Promoting Sustainable Sporting Events for Sustainable Destinations: A Demand-Side Perspective

Miha Lesjak, Eva Podovšovnik

Abstract

The present study investigates tourists' willingness to engage in two different pro-environmental actions aimed at reducing waste footprint at one of the largest international ski sport events. One action provides the tourists with the opportunity to actively participate in cleaning up the event area, the other one provides opportunity to offset negative impact by donating to the organizer's environmental fund. Results show that almost 70% of spectators are willing to actively participate in cleaning up the event area, but less than a third (28%) is willing to donate to the environmental fund. Using CHAID analysis a number of socio-demographic and psychological variables were used to identify the segments of spectators who are willing to engage in either of the two behaviors. Results show that 1) drivers of the two behaviors are different and 2) four or seven distinctive groups of spectators were identified for the two behaviors, respectively. Discussion advances the theory of environmentally sustainable tourist behavior and provides avenues for sustainable destination governance. The study concludes with recommendations for tourism policy makers and industry on how to induce environmentally sustainable spectators' behavior in local destinations.

Keywords: Environmentally Sustainable Behavior (ESB); Pro-environmental Interventions; Waste Reduction; Sport Events; Event Studies; Tourism; Events; Environmental Economy.

JEL Classification: L83, M10, D01, Q01

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Introduction

Tourism is deeply intertwined with natural resources, leveraging landscapes, biodiversity, and pristine environments as key attractions for visitors. However, this dependency presents a paradox: while natural resources form the foundation of tourism, their degradation due to overuse and mismanagement threatens both the environment and the sustainability of the industry itself (Weaver, 2011). Addressing this challenge requires the promotion of environmentally sustainable behavior (ESB) among tourists to minimize negative ecological impacts while ensuring a high-quality visitor experience (Dolnicar & Grün, 2009). A fundamental determinant of ESB is the interaction between tourists' willingness to act sustainably and the structural opportunities available to facilitate such behavior (Buckley, 2012). In tourism settings, stakeholders play a crucial role in identifying behaviors that tourists are predisposed to adopt and in implementing enabling conditions to support sustainable choices (Font & McCabe, 2017). Events, as a significant component of tourism destinations, further complicate this dynamic by introducing substantial sustainability challenges. Large-scale events necessitate specialized infrastructure, such as oversized stadiums and temporary facilities, leading to land-use changes, habitat loss, and biodiversity decline (Becken & Hay, 2012). Sports events, in particular, are often associated with high waste generation, raising concerns about their long-term environmental impact (Scott, Gössling, & Hall, 2012). At least two ways offer a promising approach towards reducing environmental footprint of events: 1) increasing environmental sustainability of building and operating sport infrastructure (the supply side) and 2) increasing the environmentally sustainable behavior of sport event spectators (the demand side approach). Empirical evidence exists that increasing the environmental sustainability using the demand side approach has greater potential for improving environmental sustainability of sport tourism (UNWTO, 2018). The present study investigates possibilities of increasing environmentally sustainable tourism demand, at large international winter sport event. Specifically, we're looking at designing interventions for engaging event spectators to keep their environmental footprint as low as possible and by offsetting their environmental footprint through financial donation to organizer's environmental fund. The two tested interventions help reducing environmental burden of sport events, using entirely different mechanisms. First requires visitors to invest their time and other requires investing money.

The aim of the present study is to analyze the potential of two visitors-oriented approaches for reducing waste problems at large-scale winter tourism events. The key theoretical contribution of the present study is empirical validation of the Theory of Environmentally significant behavior (Stern, 2000, 2005) in the context of large-scale winter tourism events. Practical contribution lays in a provision of empirically supported recommendations for reducing waste problems at large-scale winter tourism events.

Literature Review

Environmental sustainability in tourism has been widely studied, with researchers emphasizing the importance of individual behavior in mitigating tourism's ecological footprint (Hall & Gössling, 2013). The Theory of Environmentally Significant Behavior (Stern, 2000, 2005) posits that sustainable actions are influenced by personal values, beliefs, and perceived behavioral control (Peattie & Peattie, 2009). Studies have shown that tourists' willingness to engage in ESB depends on both intrinsic motivations (e.g., environmental concern, personal responsibility) and extrinsic factors (e.g., infrastructure availability, regulatory mechanisms) (Mair & Jago, 2010; Bär, Korrmann & Kurscheidt, M. (2022).

