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Tourists' environmentally responsible behaviour: The case of ecotourism and geotourism destinations in Serbia

Abstract

Sustainable tourism is a key strategy for nurturing tourists' relationships with the values of protected areas, which is beneficial for conservation. Since tourism activities may potentially harm the environment, maintaining the sustainability of the destination heavily relies on tourists' environmentally responsible behaviour (TERB). This study aims to investigate TERB in protected areas, which have been identified as exceptional and therefore require preservation and appreciation. To comprehend TERB, the conceptual framework is based on the Knowledge-Belief-Norm (KBN) theory. Data for this research were collected through a survey of tourists visiting ecotourism and geotourism destinations. The structural equation model demonstrates the linear relationship between KBN theory constructs and TERB, while TERB positively influences satisfaction and indirectly affects behavioural intentions. Geotourists and ecotourists were not distinguished from one another. Practical implications provide insights into reducing the environmental impact of tourist activities when creating effective strategies.

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Keywords: tourists' environmentally responsible behaviour, satisfaction, behavioural intentions (revisit and recommend), protected areas, ecotourists and geotourists

Introduction

Tourism is one of the largest and most rapidly expanding industries in the world (Rasool et al. 2021). Over 900 million tourists travelled abroad in 2022, more than double the number recorded in 2021, yet still only 63% of pre-pandemic levels (United Nations World Tourism Organization [UNWTO] 2023). By 2030, this number is projected to reach 1.8 billion (UNWTO 2011). However, as more people travel, additional problems arise, particularly environmental ones (Baloch et al. 2022a; Rajaonson and Tanguay 2022). The tourism industry is a major contributor to a wide range of environmental issues (Ghobadi and Verdian 2016; Kavallinis and Pizam 1994; Rajaonson and Tanguay 2022). Various environmental challenges faced by tourism destinations, such as pollution, destruction of habitats, and degradation of biological resources, are significantly exacerbated by tourists' careless and irresponsible behaviour (Baloch et al. 2022a; Bilynets and Knezevic Cvelbar 2022).

One of the most pressing environmental problems today is plastic waste, and tourism may play a significant role in providing a solution (Jambeck et al. 2015). Plastic accounts for between 65% and 95% of marine litter worldwide (Liu et al. 2022). Less than 30% of the 25–30 million tonnes of plastic waste produced annually in Europe are collected for recycling (Schröder et al. 2019). Plastic litter has been found everywhere on the Earth, and the sources of plastic pollution are increasing (Cau et al. 2022; Jambeck et al. 2015).

The amount of plastic used in the tourism sector, which is often intended for disposal and frequently cannot be recycled, results in significant pollution (Grelaud and Ziveri 2020; Liu et al. 2022). The United Nations Environment Programme (UNEP) estimates that tourists generate 4.8 million tonnes of waste annually. Some locations, such as the island of Boracay in the Philippines and a Mount Everest base camp, were closed to visitors for approximately six months for environmental restoration. These are just a few examples of tourist attractions that had to be temporarily closed to the public to manage litter accumulation (Jiang et al. 2022; Somani 2019; UNEP 2019). Waste problems negatively impact the sustainable development of tourism

worldwide (Hu et al. 2019). The accumulation of waste also affects the attractiveness of tourist destinations and, consequently, the satisfaction of travellers, as well as their intentions to return to and recommend the destination (Krelling et al. 2017).

Several researchers (Baloch et al. 2022b; Silva et al. 2021b; Han et al. 2016) believe that fostering tourists' environmentally responsible behaviour (TERB) is a strategy to address the environmental issues brought on by the rapidly expanding tourism sector. On one hand, TERB is the most practical and effective way to mitigate the negative environmental impacts of tourism, and on the other, it promotes the protection of destination resources, ultimately leading to the sustainable development of those destinations (Baloch et al. 2022b; Hu and Sung 2022; Jiang et al. 2022; Wang et al. 2020). The importance and practical significance of TERB research and its antecedents and consequences for the long-term and sustainable development of tourist destinations is becoming an important research topic (Bie and Xu 2018; Chiu et al. 2014; Lee and Jan 2019; Fenitra et al. 2021; Fenitra et al. 2022; Huang and Liu 2017; Jiang et al. 2022; Obradović et al. 2023; Zheng et al. 2018).

Acknowledging the importance of TERB, this study employed Ünal et al.'s (2018) Knowledge-Belief-Norm (KBN) theory as the theoretical framework to investigate the determinants of TERB in protected areas (PAs). Visitors are attracted to PAs due to the biodiversity and other natural and geological resources of such areas, and they are motivated to engage in TERB by the intrinsic emotions associated with these features. Furthermore, there is limited application of the KBN theory in the existing TERB literature (Confente and Scarpi 2021; Fauzi et al. 2022; Fenitra et al. 2022; Su and Swanson 2017); several researchers have considered satisfaction and behavioural intentions as consequences of TERB (Chiu et al. 2014; Han et al. 2016; Kumar and Lata 2022; Obradović et al. 2023; Sahabuddin et al. 2021). By providing a detailed interpretation of TERB in the context of ecotourism and geotourism in PAs, this study seeks to address this gap in the literature.

The primary objective of this study is to explain tourists' KBN-driven intention to engage in environmentally responsible behaviour based on evidence gathered from domestic tourists in Serbia, with satisfaction and behavioural intentions as outcomes. Building and testing a structural equation model (SEM) of KBN, TERB, satisfaction and behavioural intentions (revisit and recommend) are the key goals of this study. In addition to focusing on

the effects of KBN constructs on TERB, this research explores how TERB influences tourists' perceptions of satisfaction and how this satisfaction affects various intentions (revisit and recommend).

Another objective of the study is to ascertain whether there are variations in TERB based on the type of tourist destination. As such, empirical data were gathered through a survey involving local tourists in ten of Serbia's protected areas (five where biodiversity values dominate and five where geological/geomorphological values dominate).

