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## Forest Bathing (Shinrin-yoku) and Sustainability: Attitudes of Domestic Tourists in Serbia on Health and Nature Protection

Tamara Gajić\*<sup>1</sup>, Dragan Vukolić<sup>2</sup>

<sup>1</sup> Geographical Institute „Jovan Cvijić“ SASA, Belgrade, Serbia

<sup>2</sup> Faculty of Tourism and Hotel Management, University of Business Studies, Banja Luka, Bosnia and Herzegovina

(E-mail: <sup>1</sup>tamara.gajic.1977@gmail.com, <sup>2</sup>vukolicd@yahoo.com)

**Abstract.** *Objective* – to comprehensively assess the potential of forest bathing (Shinrin-yoku) as a health-oriented and nature-based tourism activity and to examine and explain the relationships between perceived health and psychological benefits, environmental awareness, and domestic tourists' intention to support sustainable tourism. *Methods* – the study is based on a structured survey conducted among 1,385 domestic tourists in Serbia; data were processed using exploratory factor analysis, correlation analysis, and OLS regression models with robust standard errors. *Results* – the findings indicate that perceived health and psychological benefits of forest bathing have a statistically significant direct effect on the intention to support sustainable tourism; additionally, an indirect effect mediated by environmental awareness was identified; nature-based experiences were confirmed as an important determinant of environmentally responsible and sustainable tourist behavior; the results highlight the role of forest bathing as a tool for promoting sustainable tourism. *Conclusions* – forest bathing represents an effective mechanism for integrating health benefits with sustainable tourism behavior, enhances environmental awareness, and contributes to the long-term sustainable development of tourist destinations, as well as to the improvement of tourism planning and policy-making.

**Keywords:** forest bathing, sustainable tourism, environmental awareness, health benefits, behavioral intentions

### Introduction

In the modern trends of tourism development, health-oriented and nature-based tourism is gaining more and more importance, as a response to the growing health challenges of modern society, but also to the need for more sustainable forms of tourism development. One of the

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most important concepts within this segment is forest bathing (Shinrin-yoku), which involves conscious and deep immersion in the forest environment in order to improve physical and psychological well-being. Previous research confirms that staying in the forest contributes to reducing stress, improving mental health and a general sense of well-being, making forest bathing a relevant resource in the development of wellness and health tourism (Rodtook et al., 2024; Farkic et al., 2021).

In the academic literature, forest bathing and forest health tourism viewed more broadly are most often analyzed through the prism of tourist motivation, perceived value, satisfaction and behavioral intentions of tourists. Empirical findings indicate that the perceived health benefits and value of the tourist experience have a strong influence on tourists' intention to participate in these forms of tourism, with attitudes often having a moderating role (Zhao et al., 2025). Similarly, research based on the Theory of Planned Behavior and the Health Belief Model confirms that attitudes, subjective norms and perceived behavioral control significantly shape tourists' intention to engage in forest therapy tourism, especially in the Asian context (Zhao & An, 2021). These findings indicate a growing scientific consensus on the importance of forest bathing as a factor influencing tourist behavior.

However, despite the growing body of research, there are still significant research gaps in the literature. First of all, most of the existing studies focus on individual health effects, tourist satisfaction or immediate behavioral intentions, while the connection between forest bathing and the broader concept of sustainable tourist behavior is insufficiently researched. Although forest health tourism is often implicitly seen as environmentally friendly, there are few empirical works that explicitly examine whether and in what way the perceived health benefits of staying in the forest contribute to the development of environmental awareness and support for sustainable forms of tourism. Additionally, existing research is largely geographically concentrated on Asian destinations with a long tradition of forest therapy practices, such as China and Thailand (Ge & Chen, 2024; Rodtook et al., 2024), while empirical evidence from the European and especially Southeast European context is extremely limited. At the same time, although forest bathing is conceptualized as a conscious and reflective tourism practice that can deepen the relationship between man and nature (Farkic et al., 2021), the mechanisms through which such experiences influence the formation of ecological values and support for sustainable tourism remain insufficiently elucidated. In particular, the potential mediating role of environmental awareness in the relationship between the health benefits of forest bathing and the sustainable behavioral intentions of tourists has been poorly investigated.

These gaps are particularly relevant in the context of Serbia, where forest resources represent an important part of natural capital and domestic tourism, but forest bathing has not yet been systematically developed or researched as a sustainable tourism product. Despite the growing interest of domestic tourists in staying in nature and health-oriented tourist activities, there is a lack of empirically based research that would show whether forest bathing can play a wider role in encouraging environmental awareness and sustainable tourist behavior. Based on the above, the aim of this research is to examine the relationships between the perceived health and psychological benefits of forest bathing, environmental awareness and the intention of domestic tourists to support sustainable forms of tourism. The research aims to determine whether forest bathing affects sustainable behavioral intentions directly, but also indirectly, through the development of environmental awareness, using an econometric approach based on OLS regression.

In accordance with the defined objective, the research seeks to answer the following research questions:

*R.Q.1. Whether the perceived health and psychological benefits of forest bathing significantly affect the level of environmental awareness of domestic tourists;*

*R.Q.2. Whether forest bathing has a direct impact on the intention to support sustainable tourism;*

*R.Q.3. Whether environmental awareness has a mediating role in the relationship between forest bathing and the intention to support sustainable forms of tourism.*

The importance of this research is reflected in the fact that it does not treat forest bathing exclusively as a wellness activity, but empirically positions it as a mechanism that connects individual health benefits with the formation of environmental awareness and support for sustainable tourism. The research clarifies how personal experiences of being in the forest can produce broader sustainable behavioral intentions, thus bridging the gap between the health-oriented tourism literature and sustainable tourism behavior research. In the practical context of Serbia, the results provide a solid empirical basis for the strategic use of forest bathing as a tool for simultaneously improving the health of tourists and long-term sustainable development of tourist destinations.

### **Literature review**

Contemporary literature on forest health tourism and forest bathing is developed in the broader framework of sustainable and green tourism, whereby the role of nature-based tourist experiences in shaping the behavior and values of tourists is increasingly emphasized. Early works on sustainable tourism management indicated that long-term sustainability does not depend solely on management and planning mechanisms, but also on the behavior of tourists themselves and their willingness to support environmentally responsible practices (Lim & McAleer, 2005; He et al., 2018). This turn towards the behavioral dimension of tourism has opened up space for research that connects individual experiences, attitudes and intentions with the broader goals of sustainable development. Within the framework of green and sustainable tourism, numerous studies confirm that environmental awareness, perception of environmental problems and attitudes towards nature protection significantly influence the green behavioral intentions of tourists. Studies conducted in ecologically sensitive areas, such as the Sundarbans in Bangladesh or national parks in Southeast Asia, show that tourists with a more pronounced environmental awareness more often express the intention to behave responsibly and support the sustainable development of destinations (Anuwichanont, 2011; Karmoker & Ahmed, 2022). Nevertheless, this literature mainly views environmental awareness as an already formed feature, without a deeper analysis of the process through which it arises in the tourist context.

