjand, it might not be relevant to generalize the results to other areas of South Khorasan Province. Therefore, it is recommended that in future research, these models be tested including more parameters in other popular tourist destinations in the province, such as Tabas and Nehbandan.

Finally, this study provided a scientific basis for tourism management that can be beneficial for formulating policies, wisely conducted tourism development and promotion along with environmental protection in relevant administrative departments and institutions. The proposed method of the current research can also be used in tourist attractions around the world, and its results can be applied to planning and formulating tourism development programs in the study area in order to strengthen responsible behaviors.

Conflict of interest

No potential conflict of interest was reported by the authors.

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Appendix a.

Dear tourist! This questionnaire produced, by goal of promoting city environment protection in natural and historical places. Including sentences about interests and emotions for environmental tourists` behavior. May be agree or disagree. Your careful answers help us deeply. So please show your feeling by sign☒.

Thank you for give your time to us.

Too low	Low	Medium	Much	Too much
1	2	3	4	5

Which place do/did you visit?

Demographic information:

1. Gender: female male
2. Age:
3. Education: high school diploma bachelor master degree and higher
4. Job: not working freelance job employee

Environmental tourists` behavior	1	2	3	4	5
I try to choose natural environments for traveling in the city and around it.					
I try to choose human places (monuments and city parks) for city traveling.					
I avoid animal abuse (cats, birds, etc.) during tourism.					
As I see any animal abuse in urban tourism, I would react about it.					
I try to share my photos and videos taken from tourism areas in media.					
I avoid picking flowers and destroying plants during tourism.					
I wouldn't ruin it even if I didn't enjoy a tourist spot.					
I avoid polluting the soil and running water during tourism, and at least I don't waste it.					
I avoid destruction of landscape architecture (such as writing memorials, engraving, gluing something to them, etc.)					
If there was, I use public transport to get to the tourist areas.					
I usually pay attention to educational and warning signs and messages in tourist places.					
I am interested in studying about preserving and not destroying the environment of urban tourism areas.					

Environmental perception of tourists: For each of the following, state your understanding.	1	2	3	4	5
I believe in protecting and preserving natural places for the enjoyment and peace.					
I believe in protecting and preserving historic sites for the enjoyment and peace.					
I have the right to live with all creatures, including humans, animals and plants.					
I believe that animals should have legal rights.					
I believe to protect the nature in its intangible aspects, such as the beauties and services that water, soil and air provide human beings.					
I believe that keeping animals in captivity should be scientifically sound and Normally it's not right.					
I believe that I am responsible to God for the acts that destroy the environment.					
I believe that nature and natural assets are valuable only, not just for use Man in tourism.					
I believe that spending part of the proceeds to visit the tourist areas is useful and necessary.					

Tourist Satisfaction with Tourism Area: For each of the following, state your satisfaction.	1	2	3	4	5
Here I was introduced to other cultures through other tourists.					
The social space of this place is suitable for leisure time.					
Tourism management in this place is in line with the demand and needs of tourists.					
I am satisfied with the hygiene of this place.					
The buildings built in this place are commensurate with its nature.					
Due to the location, noise pollution in the city has decreased.					
Ways to get to this place are quick and easy.					
I enjoy the tranquility of nature and the scenery of this place.					
The safety of tourists in this place is desirable					
Good condition of amenities and services of this place is Effective in attracting more tourists					
Because of this place, empathy has grown within the tourism community.					
Empathy has increased because of the location between the host community and the tourist community.					

Tourism Attitude: Comment on any of the following	1	2	3	4	5
In my opinion, the criticism and suggestions of the tourists should be easily presented to the tourism authorities					
In my opinion, intervention and destruction in nature has unpleasant consequences.					
In my opinion, due to the integration of indigenous and modern technologies, the environmental problems of It solved tourism.					
In my opinion , Urban tourism` income should be prioritized to improve and expand it					
In my opinion, reducing the use of disposable containers in tourism will reduce waste production					
In my opinion, tourism is causing economic boom in the region					
In my opinion, preserving the natural environment in the tourism area is more important than creating accommodation there, for tourists.					

Active involvement: State the extent of your involvement in any of the following activities in the tourism area.	1	2	3	4	5
In my opinion, the tourists should ask the officials for the welfare facilities in the tourism area.					
In my opinion, there should be proper training of citizens on the protection of the environment by the authorities relevant.					
In my opinion, virtual networks can play an important role in introducing tourism areas, the importance of their protection and promote tourism culture					
In my opinion, children and adolescents in the tourist area should be encouraged to conserve nature					
In my opinion, the internet should be used for tourism information					
In my opinion, it is necessary to participate in tourist organizations to improve tourism in the region.					
In my opinion, ethical messages about environmental protection need to be prepared and shared among tourists distributed every time he visited the tourist areas.					
In my opinion, every tourist should collect their own waste generated in the tourist areas at the end of the visit.					