Overall, the study aims to provide theoretical and practical insights into the aforementioned behaviours. The results of this study can be utilised by policymakers and community members to establish and implement policies and effective strategies that will reduce and prevent littering in tourist areas, enhance visitor satisfaction and ensure visitor loyalty.

The paper is structured as follows. The first section provided a thorough introduction to the subject and explained the context and scope of the research. The second section presents a critical assessment of the KBN theory, TERB, satisfaction, and behavioural intentions (revisit and recommend). This is followed by the presentation of hypotheses for the construction of the research model, the relationships between the variables, and the testing of those relationships using information gathered from visitors interested in nature. The third section discusses the study's methodology, data collection, survey instruments and analysis techniques. The fourth section presents the results and analyses. The fifth section provides a discussion of the results, and the sixth and final section presents the conclusions.

Literature Review and Hypothesis Development

In accordance with the goals of this study, the following literature review covers four areas: (a) KBN, (b) TERB, (c) satisfaction and (d) behavioural intentions.

The KBN theory suggests that people's commitment to environmental causes (belief), knowledge of environmental issues (knowledge) and adherence to societal norms (norms) motivate them to act in a pro-environmental manner (Stern, 2000). Within the context of tourism, the current study applies the KBN theory to analyse a specific environmentally responsible

behaviour. By expanding the value-belief-norm (VBN) theory, Ünal et al. (2018) developed the KBN theory (Stern, 2000). When values, knowledge, beliefs and personal norms are present, environmentally responsible behaviour is more likely to occur (Fauzi et al. 2022).

According to the KBN (Ünal et al. 2018), environmental knowledge is crucial in shaping intentional behaviour through norms and beliefs. From personal values and environmental knowledge, the causal model shifts to the new environmental paradigm, which investigates how people's awareness of consequences, accountability and personal norms impact their pro-environmental actions as well as responsible tourism behaviour (Han 2015; Lee and Jan 2018, 2019).

The new paradigm theory is influenced by personal values, such as biospheric values. People with low biospheric values and inadequate environmental knowledge are not aware of the consequences of their actions and, thus, would not be taking responsibility for them (Fenitra et al. 2022). According to several studies (Groening et al. 2018; Liobikienė et al. 2016), environmental values and knowledge can best predict belief. According to Ünal et al. (2018), biospheric values foster a new environmental paradigm that reflects current views and raise people's environmental awareness. People with strong environmental values, such as biospheric values, are more likely to factor in environmental considerations when making decisions and taking actions (Akintunde 2017; Fenitra et al. 2022; Sharma and Gupta 2020; Ünal et al. 2018). Consequently, the following hypothesis is proposed:

H1: Biospheric values have a significant positive effect on the new environmental paradigm (+).

A worldview known as the New Environmental Paradigm (NEP) promotes ecological balance, sustainability and an understanding of the boundaries of the environment by highlighting the connection between humans and the natural world (Dunlap et al. 2000).

Environmental knowledge can be linked to understanding and awareness of environmental issues as well as potential solutions (Amoah and Addoah 2021; Zsóka et al. 2013). A person's ability to make environmentally conscious decisions can be influenced by their level of environmental knowledge (Hanss and Böhm 2013; Paço and Lavrador 2017; Ünal et al. 2018). According to the new environmental paradigm (NEP), people with greater environ-

mental knowledge are more concerned about regional and global environmental issues (Amoah and Addoah 2021; Cheng and Wu 2015; Liobikienė and Poškus 2019; Zhang and Mao 2008). An understanding of the environment positively impacts NEP (Fenitra et al. 2022; Liobikienė and Poškus 2019; Ünal et al. 2018). Consequently, the following hypothesis is proposed:

H2: Environmental knowledge has a significant positive effect on the NEP (+).

The NEP has been identified as a key factor affecting tourists, particularly those interested in nature (Luo and Deng 2008; Sharma and Gupta 2020). To engage in ecologically responsible behaviour, there must be an awareness of consequences (AC), which is viewed as a cognitive prerequisite for the activation of moral norms (Ünal et al. 2018). In the context of the environment, AC refers to a person's realisation and comprehension of the possible positive or negative effects that their actions, or the actions of society, may have on the environment (Ryan and Spash 2012). Han et al. (2017) claim that the NEP can enhance tourist's AC of their behaviour. If people had a better understanding of current environmental challenges, they would be more aware of their behaviours and actions. When studying travellers' eco-friendly behavior, researchers (Campos-Soria et al. 2018; Fenitra et al. 2022; Liobikienė and Poškus 2019; Wensing et al. 2019) discovered that the NEP had a positive impact on AC. Therefore, it is suggested that:

H3: The NEP has a significant positive effect on AC (+).

In the context of the environment, Ascription of Responsibility (AR) describes how much a person feels personally responsible for the effects of their actions on the environment and believes they can contribute to preventing or mitigating environmental harm (Stern 2000).

A person's AC enhances their capacity to act to reduce the consequences of their actions (Stern 2000). It also helps them recognise their AR. When a person is concerned about the effects of their actions, they acknowledge the need for steps to reduce their negative effects and accept responsibility for them. According to the literature, AC and AR have a strong relationship (Bronfman et al. 2015; Fenitra et al. 2022; Han 2015; Han et al. 2017; Sharma and Gupta 2020; Ünal et al. 2018). Based on this, the following is hypothesised:

H4: AC has a significant positive effect on the ascription of AR (+).

Personal norms (PN), which indicate a moral duty to take environmental action, are influenced by AR (Stern 2000). In the context of the environment, 'personal norms' relate to a person's internalised moral duties or sense of obligation to act in a pro-environmental manner, based on their own personal values and views regarding environmental responsibility (Stern 2000).

Ascription of responsibility inspires a sense of moral obligation in a person that affects their PN (Ibtissem 2010). The person feels a greater moral obligation to take action to stop, or at least mitigate. the harm arising from their behaviour (Ghazali et al. 2019; Steg and Nordlund 2018). Previous studies (Han 2015; Choi et al. 2015; Fenitra et al. 2022; Ünal et al. 2018; Sharma and Gupta 2020) concluded that AR has a positive effect on PN. Consequently, the following hypothesis is proposed:

H5: AR has a significant positive effect on PN (+).