Parallel to that, the literature on forest health tourism and forest bathing is developing, which emphasizes the experiential, emotional and health value of staying in a forest environment. Empirical research confirms that experiential value and place attachment in forest health destinations have a positive effect on the environmentally responsible behavior of tourists (Xu et al., 2022). These findings suggest that being in the forest may act as a trigger for more responsible behavior, but it remains unclear whether this effect is direct or mediated through changes in attitudes and values, such as environmental awareness. Bibliometric analyzes indicate that interest in forest bathing and tourism is rapidly increasing, but at the same time reveal a clear dominance of health and psychological topics, while sustainability and behavioral implications are less represented (Pérez-Calderón et al., 2024). Similarly, conceptual models of forest-based and nature-based health tourism emphasize therapeutic and wellness effects, but rarely explicitly integrate the dimension of sustainable tourism behavior (Agarwal & Parashar,

2023; Bressane et al., 2025). At the same time, forest bathing often remains positioned as an individual health practice, rather than as a potential mechanism for wider social and environmental change.

Research on behavioral intentions in the context of forest wellness destinations additionally relies on models like the S–O–R theory, emphasizing the influence of the destination's functional and ambient attributes on tourists' intentions (Jie, 2023). Although these approaches confirm the importance of the quality of the natural environment, they often explain behavioral intentions through external stimuli, ignoring internal cognitive and value processes that can mediate between experience and behavior. The wider body of literature on green tourism and the green economy further indicates that local contexts, natural resources and domestic tourists are key to the transition to more sustainable forms of tourism (Tomassini & Cavagnaro, 2020; Toubes & Araújo-Vila, 2022; Luekveerawattana, 2024). However, even in these works, forest bathing is rarely considered as a specific practice that can simultaneously contribute to the health of tourists and strengthen their support for the sustainable development of destinations. Studies dealing with sustainable behaviors in forest and adventure tours offer useful conceptualizations of sustainable behaviors, but mostly focus on normative and managerial aspects, without considering tourists' subjective health experiences (Ghorbani et al., 2023).

Finally, research on the adaptation of tourism to climate change and social challenges indicates that the future of sustainable tourism depends on changes in the behavior of tourists and their ability to recognize the long-term ecological consequences of their decisions (Hélder Lopes et al., 2022; Thipsingh et al., 2022). However, the link between concrete natural experiences and such behavioral changes remains insufficiently empirically clarified. From the literature structured in this way, key gaps are clearly visible. First, there is a lack of empirical research that systematically links the perceived health and psychological benefits of forest bathing with the development of environmental awareness and sustainable behavioral intentions. Second, most studies rely on descriptive analyzes or structural modeling, while econometric approaches that enable a clear identification of direct and indirect effects are less common. Third, the empirical evidence comes predominantly from the Asian context, while European and especially Southeast European destinations are largely neglected. These gaps justify the need for research that considers forest bathing as a potential mechanism of transformation of tourist values and behavior, and not only as a wellness activity. By focusing on domestic tourists and applying an econometric approach, this research seeks to contribute to the integration of the literature on forest health tourism, environmental awareness and sustainable tourism behavior, offering empirically grounded insights relevant to both theory and practice of sustainable tourism development.

## **Research methods**

### *Research area and recruitment of respondents*

The research was carried out on the territory of the Republic of Serbia, at tourist destinations with a pronounced natural and forest environment, which represent a suitable space for practicing forest bathing (Shinrin-yoku). Field surveys were carried out in the areas of Tara National Park, Fruška Gora National Park, Zlatibor, and Kopaonik during the summer season, as well as on Stara Planina. The selected destinations include both highly visited and less crowded natural areas, which ensures a diverse context of staying in a forest environment.

Data collection was carried out in the period from March 10 to August 28, when the intensity of tourists' stay in nature is most pronounced. During this period, activities such as walks,

staying in the forest and outdoor recreation dominate, which allows respondents to assess the immediate health and psychological effects of being in nature, as well as attitudes about the protection of natural resources. The choice of the specified period reduces the seasonal bias and increases the relevance of the answers in relation to the subject of the research. The target population of the research consisted of domestic tourists, residents of the Republic of Serbia, over 18 years old, who were staying at one of the selected natural destinations at the time of the survey. The recruitment of respondents was carried out using the method of stratified systematic interception of tourists in the field. Stratification was carried out according to the destination and the month of the research, which ensured an even representation of respondents during the entire period of data collection. Within each destination and time interval, interviewers approached one in three visitors passing through a pre-defined recruitment point, such as national park entrances, walking trails, viewpoints, and tourist information centers. This approach made it possible to reduce the subjective selection of respondents and increased the probability of including different profiles of tourists.

A total of 1,650 questionnaires were distributed. 1,432 completed questionnaires were collected, while after quality control and elimination of incomplete or methodologically invalid answers, 1,385 questionnaires were included in the final analysis. The return rate was 86.8%, while the validity rate of the collected questionnaires was 96.7%. This sample size allows for a high level of statistical reliability of the results. At the 95% confidence level ( $Z = 1.96$ ), the maximum error of estimate for the sample proportions is  $\pm 2.63\%$ , assuming the least favorable population variance ( $p = 0.50$ ). The estimation error was calculated according to the standard formula for large samples:

$$ME = Z \times \sqrt{[p(1-p)/n]} \quad (1)$$

The statistical power of the sample was assessed in accordance with the principles of the G\*Power methodology. For correlation analyses, at a significance level of  $\alpha = 0.05$ , with an assumed small to medium effect ( $r = 0.10-0.20$ ), a sample of 1,385 respondents provides statistical power greater than 0.99. For multiple regression analysis with up to 6 predictor variables, assuming a small to medium effect ( $f^2 = 0.05-0.15$ ), statistical power also exceeds 0.95, indicating that the sample is fully adequate to detect even smaller effects. The normality of the distribution of the variables was checked using the Shapiro-Wilk test. Due to the large sample size, the test in some cases showed statistical significance ( $p < 0.05$ ), which is expected considering its sensitivity in large samples. Therefore, normality was additionally evaluated through visual analysis of the Q-Q diagram, as well as by examining the coefficients of asymmetry (skewness) and flattening (kurtosis). All analyzed variables had skewness and kurtosis values ranging from  $-1.00$  to  $+1.00$ , which is considered acceptable for the application of parametric statistical procedures.

A total of 721 respondents were female, which is 52.1% of the sample, while 664 respondents were male, i.e., 47.9%. The age structure of the sample was balanced, with a dominant representation of respondents aged 25 to 44, which corresponds to the structure of domestic tourists who most often visit natural destinations in Serbia. The majority of respondents had completed secondary or higher education, while the geographical distribution of residence included all regions of Serbia, with the largest share of respondents from Šumadija and Western Serbia, as well as Southern and Eastern Serbia (Table 1).

Table 1 – Demographic structure of the sample

Variable	Category	N	%
Gender	Male	664	47,9
	Female	721	52,1
Age	18-24	249	18,0
	25-34	374	27,0
	35-44	305	22,0
	45-54	249	18,0
	55 +	208	15,0
Education	High school	471	34,0
	Higher / vocational school	249	18,0
	Higher education (basic studies)	388	28,0
	Master's / doctoral studies	277	20,0
Region	Belgrade	249	18,0
	Vojvodina	236	17,0
	Šumadija and Western Serbia	374	27,0
	Southern and Eastern Serbia	526	38,0

Note: compiled by the authors

Participation in the research was entirely voluntary. Before filling out the questionnaire, the purpose of the research, the academic nature of data collection, and the estimated time needed to fill out the questionnaire, which amounted to an average of 7–10 minutes, were clearly explained to all respondents. The anonymity of the respondents was fully ensured, without the collection of personal or identifying data, which ensured the protection of privacy and reduced the risk of ethical problems. The research did not include the collection of medical, diagnostic or other sensitive data, but focused exclusively on the attitudes, perceptions and intentions of the respondents, thus minimizing ethical risks. Potential self-selection bias was mitigated by a systematic approach to recruiting respondents (every third tourist at defined points), which reduced the possibility of subjective selection by the interviewer. The bias of socially desirable responses is mitigated by the anonymity of the questionnaire and the neutral wording of the questions. Seasonal bias was limited by collecting data during a six-month period (March–August), while location effects were reduced by including more natural destinations with varying degrees of attendance.