Environmentally responsible behaviour is the final KBN theory construct, and it is positively influenced by PN (Stern 2000; Ünal et al. 2018). The degree to which a person feels ethically obligated to carry out a particular action is known as a PN (Schwartz 1970), and it serves as a motivating force behind environmentally responsible behaviour (Sia and Jose 2019). People believe they have a moral obligation to act correctly because it is the right thing to do (Han et al. 2015; Ghazali et al. 2019). Numerous researchers in various contexts have empirically supported this association (Choi et al. 2015; Sharma and Gupta 2020; Han 2015; Hiratsuka et al. 2018; Kiatkawsin and Han 2017; Landon et al. 2018; Fenitra et al. 2022; Ünal et al. 2018). Therefore, the following is hypothesised:

H6: PNs have a significant positive effect TERB (+).

The most significant indicator or predictor of future tourist behaviour is tourist behaviour itself (Duong et al. 2022). Understanding tourist behaviour is one of the most crucial requirements for effective destination management, which is why researchers frequently discuss it (Cohen et al. 2014). The term 'tourist behaviour' refers to a person's behavior when engaging in tourism-related activities (Pearce 2005). A person's environmental concern, commitment and ecological knowledge are indicators of their environmentally responsible behaviour, according to Cottrell and Graefe (1997).

According to previous research (Akintunde 2017; Lin et al. 2022; Lee et al. 2013; Lee et al. 2015), TERB refers to a variety of tourist activities, particularly those that lessen or avoid negative impacts on the environment during visits to such sites. Tourists' environmentally responsible behaviour also includes activities that support the preservation and conservation of such sites. This specific action reduces the industry's overall environmental impact and is crucial to maintaining its expansion (Han et al. 2016; Lee and Jan 2015). To promote sustainable tourism, it is essential to foster and encourage TERB (Zhou et al. 2020).

Previous studies (Cheng et al. 2022; Chiu et al. 2014; Lee et al. 2015; Lee and Jan 2015; Su et al. 2018; Sahabuddin et al. 2021) have shown a positive correlation between TERB and satisfaction, indicating that satisfied tourists are more likely to behave cautiously and responsibly. Tourist satisfaction is characterised as a positive emotion resulting from a contrast between the expectations of the traveller and the actual experience at the destination (Castro et al. 2017). According to several authors (Chiu et al. 2014; He et al. 2018; Le et al. 2021; Obradović et al. 2023), TERB impacts tourists' satisfaction and their perception of the destination. The current study seeks to investigate the relationship between TERB and satisfaction among tourists. Therefore, the following hypothesis is suggested:

H7: TERB has a significant positive effect on tourists' satisfaction (+).

One of the most important factors influencing tourists' decisions to return to a destination is their level of satisfaction (Zeng and Yi Man Li 2021), which refers to the level of fulfilment between their travel expectations and actual experiences (Carvache-Franco et al. 2021). Intentional behaviour includes a willingness to return to and recommend the destination to others (Kim and Chen 2021). It is widely recognised that satisfied visitors are more likely to return, repurchase the same goods and services and recommend the destination and experience to others, thereby resulting in customer loyalty, which is highly advantageous for travel destinations (Viet et al. 2020; Seetanah et al. 2020). Research indicates that satisfied visitors are more likely to return to and recommend a destination (Kim et al. 2015; Prayag et al. 2013; Obradović et al. 2023; Zeng et al. 2021). Therefore, the following are hypothesised:

H8: Tourist satisfaction has a significant positive effect on revisit intention (+).

H9: Tourist satisfaction has a significant positive effect on recommendation intention (+). (Figure 1).
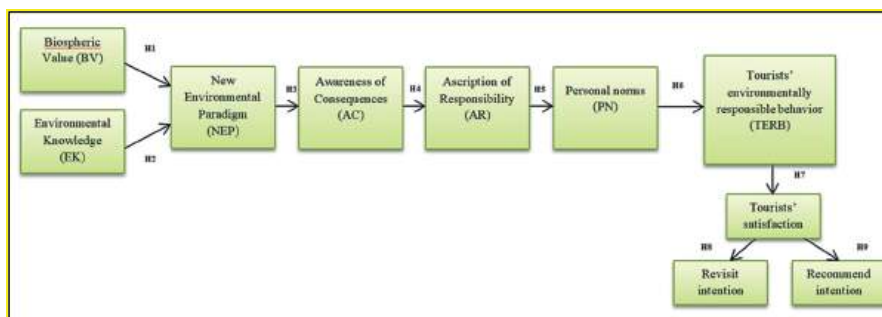

Figure 1: Proposed research model

Materials and Methods

To collect data, a survey was conducted among local tourists who had recently visited any of the selected protected areas. Two different types of protected areas were chosen: those with dominant biodiversity values (Tara National Park, Stara Planina Nature Park, Zasavica Special Nature Reserve, Golija Nature Park and Maljen Outstanding Natural Landscape) and those with dominant geodiversity (Monument of Nature: Đavolja Varoš [Devil's Town], Stopića Cave, Petnička Cave, Vrelo Mlave [Mlava Karst Spring] and Rajkova Cave). The selected protected areas represent all regions of Serbia. This study focused on two different types of protected areas to determine whether a difference exists between the environmentally responsible behaviour of ecotourists and geotourists. The study sample comprised a total of 790 respondents, all of whom were residents of Serbia over the age of 18. The sampling method used in this study was convenience sampling, which involves the inclusion of individuals who are the easiest to reach in the sample. As a result, the sample consisted of local tourists who visited the destinations and were

easily accessible. Since geotourism and ecotourism are not yet highly developed in Serbia, this sampling method was the most suitable.

The questionnaire consisted of three sections. The first section collected information on the respondents' sociodemographic characteristics (gender, age, education and employment status) and travel history (last visited PA, duration of stay and travel companions). The second section, consisting of 28 items, evaluated TERB using the KBN theory. The questions were categorised by dimensions (as shown in Figure 1) and taken from previous studies (Ajzen 1991; Bronfman et al. 2015; Ciocirlan et al. 2020; Cheng et al. 2013; Chiu et al. 2014; Ghazali et al. 2019; Han et al. 2017; Hawcroft and Milfont 2010; Liobikien and Poškus 2019; Su et al. 2018; Wang et al. 2021). A 5-point Likert scale was used to evaluate all the items (1 = *strongly disagree*, 5 = *strongly agree*).

The final section assessed visitor satisfaction and intent to return and recommend. It contained 12 items that were taken from previous studies and adjusted (Buonincontri et al. 2017; Chen and Chen 2010; Choo et al. 2016; Kim et al. 2016; Kim et al. 2015; Oh et al. 2007; Quadri-Felitti and Fiore 2013). A 5-point Likert scale was used to evaluate each item (1 = *strongly disagree*, 5 = *strongly agree*).

The questionnaire was designed and pilot tested for fulfilment of the study's objectives before being revised to ensure clarity and comprehensibility. The study was conducted between January and February 2023. The questionnaire was made available online using Google Docs and shared via email and social media (Facebook and Instagram). The data collection process was followed by data processing and analysis, discussion and final conclusions. The target audience consisted of domestic visitors who had recently visited any of the selected PAs. All the respondents were informed of the study's overall goal, the anonymity and voluntary nature of participation and the fact that the data would only be utilised for scientific and research purposes.

Data analysis tools included IBM SPSS AMOS 21.0 (SEM-CFA) and IBM SPSS 21.0 Statistics (Descriptive Statistical Analysis, Cronbach's Alpha; IBM 2012; Arbuckle 2012). The SPSS was used to conduct a Pearson Correlation test to determine the validity of the questionnaire. The validity test was carried out by comparing the questionnaire results for each item to the overall result. A significance level of 5% (2-tailed) was employed. Each item was individually validated using two methods: Pearson correlation and the item's

total score, referred to as rxy. To evaluate construct validity, confirmatory factor analysis (CFA) was used. For this study, several indicators were calculated, including the goodness of fit index (GFI), adjusted goodness of fit index (AGFI), Bentler-Bonett normed fit index (NFI), Bollen's incremental fit index (IFI), Tucker-Lewis index (TLI), relative fit index (RFI), comparative fit index (CFI), root mean square error of approximation (RMSEA) and standardised root mean square residual (SRMR). A satisfactory fit is indicated by GFI, AGFI, NFI, IFI, TLI, RFI and CFI values greater than 0.90 (Awang 2014; Hair et al. 2013). The RMSEA value should be less than 0.06, and the lower the SRMR value, the better the model fit (Hair et al. 2013).

Each step, practice and different quantitative technique utilised in this research is shown in the following workflow (Figure 2).
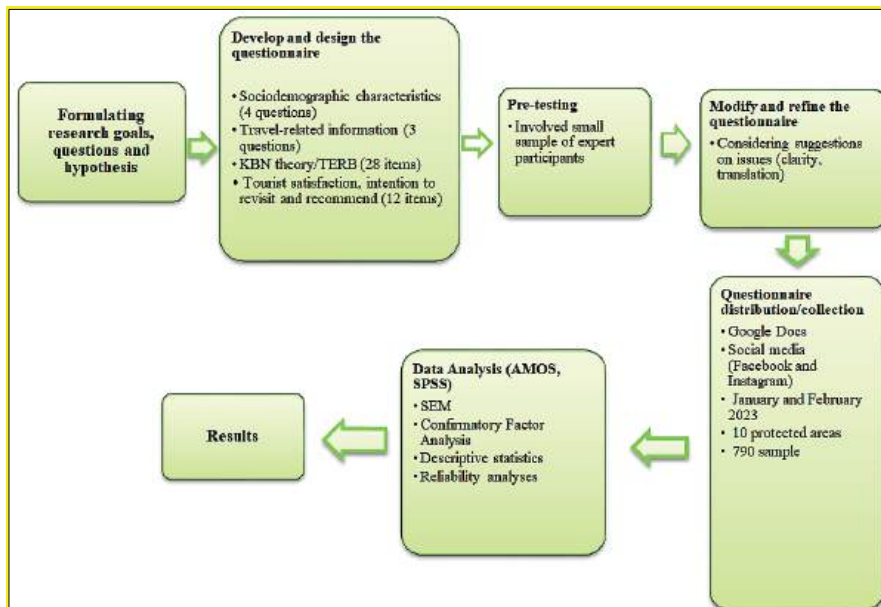

Figure 2: Methodology workflow

Results

A descriptive overview of the respondents, presented in Table 1, shows that women comprised 60.8% of the sample, while men accounted for 39.2%. The respondents had an average age of 39 years (age range: 19–84). The significant majority of respondents held bachelor's degrees (42.4%) and high school diplomas (33.5%). The majority of respondents (70.3%) were employed.

Table 1. Sociodemographic characteristics of the respondents (n=790)

Gender		Employment status	
Male	39.2%	Employed	70.3%
Female	60.8%	Unemployed	8.2%
		Student	19.0%
Age		Retired	2.5%
Average age = 39		**Destination**	
Std. = 13.5025		Ecotourist destination	62%
Age range (19–84)		Geotourist destination	38%
		Length of stay	
		Average stay = 3.5 days	
Education		Std.= 3.3002	
High school	33.5%	Stay range (1-30)	
Bachelor's degree	42.4%	**Travel company**	
Master's degree	15.2%	Alone	5.1%
PhD degree	8.9%	Tourist tour	14.6%
		Family/friends	71.5%
		Other	8.9%

Source: Created by the authors based on data analysis in SPSS 21.0.

More respondents travelled to ecotourism destinations than to geotourism destinations, which is to be expected given that Serbia's mountains and nature reserves are popular ecotourism destinations. The average length of stay was 3.5 days.