#### *Research instrument*

The research instrument is a structured questionnaire constructed based on the integration of three theoretically and empirically confirmed models: the model of perception of benefits in natural tourism (Lee, Jan & Yang, 2013), the theory of planned behavior (Ajzen, 1991) and the NEP scale of environmental awareness (Dunlap et al., 2000). All statements are adapted to the context of forest bathing (Shinrin-yoku) and domestic tourists in Serbia (Table 2). The questionnaire contained statements grouped into three latent dimensions: perception of health and psychological benefits of staying in a forest environment, environmental awareness and attitudes about nature protection, as well as respondents' intention to support and practice sustainable forms of tourism. Answers were measured using a five-point Likert scale (1 - strongly disagree, 5 - strongly agree).

Table 2 – Research Instrument

Construct (Composite Index)	Item Code	Statement	Source
Perceived Health and Psychological Benefits of Forest Bathing (HB Index)	HB1	Spending time in a forest environment significantly reduces my level of stress.	Lee et al. (2013)
	HB2	After spending time in the forest, I feel an improvement in my mental well-being.	
	HB3	Forest bathing has a positive effect on my overall psychophysical health.	
Environmental Awareness and Attitudes toward Nature Protection (ES Index / NEP)	ES1	Humans should live in harmony with nature rather than exploit it uncontrollably.	Dunlap et al. (2000)
	ES2	Forest conservation is more important than short-term economic benefits from tourism.	
	ES3	Mass tourism represents a serious threat to natural ecosystems.	
Intention to Support Sustainable Tourism (OB Index) – Outcome Variable	OB1	I am willing to choose destinations that apply the principles of sustainable tourism.	Ajzen (1991)
	OB2	During my travels, I try to behave in ways that minimize negative impacts on the natural environment.	
	OB3	I would support the further development of forest bathing as a sustainable form of tourism in Serbia.	

Note: compiled by the authors

### *Data processing*

The analysis of the collected data was carried out using descriptive, factorial and econometric methods, in accordance with the set goals of the research. All statistical procedures were performed in the IBM SPSS Statistics program (version 26), while the statistical power of the sample was assessed using the G\*Power 3.1 software. The level of statistical significance in all analyzes was set at 0.05. After cleaning the database and eliminating methodologically invalid questionnaires, a total of 1,385 respondents were included in the final analysis. In the first phase, a descriptive analysis was carried out, which calculated arithmetic means and standard deviations for all individual statements and composite indices. The obtained results indicate the expressed positive attitudes of the respondents towards forest bathing, a high environmental awareness and a strong intention to support sustainable tourism.

In the next step, the structure and reliability of the measuring instrument were checked. The suitability of the data for factor analysis was confirmed by the high value of the Kaiser–Meyer–Olkin coefficient (KMO = 0.842) and the statistically significant Bartlett's sphericity test ( $\chi^2 =$

6,214.37;  $p < 0.001$ ). Exploratory factor analysis, conducted using the method of principal axis factoring with Varimax rotation, resulted in a clear three-factor structure that explains 71.4% of the total variance. The reliability of the obtained constructs was confirmed by satisfactory values of Cronbach's alpha and McDonald's omega coefficients, while additional indicators of composite reliability and average variance extracted indicated good convergent validity. Based on the confirmed factor structure, composite indices of the perception of the health and psychological benefits of forest bathing, environmental awareness and the intention to support sustainable tourism were constructed for each respondent, as the arithmetic mean of the corresponding items. Given that all variables had a continuous range of values from 1 to 5, the conditions for applying the method of ordinary least squares in econometric analysis were met. Before carrying out regression analyses, Pearson's correlation analysis was performed, which established positive and statistically significant relationships between all main variables. None of the correlations exceeded the threshold that would indicate the problem of multicollinearity, which enabled the simultaneous inclusion of variables in the regression models.

Econometric analysis was conducted using OLS regression through three consecutive models. In the first model, environmental awareness was considered as a dependent variable, while the perception of health and psychological benefits of forest bathing was included as an independent variable. The results of this model show a statistically significant and positive effect of forest bathing on environmental awareness, with a standardized regression coefficient  $\beta = 0.42$  and a robust standard error of 0.03, resulting in high statistical significance ( $p < 0.001$ ). The value of the coefficient of determination is  $R^2 = 0.18$ , while the robust F-statistic confirms the overall statistical significance of the model ( $F = 298.6$ ;  $p < 0.001$ ). The second regression model is aimed at examining the direct impact of forest bathing on the intention to support sustainable tourism. The results indicate a strong positive effect, with a regression coefficient value of  $\beta = 0.48$ , a robust standard error of 0.03 and a significance level of  $p < 0.001$ . This model explained 23% of the variance of the dependent variable ( $R^2 = 0.23$ ), while the robust F-statistic ( $F = 411.2$ ;  $p < 0.001$ ) indicates its high overall statistical significance. In the third, expanded model, the perception of the health benefits of forest bathing and environmental awareness were simultaneously included as independent variables, while the intention to support sustainable tourism was kept as a dependent variable. The results show that the introduction of environmental awareness leads to a reduction in the direct effect of forest bathing, whereby the  $\beta$  coefficient drops to 0.29, but remains statistically significant (robust SE = 0.03;  $p < 0.001$ ). At the same time, environmental awareness shows a strong positive influence on the intention to support sustainable tourism, with a coefficient of  $\beta = 0.44$  and the same level of statistical significance. The value of the coefficient of determination in this model is  $R^2 = 0.41$ , while the robust F-statistic ( $F = 483.9$ ;  $p < 0.001$ ) confirms its high explanatory power. This pattern of results indicates the existence of a partial indirect effect, whereby the perception of health and psychological benefits of forest bathing affects the intention to support sustainable tourism both directly and indirectly, through environmental awareness. Given the survey nature of the data and the potential presence of heteroskedasticity, robust (Huber-White) standard errors were used in all regression analyses, which ensured greater reliability of standard error estimation and the validity of statistical conclusions.

## Results

Descriptive analysis included all individual claims and composite indices that measure the perception of health and psychological benefits of forest bathing, environmental awareness and

intention to support sustainable tourism. All variables were measured on a five-point Likert scale ranging from 1 to 5.

Within the perception of health and psychological benefits of forest bathing, the mean values of individual statements range from 4.15 to 4.21, while the composite index records a mean value of 4.18 with a standard deviation of 0.63. For environmental awareness, the mean values of the statements range from 3.88 to 4.32, and the average value of the index is 4.05 with a standard deviation of 0.58. The intention to support sustainable tourism shows mean values of individual statements between 4.09 and 4.18, while the composite index has a mean value of 4.12 with a standard deviation of 0.61. The results indicate high average values of all analyzed constructs and a moderate dispersion of respondents' answers (Table 3).