The variables relevant to the concepts considered to be measured are included in the structural equation model (SEM) created in the study (Arbuckle 2012).

From Table 2, it can be seen that the GFI and AGFI are generally within good limits and that their values meet the minimal criteria proposed by Schumacker and Lomax (2016). As a result, the GFI and AGFI values indicate that the model is valid and that the relationships in the model are consistent with the sample data.

Table 2. Results of Goodness-of-Fit (32 items, n=790)

Goodness of Fit Criteria	Fit indices	Good fit	Acceptable fit	Goodness of Fit Obtained	Fit Situations
Statistic of ChiSquare Test	$\chi 2$	$0.00 \leq \chi2 \leq 2.00*sd$	$2.00*sd \leq \chi2 \leq 5.00*sd$	$418 \leq 551.914 \leq 1045$	Acceptable
Chi-square value	CMIN ($\chi2/sd$)	$0.00 \leq \chi2/sd \leq 2.00$	$2.00 \leq \chi2/sd \leq 5.00$	$551.914 /209 = 2.641$	Acceptable
Root Mean Square Error of Approximation	RMSEA	$0.00 \leq \mathbf{RMSEA} \leq 0.05$	$0.05 \leq \mathbf{RMSEA} \leq 0.10$	0.046	Good
Standardized Root Mean Square Residual	SRMR	$0.00 \leq \mathbf{SRMR} \leq 0.05$	$0.05 \leq \mathbf{SRMR} \leq 0.10$	0.016	Good
Normed Fıt Index	NFI	$0.95 \leq \mathbf{NFI} \leq 1.00$	$0.90 \leq \mathbf{NFI} \leq 0.95$	0.979	Good
Relative fix index	RFI	$0.95 \leq \mathbf{RFI} \leq 1.00$	$0.90 \leq \mathbf{RFI} \leq 0.95$	0.950	Good
Incremental fit index	IFI	$0.95 \leq \mathbf{IFI} \leq 1.00$	$0.90 \leq \mathbf{IFI} \leq 0.95$	0.987	Good
Goodness-of-fit index	GFI	$0.95 \leq \mathbf{GFI} \leq 1.00$	$0.90 \leq \mathbf{GFI} \leq 0.95$	0.960	Good
Adjusted goodness-of-fit index	AGFI	$0.90 \leq \mathbf{AGFI} \leq 1.00$	$0.85 \leq \mathbf{AGFI} \leq 0.90$	0.899	Acceptable
Tucker-Lews index	TLI	$0.95 \leq \mathbf{TLI} \leq 1.00$	$0.90 \leq \mathbf{TLI} \leq 0.95$	0.969	Good
Comparative fit index	CFI	$0.97 \leq \mathbf{CFI} \leq 1.00$	$0.95 \leq \mathbf{CFI} \leq 0.97$	0.987	Good

Note: df=39

Source: Schumacker and Lomax 2016 (and modified by authors)

The internal consistency of the measurements can be assessed based on Table 3, as the individual item loadings were greater than 0.5 (Field 2017; Hair et al. 2013). Reliability analyses were conducted to examine the items' internal consistency in assessing each factor. Cronbach's Alpha Reliability scores were 0.7 and higher (Nunnally et al. 1994), while the overall scale reliability was 0.95. This demonstrates the scale's internal consistency and reliability by showing a positive or strong connection between the variables and their factor grouping. All composite reliability (CR) values were above the cut-off point of 0.6 (Table 3), which must be exceeded for composite reliability to be considered satisfactory (Hair et al. 2013; Nunnally et al. 1994).

In addition to the Cronbach's alpha values, the average variance extracted (AVE) method was utilised to confirm the convergent validity of the items. The model's test results (Table 3) demonstrate that the AVE values exceeded the 0.5 threshold value (Hair et al. 2013). Each concept in the 32-item model had sufficient convergent validity and internal consistency.

Table 3. Research Model SEM Results – Results of Confirmatory Factor Analysis

Factors	Item description	Factor loadings	Mean values	Cronbach's Alpha (α)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Biospheric Value	I am a person who values unity with nature and harmonising with nature.	0.745	4.59	0.79	0.69	0.53
	I am a person who values preventing pollution and conserving natural resources.	0.712				
Environmental Knowledge	Preventing littering can help eliminate the unpleasant smell of litter and reduce the spread of harmful organisms.	0.757	4.80	0.90	0.75	0.61
	I know that excessive litter will damage the tourism destination environments.	0.800				
New Environmental Paradigm	We are approaching the limit of the number of people that the earth can support.	0.671	4.13	0.70	0.75	0.51
	Humans are severely abusing the environment.	0.712				
	The balance of nature is very delicate and easily upset.	0.761				
Awareness of consequences	Tourists' litter can generate huge negative environmental impacts in the tourism destination.	0.712	4.64	0.86	0.76	0.52
	Tourists can cause environmental deteriorations of the destination due to the littering.	0.761				
	Tourists can cause pollution, climate change, and exhaustion of natural resources because of a litter of the tourists.	0.680				
Ascription of responsibility	I am responsible for the impacts of litter on the environment.	0.722	4.53	0.76	0.70	0.54
	I am responsible for minimising the impacts of litter on the environment as a tourist.	0.750				

Factors	Item description	Factor loadings	Mean values	Cronbach's Alpha (α)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Personal Norm	I feel I am obligated to do my part to reduce the impact of litter on the environment as a tourist.	0.812	4.56	0.87	0.86	0.60
	People like me should minimise the impact of litter on the environment when traveling.	0.803				
	As a tourist, I feel morally obligated to reduce litter to minimise my environmental impact.	0.782				
	I would feel guilty if I were not able to dispose of litter properly when traveling.	0.704				
Tourists' environmentally responsible behaviour (TERB)	I plan to engage in preventing littering when traveling in the future.	0.634	4.37	0.89	0.88	0.53
	I will properly dispose of the littering when traveling in the future.	0.788				
	I will make an effort to reduce littering when traveling in the future.	0.769				
	I complied with the regulations to not destroy the visited nature site's environment.	0.824				
	I tried not to disrupt the fauna and flora during my recent nature based trip.	0.778				
	If there were environment improvement activities in the visited destination, I was willing to attend.	0.615				
	I try to convince others to protect the destination's natural environment.	0.642				