Table 3 – Descriptive Statistics of All Research Variables

Construct / Index	Code	Variable (Statement)	Min	Max	M	SD
Perceived Health and Psychological Benefits of Forest Bathing (HB)	HB1	Spending time in a forest environment significantly reduces my level of stress.	1	5	4.21	0.71
	HB2	After spending time in the forest, I feel an improvement in my mental well-being.	1	5	4.17	0.69
	HB3	Forest bathing has a positive effect on my overall psychophysical health.	1	5	4.15	0.73
	HB (index)	Mean value of HB1–HB3	1.33	5.00	4.18	0.63
Environmental Awareness and Attitudes toward Nature Protection (ES / NEP)	ES1	Humans should live in harmony with nature rather than exploit it uncontrollably.	1	5	4.32	0.64
	ES2	Forest conservation is more important than short-term economic benefits from tourism.	1	5	3.96	0.77
	ES3	Mass tourism represents a serious threat to natural ecosystems.	1	5	3.88	0.81
	ES (index)	Mean value of ES1–ES3	1.67	5.00	4.05	0.58
Intention to Support Sustainable Tourism (OB – Outcome Variable)	OB1	I choose tourist destinations that apply the principles of sustainable tourism.	1	5	4.09	0.74
	OB2	During my travels, I behave in ways that minimize negative impacts on the natural environment.	1	5	4.18	0.68
	OB3	I support the development of forest bathing as a sustainable form of tourism in Serbia.	1	5	4.10	0.72
	OB (index)	Mean value of OB1–OB3	1.33	5.00	4.12	0.61

Note: compiled by the authors

Exploratory factor analysis was conducted using the principal axis factoring method, with Varimax rotation. Kaiser's criterion (eigenvalue > 1) was used as a factor retention criterion, as well as the theoretical foundation of the model. The results indicated a three-factor structure, which explained a total of 71.4% of the variance, which is above the recommended threshold in the social sciences. Total explained variance: 71.4% (Factor 1 = 34.7%; Factor 2 = 22.0%; Factor 3 = 14.7% (Table 4).

Table 4 – Exploratory factor analysis results and reliability

Construct	Item	M	SD	Factor 1 (HB)	Factor 2 (ES)	Factor 3 (OB)	Cronbach's $\alpha$
Health and Psychological Benefits of Forest Bathing (HB)	HB1	4.21	0.71	0.81	—	—	0.81
	HB2	4.17	0.69	0.78	—	—	
	HB3	4.15	0.73	0.75	—	—	
Environmental Awareness (ES)	ES1	4.32	0.64	—	0.84	—	0.78
	ES2	3.96	0.77	—	0.79	—	
	ES3	3.88	0.81	—	0.72	—	
Intention to Support Sustainable Tourism (OB)	OB1	4.09	0.74	—	—	0.82	0.80
	OB2	4.18	0.68	—	—	0.79	
	OB3	4.10	0.72	—	—	0.76	

Note: compiled by the authors

The results indicate satisfactory internal consistency and convergent validity for all constructs included in the research model. All factors show Cronbach's alpha and McDonald's omega values above the recommended threshold of 0.70, confirming adequate reliability. Composite reliability (CR) values exceed 0.80 for all constructs, while average variance extracted (AVE) values are above the minimum acceptable level of 0.50, supporting the convergent validity of the measurement model.

Table 5 – Reliability and Validity of the Research Model Factors

Factor (Latent Variable)	Number of Items	M	SD	Cronbach's $\alpha$	McDonald's $\omega$	CR	AVE
Health and Psychological Benefits of Forest Bathing (HB)	3	4.18	0.63	0.81	0.82	0.83	0.62
Environmental Awareness and Attitudes toward Nature Protection (ES)	3	4.05	0.58	0.78	0.79	0.80	0.58
Intention to Support Sustainable Tourism (OB)	3	4.12	0.61	0.80	0.81	0.82	

Note: compiled by the authors

The Pearson correlation analysis reveals statistically significant and positive relationships between all research factors. The strength of correlations ranges from moderate to moderately strong, indicating meaningful associations without exceeding thresholds that would suggest multicollinearity. These results support the suitability of the variables for subsequent regression analysis.

Table 6 – Pearson Correlation Matrix of Research Factors

Factor	HB	ES	OB
HB – Health and Psychological Benefits of Forest Bathing	1	0.42***	0.48***
ES – Environmental Awareness	0.42***	1	0.55***
OB – Intention to Support Sustainable Tourism	0.48***	0.55***	1

Note: \*\*\*p < 0.001

The construction of variables for the purposes of econometric analysis was carried out at the level of individual respondents. For each respondent, composite indices were formed as arithmetic means of the corresponding items. The index of perception of health and psychological benefits of forest bathing is defined by the expression:

$$HB_i = (HB1 + HB2 + HB3) / 3,$$

where the variables HB1, HB2 and HB3 represent individual statements that measure the subjective assessment of the health and psychological effects of being in a forest environment. In the same way, an index of ecological awareness was constructed, which is defined by the expression:

$$ES_i = (ES1 + ES2 + ES3) / 3,$$

whereby items ES1, ES2 and ES3 operationalize the respondents' attitudes regarding the relationship of man to nature and the need to preserve it. The index of the intention to support sustainable tourism was formed as:

$$OB_i = (OB1 + OB2 + OB3) / 3,$$

where variables OB1, OB2 and OB3 measure respondents' willingness to support and practice sustainable forms of tourism behavior. All constructed variables have a continuous range of values from 1 to 5, which results from the application of a five-point Likert scale and the use of the average values of the items. This data structure enables the variables to be treated as approximately continuous, which fulfills the methodological requirements for the application of the ordinary least squares (OLS) method in further econometric analysis. The econometric analysis was carried out using the ordinary least squares (OLS) method through three regression models, with the aim of examining the direct and indirect effects of the perception of the health benefits of forest bathing on environmental awareness and the intention to support sustainable tourism. In the first model, the impact of forest bathing on environmental awareness was analyzed, whereby environmental awareness was defined as a dependent variable, and the perception of health and psychological benefits of forest bathing as an independent variable. This relationship is formally expressed by a regression equation:

$$ES_i = \beta_0 + \beta_1 HB_i + \varepsilon_i,$$

where  $ES_i$  represents the level of environmental awareness of the respondents and,  $HB_i$  denotes the perception of the health benefits of forest bathing,  $\beta_0$  is a constant member of the model,  $\beta_1$  is a regression coefficient that measures the strength and direction of the impact of forest bathing on environmental awareness, while  $\varepsilon_i$  represents a random error. The aim of this model was to check whether the subjective experience of the health benefits of staying in a forest environment contributes to the development of environmental awareness among domestic tourists. In the second model, the direct impact of forest bathing on the intention to support sustainable tourism was examined. In this case, the dependent variable is the intention to support sustainable tourism, while the perception of the health benefits of forest bathing is again included as an independent variable. The regression relationship is described by the equation:

$$OB_i = \beta_0 + \beta_1 HB_i + \varepsilon_i,$$

where  $OB_i$  indicates the intention of the respondents to support sustainable forms of tourism. This model tested the direct effect of forest bathing on the behavioral intentions of tourists, independent of other psychological or value factors. A third, extended model was introduced to examine the mediating role of environmental awareness in the relationship between forest bathing and the intention to support sustainable tourism. In this model, the perception of the health benefits of forest bathing and environmental awareness are simultaneously included as independent variables, while the dependent variable is retained as the intention to support sustainable tourism. The regression relationship is formally expressed as:

$$OB_i = \beta_0 + \beta_1 HB_i + \beta_2 ES_i + \varepsilon_i,$$

where the coefficient  $\beta_1$  measures the direct effect of forest bathing on sustainable intention, while  $\beta_2$  measures the impact of environmental awareness on the same dependent variable. The mediating effect is identified by comparing the values of the coefficient  $\beta_1$  from the second and third models. If the  $\beta_1$  value in the third model decreases compared to the second model, but remains statistically significant, while the  $\beta_2$  coefficient remains significant, it is concluded that there is partial mediation, i.e., that environmental awareness partially conveys the impact of forest bathing on the intention to support sustainable tourism. Within this econometric approach, the direct effect of forest bathing on sustainable intention is operationalized by the coefficient  $\beta_1$  in the third model, while the indirect effect is conceptualized as the product of the impact of forest bathing on environmental awareness, expressed by the coefficient  $\beta_1$  in the first model, and the impact of environmental awareness on sustainable intention, expressed by the coefficient  $\beta_2$  in the third model. Although the significance of the indirect effect can be additionally checked using the bootstrap method with a larger number of replications, this approach is considered methodologically acceptable even without the application of structural modeling. Given that the data were collected through a survey, there is a possibility of the presence of heteroscedasticity in the residuals of the regression models. Therefore, robust standard errors based on Huber-White correction were used in all regression analyses, which provided more reliable estimates of standard errors and statistical significance of regression coefficients, as well as greater validity of conclusions derived from econometric results.

The OLS regression results indicate statistically significant relationships between perceived health benefits of forest bathing, environmental awareness, and the intention to support

sustainable tourism. In Model 1, perceived health benefits show a significant positive effect on environmental awareness. Model 2 confirms a strong direct effect of forest bathing on sustainable tourism intentions. In Model 3, the effect of forest bathing decreases but remains significant after including environmental awareness, while environmental awareness itself exhibits a strong positive association with sustainable tourism intentions. The increase in explained variance across models suggests improved model fit.

Table 7 – Results of OLS Regression Analysis (Robust SE, N = 1,385)

Variable	Model 1: ES	Model 2: OB	Model 3: OB
HB – Health benefits	0.42*** (0.03)	0.48*** (0.03)	0.29*** (0.03)
ES – Environmental awareness	—	—	0.44*** (0.03)
Constant	2.29***	2.11***	1.47***
R <sup>2</sup>	0.18	0.23	0.41
F (robust)	298.6***	411.2***	483.9***

Robust standard errors in parentheses

\*\*\* p < 0.001

## Discussion

The results of this research provide strong empirical confirmation that forest bathing (Shinrin-yoku) goes beyond the framework of an individually focused wellness experience and has a significant role in shaping the environmental awareness and sustainable behavioral intentions of domestic tourists. The identified direct and indirect effects of the perceived health and psychological benefits of forest bathing contribute to deepening the understanding of the mechanisms through which nature-based tourism experiences can influence sustainable tourism behaviour.

The finding that the perception of the health and psychological benefits of forest bathing has a strong and statistically significant impact on environmental awareness is consistent with previous research that indicates that intense and positive experiences in a forest environment can encourage environmentally responsible behavior of tourists. A similar pattern was observed in a study by Xu et al. (2022), where experiential value and attachment to place in forest health destinations were identified as significant predictors of environmentally responsible behavior. However, in contrast to those studies, which most often consider environmental behavior as a direct result of experience or affective connection with the destination, the results of this work indicate that the impact of forest bathing is partly through the cognitive process of developing environmental awareness. This builds on the existing literature, because environmental awareness is not treated as a given characteristic of tourists, but as a variable that can be formed or strengthened through concrete experiences in nature.

The direct effect of forest bathing on the intention to support sustainable tourism confirms the findings of previous research that showed that the perceived benefits, motivation and value of the experience play a key role in shaping the behavioral intentions of tourists in the context of forest health and wellness tourism. Studies based on the theory of planned behavior and the health belief model indicate that positive attitudes and perceived benefits significantly increase the intention to participate in forest therapy tourism (Zhao & An, 2021), while recent

research additionally confirms the importance of perceived value and motivation for behavioral intentions (Zhao et al., 2025). The results of this research are in agreement with those findings, but extend them by focusing not on the intention to re-participate or satisfaction, but on the intention to support sustainable forms of tourism in a broader sense.

A special contribution of the work is reflected in the identification of the partial mediating role of environmental awareness in the relationship between forest bathing and the intention to support sustainable tourism. The reduction of the direct effect of forest bathing in the presence of environmental awareness, while maintaining its statistical significance, indicates that the health experiences of staying in the forest not only act directly, but also through the change of value and attitudinal orientations of tourists. This finding is consistent with broader theoretical approaches that view sustainable behavior as a result of the interaction of affective, cognitive and normative factors (He et al., 2018; Lim & McAleer, 2005), but provides empirical evidence of the specific mechanism of that process in the context of forest bathing. Compared to research that uses the S-O-R framework and emphasizes the role of destination functional attributes in shaping behavioral intentions (Jie, 2023), the results of this paper suggest that internal psychological processes, such as environmental awareness, play an equally important, if not more significant, role than external stimuli. This is particularly relevant in the context of forest bathing, which is increasingly described in the literature as a conscious and reflective tourist practice (Farkić et al., 2021), but whose effects on the value orientations of tourists have so far been insufficiently clarified empirically.

The research findings also contribute to the literature on green and sustainable tourism, which emphasizes the importance of local contexts and domestic tourists in the transition to more sustainable forms of tourism development (Tomassini & Cavagnaro, 2020; Toubes & Araújo-Vila, 2022; Luekveerawattana, 2024). Unlike most previous studies that were conducted in Asian destinations with a long tradition of forest therapy practice, this research provides empirical evidence from the Southeast European context, where forest bathing has not yet been institutionalized as a tourism product. This confirms that the potential of forest bathing to encourage sustainable behavior is not culturally or regionally limited, but depends on more universal mechanisms of connection between health, nature and value orientations.

The results of this research not only confirm previous findings on the importance of forest bathing for the behavioral intentions of tourists, but also conceptually expand them by pointing to environmental awareness as a key link that connects individual health benefits with support for sustainable tourism. This approach enables a more precise understanding of the role of forest bathing in modern tourism and lays the foundation for further theoretical and empirical research of this phenomenon in the context of sustainable development.

## **Conclusion**

This research provides an empirically based insight into the role of forest bathing as a modern form of forest health tourism that goes beyond the framework of an individually oriented wellness experience and becomes a relevant factor in shaping sustainable tourist behavior. The results show that the perceived health and psychological benefits of staying in a forest environment have a strong direct influence on the intention of domestic tourists to support sustainable forms of tourism, but also an indirect influence mediated by the development of environmental awareness. This confirms that forest bathing acts simultaneously as an experiential, cognitive

and value mechanism, through which individual benefit is transformed into broader socially responsible behavior.

A particularly significant finding refers to the partial mediating role of environmental awareness, which indicates that health experiences in nature do not remain at the level of personal well-being, but can contribute to the formation of attitudes and values that support the long-term goals of sustainable tourism development. In the context of Serbia, where forest bathing is still not institutionalized as a tourist product, the research results provide an important empirical argument for its strategic positioning within sustainable and health-oriented tourism.