Factors	Item description	Factor loadings	Mean values	Cronbach's Alpha (α)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Satisfaction	My overall feeling with the destination was positive.	0.751	4.28	0.93	0.77	0.52
	The recent tourism experience made me feel very satisfied.	0.712				
	The recent tourism experience made me feel very delighted.	0.705				
Revisit	If given the opportunity I would return to this place.	0.742	4.39	0.92	0.77	0.53
	I will return to this place.	0.733				
	The likelihood of my return to this heritage site for another heritage travel is high.	0.705				
Recommend	I would like to recommend others to visit this national park.	0.733	4.45	0.95	0.76	0.51
	I would say positive things about this national park to others.	0.705				
	If someone is looking for a good destination I will suggest to him/her to visit this national park.	0.703				

Source: Created by the authors based on data analysis in SPSS AMOS 21.0.

Table 4. Table Discriminant Validity

Constructs	1	2	3	4	5	6	7	8	9	10
BV	**0.728**									
EK	0.625	**0.800**								
NEP	0.326	0.533	**0.714**							
AC	0.532	0.741	0.569	**0.721**						
AR	0.643	0.699	0.430	0.614	**0.735**					
PN	0.723	0.713	0.453	0.706	0.730	**0.775**				
TERB	0.724	0.646	0.449	0.665	0.669	0.702	**0.728**			
Satisfaction	0.266	0.316	0.200	0.257	0.285	0.297	0.276	**0.721**		
Revisit	0.406	0.355	0.263	0.356	0.433	0.440	0.415	0.640	**0.728**	
Recommend	0.350	0.438	0.274	0.360	0.475	0.423	0.398	0.710	0.680	**0.714**

⋆ Diagonal elements are the square root of AVE; off-diagonal are correlations.

Source: Created by the authors based on data analysis in SPSS AMOS 21.0.

A comparison of the square roots of the AVEs for all the constructs with diagonal and off-diagonal values is shown in Table 4. The square roots of the AVE values were higher than the correlation values, clearly suggesting discriminant validity (Fornell and Larcker 1981).

To investigate the relationships between the research constructs and test the proposed hypotheses, correlation analysis was applied (Table 5).

Table 5. Correlation analysis – hypothesis test results

Hypothesis	Relationship	Pearson correlation coefficient (r)	Status of hypothesis
H1	BV to NEP	0.326**	**Supported**
H2	EK to NEP	0.533**	**Supported**
H3	NEP to AC	0.569**	**Supported**
H4	AC to AR	0.614 **	**Supported**
H5	AR to PN	.0.777**	**Supported**
H6	PN to TERB	0.859**	**Supported**
H7	TERB to Satisfaction	0.276**	**Supported**
H8	Satisfaction to Revisit	0.640**	**Supported**
H9	Satisfaction to Recommend	0.750**	**Supported**

** The correlation is significant at the level of p = 0.01

Source: Created by the authors based on data analysis in SPSS 21.0

Environmental knowledge and personal values, such as those associated with the biosphere, impact the new paradigm theory (H1 and H2). Strong environmental values and increased environmental knowledge make a person more aware of environmental issues and inclined to consider the environment when acting or making decisions. Those who are aware of environmental problems recognise the consequences of their actions and accept responsibility for them (H3 and H4). This means that travellers who understand the potential consequences of their actions on the environment are also prepared to take action to mitigate those effects and accept responsibility for their actions.

Tourists who are aware of their responsibility will not engage in behaviours that harm the environment related to their PNs (H5). People who do things that seem morally right tend to behave in an environmentally responsible manner, as confirmed by the correlation results (H6). This implies

that when a visitor feels they have done something wrong, they experience a stronger sense of moral duty to stop the harm or at least mitigate it. People believe that since doing the right thing is correct, they should act accordingly; hence, they feel a moral obligation to do so. The significant predictor of tourist satisfaction, as well as intention to return and recommend, is environmentally responsible behaviour. Responsible environmental behaviour increases the likelihood that tourists will be satisfied with their experience, which, in turn, increases the probability that they will return and recommend the destination to others. (H7–H9).

Discussion

The findings of this study provide a thorough understanding of norm-driven, environmentally responsible behaviour based on the KBN theory within the context of Serbia's protected areas. Tourists' KBN can influence the environmentally responsible behaviour, which affects their satisfaction with their visit. Another relationship that was examined and subsequently confirmed was the impact of satisfaction on the intention to return to and recommend the destination. All nine hypotheses were supported by the empirical findings. In particular, the paper focused on environmentally responsible behaviour and its consequences, which improved the development and established application of KBN theory in tourism research.

The study's findings reveal that the NEP is positively impacted by biospheric values (H1 confirmed). This is consistent with the VBN theory, which holds that environmental beliefs and norms are shaped by biospheric values, which, in turn, encourage pro-environmental behaviour. Value-based interventions have the potential to effectively promote a transition towards more sustainable mindsets and actions, as suggested by the relationship found between the NEP and biospheric values. This relationship can help guide policies, plans for environmental education and the growth of the tourism industry by emphasising the importance of aligning personal and societal values with sustainable objectives.

Regarding ecotourism and geotourism in Serbia, tourists' level of biospheric values significantly affected their concern for current environmental issues. In accordance with Groening et al. (2018), Liobikienė et al. (2016) and Ünal

et al. (2018), biospheric values increase tourists' concerns about the NEP. These findings contrast with Fenitra et al.'s (2022) examination of domestic tourists in Indonesia that found that the level of biospheric values did not significantly affect or increase their concern about growing environmental issues. The current study's findings are consistent with earlier research (Akintunde 2017; Groening et al. 2018; Ünal et al. 2018) and demonstrate that people with strong environmental values, such as biospheric values, are more likely to take the environment into consideration when making decisions and taking actions.