#### *Theoretical and practical implications of implications*

The theoretical contribution of this research is reflected in the integration of three hitherto relatively separate research directions: forest health and wellness tourism, environmental awareness based on the NEP framework and research on sustainable behavioral intentions of tourists. In contrast to previous studies that predominantly view forest bathing as a health or recreational practice, this paper empirically confirms its role in shaping the value and behavioral orientations of tourists. Thus, forest bathing is theoretically positioned as a mechanism of transition from the micro-level of individual experience to the meso-level of tourist behavior and the macro-level of sustainable development of destinations.

Additionally, the research contributes to the literature on behavioral intentions in tourism by treating environmental awareness not as a static predisposition of tourists, but as a variable that can be actively formed through experiences in the natural environment. The identification of partial mediation provides empirical confirmation that cognitive and value processes are a key link in the relationship between health benefits and sustainable behavior, thus extending existing models of behavioral intentions in the context of nature-based tourism. Methodologically, the paper shows that an econometric regression approach can provide theoretically relevant insights into the complex relationships between experiences, attitudes and behaviour, thus offering an alternative to the dominant use of structural modeling in tourism.

The practical implications of the research have direct significance for destination management, tourism policy makers and actors in the forestry and nature protection sector. The results clearly indicate that forest bathing can be strategically developed not only as a wellness product, but also as a tool for strengthening environmental awareness and support for sustainable tourism among domestic tourists. This implies the need for forest bathing programs not to be designed solely around health benefits, but to consciously include interpretive and educational elements that encourage understanding of the ecosystem values of forests.

For destinations in Serbia, the findings suggest that the integration of forest bathing into the tourist offer can contribute to the diversification of products, reducing the pressure of mass tourism and extending the tourist season, especially in rural and protected areas. At the same time, the results provide a basis for connecting health tourism with nature protection policies, as they indicate that tourists who perceive the health benefits of staying in the forest show a greater willingness to support sustainable practices. This opens up space for cross-sectoral cooperation between tourism organizations, forest managers and local communities, with the aim of developing products that simultaneously improve health, nature conservation and local development.

### *Limitations and future research directions*

Despite the significant contributions, the research has certain limitations that should be taken into account when interpreting the results. First of all, the research is based on cross-sectional data, which limits the possibility of making stronger conclusions about cause-and-effect relationships between variables. Future research could employ a longitudinal or experimental design to more precisely examine the dynamics of the development of environmental awareness and behavioral intentions through repeated forest bathing experiences.

Furthermore, the research is focused on domestic tourists in Serbia, which may limit the generalization of the results to other cultural and institutional contexts. Comparative research that would include different countries and types of destinations would enable a deeper understanding of the contextual factors that influence the role of forest bathing in sustainable tourism. Finally, future research could extend the model by including additional psychological and social variables, such as emotional connection with nature, normative pressures, or perceptions of the authenticity of the experience, thereby further deepening the understanding of the mechanisms that link the health benefits of nature with sustainable tourism behavior.

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**Authors' contribution:** Tamara Gajić was responsible for the study conceptualization, data collection, and analysis; Dragan Vukolić contributed to scientific supervision, interpretation of results, and manuscript editing.

### **References**

1. Agarwal, P., & Parashar, A. (2023). Forest-based model: A nature-based health tourism practice at tourism destinations. *Himalayan Journal of Social Sciences and Humanities*, 18, 99–110. <https://doi.org/10.51220/hjssh.v18i1.13>
2. Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
3. Anuwichanont, A. L. J. (2011). Tourists' expectation and perception towards environmental issue management for green tourism of Khao Yai National Park. *International Business & Economics Research Journal*, 10(9), 41–46. <https://doi.org/10.19030/iber.v10i9.5625>
4. Bressane, A., Medeiros, L. C. D. C., & Lima, Y. C. D. (2025). Five-step forest bathing protocol as a nature-based solution for student wellbeing in higher education: A research brief on insights and lessons from a pilot study. *International Journal of Environmental Research and Public Health*, 22(4), 579. <https://doi.org/10.1016/j.ufug.2024.128441>
5. Chankoson, T. (2018). Multilevel confirmatory factor analysis of green tourism management in Thailand for ASEAN economic community. *Asian Administration and Management Review*, 1(2), 88–99. <https://so01.tci-thaijo.org/index.php/aamr/article/view/229570>
6. Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425–442. <https://doi.org/10.1111/0022-4537.00176>
7. Farkić, J., Isailović, G., & Taylor, S. (2021). Forest bathing as a mindful tourism practice. *Annals of Tourism Research Empirical Insights*, 2(2), 100028. <https://doi.org/10.1016/j.annale.2021.100028>

8. Ge, H., & Chen, X. (2024). Research on tourist satisfaction and behavioral intention in ecological health tourism activities in Bama, Guangxi, based on structural equation model. *GeoJournal of Tourism and Geosites*, 52(1), 221–230. <https://doi.org/10.30892/gtg.52121-1198>
9. Ghorbani, A., Zhu, K., Mousazadeh, H., Almani, F. A., Zangiabadi, A., Pireh, M., & Dávid, L. D. (2023). Sustainable behaviors conceptualization for forest adventure tours: The case of Cloud Ocean sites in Hyrcanian forests listed as UNESCO World Heritage property. *Forests*, 14(5), 1034. <https://doi.org/10.3390/land12040808>
10. He, P., He, Y., & Xu, F. (2018). Evolutionary analysis of sustainable tourism. *Annals of Tourism Research*, 69, 76–89. <https://doi.org/10.1016/j.annals.2018.02.002>
11. Jie, D. (2023). The influence of functional attributes of forest wellness tourism destination on tourists' behavioral intention based on SOR theory. *Tourism Management Technology and Economics*, 6, 53–62. <https://doi.org/10.23977/tmte.2023.060608>
12. Karmoker, K., & Ahmed, F. (2022). Promoting green behavioral intentions of tourists for the growth of sustainable tourism development in the Sundarbans of Bangladesh. *International Journal of Business and Management*, 17(1), 52–64. <https://doi.org/10.5539/ijbm.v17n1p52>
13. Lee, T.-H., Jan, F.-H., & Yang, C.-C. (2013). Conceptualizing and measuring environmentally responsible behaviors from the perspective of community-based tourists. *Tourism Management*, 36, 454–468. <https://doi.org/10.1016/j.tourman.2012.09.012>
14. Lim, C., & McAleer, M. (2005). Ecologically sustainable tourism management. *Environmental Modelling & Software*, 20(11), 1431–1438. <https://doi.org/10.1016/j.envsoft.2004.09.023>
15. Lopes, H. S., Remoaldo, P. C., Ribeiro, V., & Martín-Vide, J. (2022). Pathways for adapting tourism to climate change in an urban destination: Evidence based on thermal conditions for the Porto metropolitan area (Portugal). *Journal of Environmental Management*, 315, 115161. <https://doi.org/10.1016/j.jenvman.2022.115161>
16. Luekveerawattana, R. (2024). Successful green tourism in remote cultural community areas. *Cogent Social Sciences*, 10(1), 2330733. <https://doi.org/10.1080/23311886.2024.2330733>
17. Pérez-Calderón, E., Miguel-Barrado, V., & Rodríguez-Rangel, M. C. (2024). Forest bathing and tourism: A bibliometric analysis. *Tourism and Hospitality Research*. <https://doi.org/10.1177/14673584241304294>
18. Rodtook, P., Simpattanawong, D., Ruenbanthoeng, T., & Nongkhai, K. N. (2024). Forest bathing activity as a tool to promote wellness tourism in Thailand. *Humanities, Arts and Social Sciences Studies*, 428–440. <https://doi.org/10.69598/hass.24.2.265134>
19. Thipsingh, S., Srisathan, W. A., Wongsachia, S., Ketkaew, C., Naruetharadhol, P., & Hengboriboon, L. (2022). Social and sustainable determinants of tourist satisfaction and temporal revisit intention: A case of Yogyakarta, Indonesia. *Cogent Social Sciences*, 8(1), 2068269. <https://doi.org/10.1080/23311886.2022.2068269>
20. Tomassini, L., & Cavagnaro, E. (2020). The novel spaces and power-geometries in tourism and hospitality after 2020 will belong to the 'local'. *Tourism Geographies*, 22(3), 713–719. <https://doi.org/10.1080/14616688.2020.1757747>
21. Toubes, D. R., & Araújo-Vila, N. (2022). A review research on tourism in the green economy. *Economies*, 10(6), 137. <https://doi.org/10.3390/economies10060137>
22. Xu, H., Lin, X., Liu, F., Wang, X., & Wang, M. (2022). Experiential value, place attachment, and environmentally responsible behavior of forest health tourism: A case of China. *Forests*, 13(11), 1855. <https://doi.org/10.3390/f13111855>
23. Zhao, J., & An, Y. (2021). Behavioural intention of forest therapy tourism in China: Based on health belief model and the theory of planned behaviour. *Current Issues in Tourism*, 24(24), 3425–3432. <https://doi.org/10.1080/13683500.2021.1886256>
24. Zhao, Y., Yang, J., Song, J., & Lu, Y. (2025). The effects of tourism motivation and perceived value on tourists' behavioral intention toward forest health tourism: The moderating role of attitude. *Sustainability*, 17(2), 713. <https://doi.org/10.3390/su17020713>

**Tamara Gajić\*<sup>1</sup>, Dragan Vukolić<sup>2</sup>**

<sup>1</sup>САНУ-дың «Йован Цвийич» Географиялық институты, Белград, Сербия

<sup>2</sup>Бизнес зерттеулер университеті, Туризм және қонақ үй менеджменті факультеті,  
Баня-Лука, Босния және Герцеговина

### **Орман терапиясы (Shinrin-yoku) және тұрақты даму: Сербиядағы ішкі туристердің денсаулық пен табиғатты қорғауға көзқарасы**

**Аңдатпа.** Мақаланың мақсаты – орман терапиясының (Shinrin-yoku) денсаулыққа бағытталған және табиғатқа негізделген туризм түрі ретіндегі әлеуетін жан-жақты бағалау, сондай-ақ оның қабылданған денсаулықтық және психологиялық пайдасы, экологиялық сана және ішкі туристердің тұрақты туризмді қолдау ниеті арасындағы өзара байланысын анықтау және түсіндіру. *Әдістер* – зерттеу барысында құрылымдалған сауалнама әдісі қолданылып, Сербиядағы 1 385 ішкі турист қамтылды; алынған деректерге барлау факторлық талдау, корреляциялық талдау және берік стандартты қателіктері бар OLS регрессиялық модельдері қолданылды. *Нәтижелері* – орман терапиясының қабылданған денсаулықтық және психологиялық артықшылықтары тұрақты туризмді қолдау ниетіне статистикалық тұрғыдан мәнді тікелей әсер ететіні анықталды; сонымен қатар, бұл әсердің маңызды бөлігі экологиялық сана арқылы жанама түрде жүзеге асатыны дәлелденді; табиғатпен өзара әрекеттесу тәжірибесінің туристердің экологиялық жауапкершілігі мен тұрақты мінез-құлқын қалыптастыруда маңызды фактор екендігі көрсетілді; алынған нәтижелер орман терапиясының тұрақты туризмді ілгерілетудің тиімді құралы екенін дәлелдейді. *Қорытындылар* – орман терапиясы денсаулықтық және психологиялық тиімділікті экологиялық жауапкершілікпен үйлестіре отырып, тұрақты туристік мінез-құлқты қалыптастырудың тиімді құралы болып табылады және туристік дестинациялардың тұрақты дамуын қамтамасыз етуде маңызды бағыттардың бірі ретінде ұсынылады, сондай-ақ туризмді басқару мен жоспарлау жүйесіне енгізуді талап етеді.

**Түйін сөздер:** орман терапиясы, тұрақты туризм, экологиялық сана, денсаулыққа пайдасы, мінез-құлқын ниеті.

**Tamara Gajić\*<sup>1</sup>, Dragan Vukolić<sup>2</sup>**

<sup>1</sup>Географический институт «Йован Цвийич» Сербской академии наук и искусств (САНУ),  
Белград, Сербия

<sup>2</sup>Университет бизнес-исследований, факультет туризма и гостиничного менеджмента,  
Баня-Лука, Босния и Герцеговина

### **Лесная терапия (Shinrin-yoku) и устойчивое развитие: отношение внутренних туристов в Сербии к здоровью и охране природы**

**Аннотация.** *Цель* – комплексно оценить потенциал лесной терапии (Shinrin-yoku) как формы оздоровительного и природоориентированного туризма, а также выявить и объяснить взаимосвязь между воспринимаемыми оздоровительными и психологическими эффектами, экологической осведомленностью и намерением внутренних туристов поддерживать устойчивые формы туризма. *Методы* – исследование проведено на основе структурированного анкетирования 1 385 внутренних туристов в Сербии; для обработки данных использованы факторный и корреляционный анализ, а также регрессионные модели OLS с робастными стандартными ошибками. *Результаты* – установлено, что воспринимаемые оздоровительные и психологические эффекты лесной терапии оказывают статистически значимое прямое влияние на намерение поддерживать устойчивый туризм; выявлено также косвенное

влияние через уровень экологической осведомленности; подтверждена значимость природно-ориентированных практик в формировании экологически ответственного и устойчивого туристского поведения; полученные результаты демонстрируют потенциал лесной терапии как инструмента продвижения устойчивого туризма. *Выводы* – лесная терапия выступает эффективным механизмом интеграции оздоровительных эффектов и устойчивого туристского поведения, способствует повышению экологической ответственности и формированию долгосрочных предпосылок устойчивого развития туристских дестинаций, а также требует учета при разработке туристской политики и стратегий развития отрасли.

**Ключевые слова:** лесная терапия, устойчивый туризм, экологическая осведомленность, польза для здоровья, поведенческие намерения.