The NEP and environmental knowledge were found to be positively correlated (H2 supported). The Theory of Planned Behaviour (TPB) and Environmental Literacy Framework are linked to the positive correlation that exists between environmental knowledge and the NEP. According to the TPB, greater knowledge improves attitudes towards the environment and strengthens beliefs that support the environment, such as those found in the NEP. Similarly, the Environmental Literacy Framework posits that better environmental knowledge leads to deeper ecological awareness, supporting the acceptance of sustainable worldviews such as the NEP.

Tourists with more environmental knowledge are more aware of environmental problems and potential solutions. The current research is consistent with previous findings (Amoah and Addoah 2021; Paço and Lavrador 2017; Ünal et al. 2018) that environmental knowledge positively affects the NEP. Previous research (Amoah and Addoah 2021; Liobikienė and Poškus 2019; Ünal et al. 2018; Zsóka et al. 2013) has shown that visitors' environmental knowledge can influence their willingness to engage in environmentally responsible behaviours. This study's findings indicate that eco- and geotourists who possess a strong appreciation for the biosphere and sufficient environmental knowledge are aware of the consequences of their actions and are willing to accept responsibility for them.

The results of the current research complement recent research by Campos-Soria et al. (2018), Fenitra et al. (2022), Liobikienė & Poškus (2019) and Ünal et al. (2018), showing that the NEP has a favourable effect on AC (H3 supported). The NEP shapes people's perceptions of the consequences of environmental harm and is consistent with the positive effect of the NEP on AC. Adopting the NEP increases the likelihood of people noticing and acting upon the potential harm resulting from environmental degradation, thereby promoting pro-environmental behaviour.

Serbian domestic tourists who are more aware of current environmental issues are more conscious of their behaviour and actions. When tourists are aware and concerned about the effects of their actions, they recognise the need for steps to reduce their negative impacts and accept responsibility for them (H4 supported). The current research supports the notion that people are more likely to accept responsibility for their behaviours and take steps to decrease their impacts when they are aware of the consequences (Fenitra et al. 2022; Ghazali et al. 2019; Han et al. 2015; Ünal et al. 2018). According to H5 , AC strengthens PNs, which is consistent with earlier research (Han 2015; Choi et al. 2015; Fenitra et al. 2022; Ünal et al. 2018; Sharma and Gupta 2020). The VBN theory aligns with the relationship in which AC influences AR and fortifies PNs. According to VBN theory, people become personally accountable (AC) when they recognise their influence on the environment (knowledge of consequences), and this supports their internalised requirements to act sustainably (PNs).

In the case of Serbian PAs, tourists who feel they have done something wrong experience a stronger moral duty to take action to make amends or at least mitigate the harm arising from their action. They feel a moral obligation to act responsibly towards the environment.

The findings have validated H6, which claims that personal norms positively impact environmentally responsible behaviour. The Norm-Activation Model (NAM), which posits that people are more inclined to act in a pro-environmental manner when they internalise moral obligations (PNs) to protect the environment, is consistent with the positive influence of PNs on environmentally responsible behaviour. This strengthens the connection between sustainable behaviour and individual accountability.

Many studies in various contexts have empirically validated this association (Fenitra et al. 2022; Ghazali et al. 2019; Han 2015; Hiratsuka et al. 2018; Landon et al. 2018; Ünal et al. 2018). Eco- and geotourists in Serbia feel a moral obligation to behave ethically since it is the right thing to do, and they actively choose to act in a manner that does not harm the resources of PAs.

Hypothesis 7, which asserts that TERB has a positive impact on tourists' satisfaction, has been confirmed. Researchers' perspectives differ when examining the connection between these two variables. Contrary to the current research findings, earlier research discovered a connection between satisfaction and TERB, contending that satisfied tourists are more likely to act

responsibly (Cheng et al. 2022; Chiu et al. 2014; Su et al. 2020). The current findings indicate that TERB is a prerequisite for satisfaction and perception of the destination among Serbian eco- and geotourists. This is logical given that tourists appreciate nature and wish to contribute to its preservation, especially when visiting PAs like those focused on in this study. Tourist satisfaction increases as the likelihood of environmentally responsible behaviour increases. This is consistent with earlier research (Obradović et al. 2023) that found that satisfaction and memorable tourist experiences were mediated by environmentally responsible behaviour.

The results of the research demonstrated a direct correlation between future behavioural intentions and satisfaction with environmentally responsible behaviour. The intention of visitors to return and recommend is greatly influenced by their level of satisfaction (H8 and H9 confirmed). If tourists at Serbia's eco- and geotourism destinations value and respect natural areas, they will want to act responsibly, which will enhance their satisfaction with the destination. When they are satisfied, they will be eager to return and recommend it to others. The findings here are consistent with earlier studies (Kim et al. 2015; Viet et al. 2020; Prayag et al. 2013; Obradović et al. 2023; Zeng et al. 2021).

Tourists' concern for environmental issues will increase and their awareness of their behaviour will be heightened when they are informed about the environment and possess biospheric values. Additionally, raising people's understanding of how their actions could harm the environment would make them more responsible for minimising the negative effects of their actions. Consequently, travellers would be motivated to take appropriate action to lessen the potential consequences of their actions. The current study also demonstrated that caring for the environment (acting responsibly) has a significant impact on visitor satisfaction, which, in turn, enhances tourists' interest in returning to and recommending the destination.

The current study does not support the idea that tourists behave differently depending on the type of destination (ecotourism or geotourism) they are visiting. Furthermore, it is possible that local tourists do not distinguish between eco- and geotourism destinations. Therefore, it would be beneficial for tourist organisers to better inform tourists about the differences between these destinations.

Conclusion

This study was designed to contribute to the application of the KBN theory in the context of tourism by enhancing and developing its application in the tourism sector. The research confirmed the theory's ability to describe environmentally responsible tourist behaviour. It sheds light on Serbian domestic eco- and geotourism practices that are environmentally responsible. The current research supports the causal link between the components of the KBN theory, environmentally responsible behaviour, satisfaction and behavioural intentions (revisit and recommend).

The theoretical contribution of this study includes the extension of the KBN theory and TERB by integrating additional dimensions (satisfaction and behavioural intentions) as the consequences of TERB in the context of eco- and geotourism in Pas. With a focus on domestic tourism in Serbia, the study advances the theory by highlighting its applicability in understanding ecologically conscious tourist behaviour. It validates the causal connections among knowledge, beliefs and PNs, as well as the ways in which these elements affect travellers' satisfaction, eco-friendly actions and behavioural intentions, such as their propensity to return to or recommend eco- and geotourism destinations. The research expands the theoretical application of the KBN theory to the tourism industry and provides insights for the development of sustainable tourism.

One of the primary objectives of this study was to enhance awareness of how tourists can behave in an environmentally responsible manner in PAs. This study aimed to investigate the relationship between KBN factors TERB as well as how TERB influences environmentally responsible behaviour. This study is the first to employ a unified research approach to examine the connections between KBN, TERB, satisfaction and behavioural intentions (revisit and recommend). This relationship provides a nuanced understanding of how eco-friendly behaviour impacts visitors' overall experiences and their future actions.

Consequently, this research addresses a gap in the literature on sustainable tourism that calls for further in-depth research into applications of the KBN theory and TERB in tourism, particularly in the realms of ecotourism and geotourism. The study primarily illustrates that tourists' awareness of their actions increases when they possess environmental knowledge and biospheric values. Raising awareness of the potential negative consequences cer-

tain behaviours could have on the environment would encourage people to take responsibility for minimising those effects and motivate them to take the necessary steps to mitigate their impact. The study also demonstrated that environmentally responsible behaviour significantly impacts visitor satisfaction, which, in turn, enhances tourists' interest in returning to and recommending eco- and geotourist destinations.

This research expands the current understanding of the antecedents and consequences of TERB, contributing to the comprehension of environmentally responsible behaviour and sustainable tourism practices. The results revealed significant, favourable relationships among all variables, validating the reliability of the instrument within the context of ecotourism and geotourism. The availability of this tool will facilitate an urgently needed empirical investigation focusing on the significance of tourists' environmentally responsible behaviour.

The findings of this study provide a valid and reliable scale that can be utilised to assess environmental responsibility in the context of ecotourism and geotourism. By applying the KBN theory to develop strategies that encourage sustainable behaviours among visitors, the research offers valuable implications for reducing the environmental impact of tourism and advancing conservation objectives in PAs. While the study does not differentiate between ecotourists and geotourists, it emphasises the importance of TERB in both contexts, thereby enhancing the understanding of eco-friendly behaviour in these tourism niches. The findings of this study have numerous implications for destination marketers and managers. They indicate that knowledge, values, moral obligation and a person's willingness to accept responsibility for the consequences of their actions all influence a person's commitment to environmental responsibility. If individuals possess sufficient environmental knowledge and values, they are more likely to act appropriately. Therefore, environmental education is crucial. The development of ecological consciousness, which is essential for influencing pro-environmental attitudes and actions, is significantly supported by education. Ecological education fosters sustainable actions and cultivates a sense of responsibility towards the environment by raising awareness of environmental challenges. By illustrating the relationship between ecosystems and human well-being, these initiatives inspire individuals to take actions that protect the environment. Ecological education is vital to the broader effort to address global environmental concerns, as it can lead

to long-term societal shifts towards sustainability by imparting ecological understanding from a young age.

For instance, destination marketers should design tourism programmes that enable tourists to actively participate in environmental improvement projects. The presentation of PAs should be prioritised by decision-makers and destination management organisations, and tours could be crafted to help tourists appreciate the importance of these sites. Providing brief training sessions for visitors before they enter the PAs would be beneficial. For instance, a documentary highlighting the ecological and geomorphological values of the PAs, as well as how increased tourism activity – particularly irresponsible tourist behaviour – challenges is challenging the ecological balance of PAs and harms ecosystems, could be produced. This documentary could be disseminated through various social media platforms, making it easily accessible. Such initiatives would educate visitors, raise awareness of the consequences of their actions, foster a sense of responsibility and encourage them to behave more responsibly, thereby enhancing their connection to nature. This, in turn, would lead to increased satisfaction and the willingness to return to and recommend the PAs. Consequently, there would be a rise in the number of committed ecotourists and geotourists, with more individuals acting responsibly.

This study may contribute to the development of an effective campaign and strategy to promote sustainable tourism and TERB. Environmental education programmes that raise people's environmental consciousness and enhance environmentally responsible behaviour can considerably lessen the environmental impact of tourism. However, certain limitations of this study could be addressed in future research. By including additional elements such as perceptions of the natural environment, the availability of infrastructure, emotional experiences and environmental commitment, future research could build upon and expand the findings of the current study. Future investigations should add more values, such as altruistic and egoistic values, as this study's model only accounted for biospheric values. Conducting interviews with tourists would also provide insightful evidence regarding TERB. Non-random sampling is another limitation of this study; when respondents are not selected randomly, it can lead to biases, as the sample might not be representative of the whole population. For instance, if the study only surveyed travellers visiting specific destinations or those predisposed to eco-friendly behaviour, the results may not be generalisable to all visitors.

Additionally, selecting a *p*-value of 0.01 could result in a more cautious analysis of the data, potentially affecting the conclusions drawn regarding the significance and interrelationships of the study's constructs.

The primary reason for tourists' visits and their motivations may impact TERB, although these were not addressed in the study. Future research should take this into account. Subsequent investigations could explore additional locations, both within and outside Serbia. As foreign visitors were not surveyed, it would be interesting to compare their perspectives to identify any potential variations. The same approach could be used to investigate various forms of tourism (for example, cultural tourism, rural tourism, heritage tourism and community-based tourism). Future surveys should include questions regarding residents' perspectives, which would provide intriguing insights.

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