## References

1. Agarwal, P., & Parashar, A. (2023). Forest-based model: A nature-based health tourism practice at tourism destinations. *Himalayan Journal of Social Sciences and Humanities*, 18, 99–110. Available at: <https://doi.org/10.51220/hjssh.v18i1.13> [in English].
2. Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. Available at: [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T) [in English].
3. Anuwichanont, A. L. J. (2011). Tourists' expectation and perception towards environmental issue management for green tourism of Khao Yai National Park. *International Business & Economics Research Journal*, 10(9), 41–46. Available at: <https://doi.org/10.19030/iber.v10i9.5625> [in English].
4. Bressane, A., Medeiros, L. C. D. C., & Lima, Y. C. D. (2025). Five-step forest bathing protocol as a nature-based solution for student wellbeing in higher education: A research brief on insights and lessons from a pilot study. *International Journal of Environmental Research and Public Health*, 22(4), 579. Available at: <https://doi.org/10.1016/j.ufug.2024.128441> [in English].
5. Chankoson, T. (2018). Multilevel confirmatory factor analysis of green tourism management in Thailand for ASEAN economic community. *Asian Administration and Management Review*, 1(2), 88–99. Available at: <https://so01.tci-thaijo.org/index.php/aamr/article/view/229570> [in English].
6. Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56(3), 425–442. Available at: <https://doi.org/10.1111/0022-4537.00176> [in English].
7. Farkić, J., Isailović, G., & Taylor, S. (2021). Forest bathing as a mindful tourism practice. *Annals of Tourism Research Empirical Insights*, 2(2), 100028. Available at: <https://doi.org/10.1016/j.annale.2021.100028> [in English].
8. Ge, H., & Chen, X. (2024). Research on tourist satisfaction and behavioral intention in ecological health tourism activities in Bama, Guangxi, based on structural equation model. *GeoJournal of Tourism and Geosites*, 52(1), 221–230. Available at: <https://doi.org/10.30892/gtg.52121-1198> [in English].
9. Ghorbani, A., Zhu, K., Mousazadeh, H., Almani, F. A., Zangiabadi, A., Pireh, M., & Dávid, L. D. (2023). Sustainable behaviors conceptualization for forest adventure tours: The case of Cloud Ocean sites in Hyrcanian forests listed as UNESCO World Heritage property. *Forests*, 14(5), 1034. Available at: <https://doi.org/10.3390/land12040808> [in English].
10. He, P., He, Y., & Xu, F. (2018). Evolutionary analysis of sustainable tourism. *Annals of Tourism Research*, 69, 76–89. Available at: <https://doi.org/10.1016/j.annals.2018.02.002> [in English].
11. Jie, D. (2023). The influence of functional attributes of forest wellness tourism destination on tourists' behavioral intention based on SOR theory. *Tourism Management Technology and Economics*, 6, 53–62. Available at: <https://doi.org/10.23977/tmte.2023.060608> [in English].
12. Karmoker, K., & Ahmed, F. (2022). Promoting green behavioral intentions of tourists for the growth of sustainable tourism development in the Sundarbans of Bangladesh. *International Journal of Business and Management*, 17(1), 52–64. Available at: <https://doi.org/10.5539/ijbm.v17n1p52> [in English].
13. Lee, T.-H., Jan, F.-H., & Yang, C.-C. (2013). Conceptualizing and measuring environmentally

responsible behaviors from the perspective of community-based tourists. *Tourism Management*, 36, 454–468. Available at: <https://doi.org/10.1016/j.tourman.2012.09.012> [in English].

14. Lim, C., & McAleer, M. (2005). Ecologically sustainable tourism management. *Environmental Modelling & Software*, 20(11), 1431–1438. Available at: <https://doi.org/10.1016/j.envsoft.2004.09.023> [in English].

15. Lopes, H. S., Remoaldo, P. C., Ribeiro, V., & Martín-Vide, J. (2022). Pathways for adapting tourism to climate change in an urban destination: Evidence based on thermal conditions for the Porto metropolitan area (Portugal). *Journal of Environmental Management*, 315, 115161. Available at: <https://doi.org/10.1016/j.jenvman.2022.115161> [in English].

16. Luekveerawattana, R. (2024). Successful green tourism in remote cultural community areas. *Cogent Social Sciences*, 10(1), 2330733. Available at: <https://doi.org/10.1080/23311886.2024.2330733> [in English].

17. Pérez-Calderón, E., Miguel-Barrado, V., & Rodríguez-Rangel, M. C. (2024). Forest bathing and tourism: A bibliometric analysis. *Tourism and Hospitality Research*. Available at: <https://doi.org/10.1177/14673584241304294> [in English].

18. Rodtook, P., Simpattanawong, D., Ruenbanthoeng, T., & Nongkhai, K. N. (2024). Forest bathing activity as a tool to promote wellness tourism in Thailand. *Humanities, Arts and Social Sciences Studies*, 428–440. Available at: <https://doi.org/10.69598/hasss.24.2.265134> [in English].

19. Thipsingh, S., Srisathan, W. A., Wongsachia, S., Ketkaew, C., Naruetharadhol, P., & Hengboriboon, L. (2022). Social and sustainable determinants of tourist satisfaction and temporal revisit intention: A case of Yogyakarta, Indonesia. *Cogent Social Sciences*, 8(1), 2068269. Available at: <https://doi.org/10.1080/23311886.2022.2068269> [in English].

20. Tomassini, L., & Cavagnaro, E. (2020). The novel spaces and power-geometries in tourism and hospitality after 2020 will belong to the 'local'. *Tourism Geographies*, 22(3), 713–719. Available at: <https://doi.org/10.1080/14616688.2020.1757747> [in English].

21. Toubes, D. R., & Araújo-Vila, N. (2022). A review research on tourism in the green economy. *Economies*, 10(6), 137. Available at: <https://doi.org/10.3390/economies10060137> [in English].

22. Xu, H., Lin, X., Liu, F., Wang, X., & Wang, M. (2022). Experiential value, place attachment, and environmentally responsible behavior of forest health tourism: A case of China. *Forests*, 13(11), 1855. Available at: <https://doi.org/10.3390/f13111855> [in English].

23. Zhao, J., & An, Y. (2021). Behavioural intention of forest therapy tourism in China: Based on health belief model and the theory of planned behaviour. *Current Issues in Tourism*, 24(24), 3425–3432. Available at: <https://doi.org/10.1080/13683500.2021.1886256> [in English].

24. Zhao, Y., Yang, J., Song, J., & Lu, Y. (2025). The effects of tourism motivation and perceived value on tourists' behavioral intention toward forest health tourism: The moderating role of attitude. *Sustainability*, 17(2), 713. Available at: <https://doi.org/10.3390/su17020713> [in English].

#### **Information about the authors:**

**Tamara Gajić** – corresponding author, PhD, Research Associate, Geographical Institute “Jovan Cvijić”, Serbian Academy of Sciences and Arts (SASA), 11000, Belgrade, Serbia

**Dragan Vukolić** – PhD in Management and Business, Assistant Professor, Faculty of Tourism and Hotel Management, University for Business Studies, 78000, Banja Luka, Bosnia and Herzegovina

**Tamara Gajić** – хат-хабар авторы, PhD, ғылыми қызметкер, Сербия ғылымдар және өнер академиясының (SASA) «Йован Цвийич» Географиялық институты, 11000, Белград, Сербия

**Dragan Vukolić** – Менеджмент және бизнес бойынша PhD, ассистент профессор, Бизнес зерттеулер университеті, Туризм және қонақ үй менеджменті факультеті, 78000, Баня-Лука, Босния және Герцеговина

**Tamara Gajić** – автор для корреспонденции, PhD, научный сотрудник Географического института «Йован Цвийич» Сербской академии наук и искусств (САНУ), 11000, Белград, Сербия

**Dragan Vukolić** – PhD по менеджменту и бизнесу, ассистент профессор, факультет туризма и гостиничного менеджмента, Университет бизнес-исследований, 78000, Баня-Лука, Босния и Герцеговина



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