Event tourism presents additional sustainability challenges, as large gatherings generate significant waste and environmental strain (Higham, 2005; Collins, Jones & Munday, 2009; El-

Said, Aziz, Salem & Youssif, M. (2025); Chalip & Fairley, 2019; Mchunu, Nyikana & Tichaawa (2021). Previous research has identified waste management as a critical area requiring intervention, with strategies including behavioral nudges, financial incentives, and participatory engagement (Getz, 2009; Bazzanella, Schnitzer, Peters & Bichler, 2023). However, the efficacy of these approaches varies based on demographic factors, cultural attitudes, and event-specific characteristics (Gössling & Hall, 2006; Bär, Korrmann & Kurscheidt, M. (2022). For instance, studies by Dolnicar and Grün (2009) demonstrate that tourists respond positively to sustainability initiatives when they perceive a direct benefit or impact. Similarly, research by Buckley (2012) highlights that behavioral change is most effective when infrastructure and policy measures align with visitors' environmental concerns. Recent developments in event sustainability emphasize the integration of circular economy principles, where waste is minimized through recycling and resource efficiency (Mair & Jago, 2010; Wise, 2020). Case studies in sport tourism demonstrate that green event management practices, such as the use of biodegradable materials and carbon offsetting programs, can significantly reduce the environmental footprint of large-scale sporting events (Becken & Hay, 2012). Furthermore, studies by Higgins-Desbiolles (2006) and Font and McCabe (2017) argue that sustainable event policies must be co-developed with local communities to ensure inclusivity and long-term viability.

Social norms and peer influence also play a crucial role in shaping pro-environmental behavior at sporting events (Peattie & Peattie, 2009). Research by Miller and Twining-Ward (2005) found that tourists are more likely to engage in sustainable practices when they observe others participating, reinforcing the need for well-structured public campaigns and visual cues at event venues. Additionally, Gössling and Hall (2006) suggest that digital tools and mobile applications can be leveraged to encourage sustainable practices by providing real-time information on waste disposal points and incentive-based programs. From a policy perspective, there is a growing recognition that sustainability initiatives must extend beyond individual actions to include systemic changes in event planning and governance (Scott, Gössling, & Hall, 2012;). For example, studies on mega-events such as the Olympics and FIFA World Cup highlight the need for stringent environmental policies that mandate carbon neutrality, sustainable sourcing, and post-event infrastructure repurposing (Higham, 2005). Research by Hall and Gössling (2013) also underscores the importance of policy coherence, where event sustainability is aligned with broader climate adaptation and conservation goals.

Studies indicate that tourists' attitudes toward sustainability are influenced by factors such as past behavior, environmental knowledge, and perceived behavioral control (Weaver, 2011). Mair and Jago (2010) argue that sustainability messaging must be tailored to different audience segments to maximize engagement. For instance, eco-conscious tourists may respond positively to messages emphasizing environmental ethics, whereas casual spectators may be more motivated by convenience and social incentives. The role of financial mechanisms in promoting sustainability remains a debated topic. While some studies suggest that tourists are reluctant to pay extra for sustainable event initiatives (Dolnicar & Grün, 2009), others indicate that transparent and well-communicated financial contributions, such as carbon offset programs, can enhance participation rates (Font & McCabe, 2017). Research by Peattie and Peattie (2009) supports the idea that sustainability initiatives should be seamlessly integrated into the overall event experience to reduce perceived inconvenience.

Ultimately, the literature suggests that a holistic approach incorporating behavioral insights, policy interventions, community engagement, and technological innovations is necessary to achieve sustainable sporting events (Higgins-Desbiolles, 2006; Musgrave, 2011; Martins, Pereira, Rosado, Marôco, McCullough & Mascarenhas (2022). Future research should focus on longitudinal studies that assess the long-term effectiveness of sustainability initiatives and

explore ways to scale successful interventions across different types of events and destinations (Higham, 2005).

Methodology

This study employs a quantitative approach to evaluate tourist engagement in sustainable waste management at a major international ski event. The study was conducted at The Fis Ski Jumping World Cup Finals, a major winter sport event in Slovenia. Quantitative data were collected through surveys administered to spectators, measuring their willingness to participate in three interventions: (1) site clean-up, (2) waste separation at exit areas, and (3) financial contributions to an environmental fund. The survey included demographic variables, attitudinal measures, and perceptions of event organizers' responsibility for waste management (Hall & Gössling, 2013). The questionnaire can be found in Appendix 1.

In 2016 and beyond on-line surveys were adopted for the purpose of the study. Researchers collected spectators' contact information and asked them for permission to send the invitation and access to an on-line survey. After the event was over, an e-mail with a cover letter and the link to the web survey was sent to all the collected e-mails. Spectators contacts were collected via specially instructed students and resulted in over 2500 e-mails every year during each event. The response rate was about one half of spectators that gave their e-mail addresses answered the survey. The first year, when collecting data on-site, around 500 valid answers were collected, while since 2016 the number of valid answers more than doubled – in 2018 more than 1300 and in 2019 more than 1200 completed surveys were received. For the purpose of the paper, only valid answers from 2017, 2018 and 2019 surveys were analysed . In total, there were 3805 valid cases in the database.

For the purpose of the paper, the following research hypotheses were formulated:

Hypothesis 1: Socio-demographic characteristics of respondents and the characteristics of the venue influence the willingness to act sustainably.

Hypothesis 2: Psychological characteristics of respondents (the satisfaction with the event, the perception of the waste issues, the awareness of the waste issues, and the perception of handling the waste issues) influence the willingness to act sustainably.

In figure 1, the research model is presented. In the brackets, the numbers of questions from the questionnaire are presented.

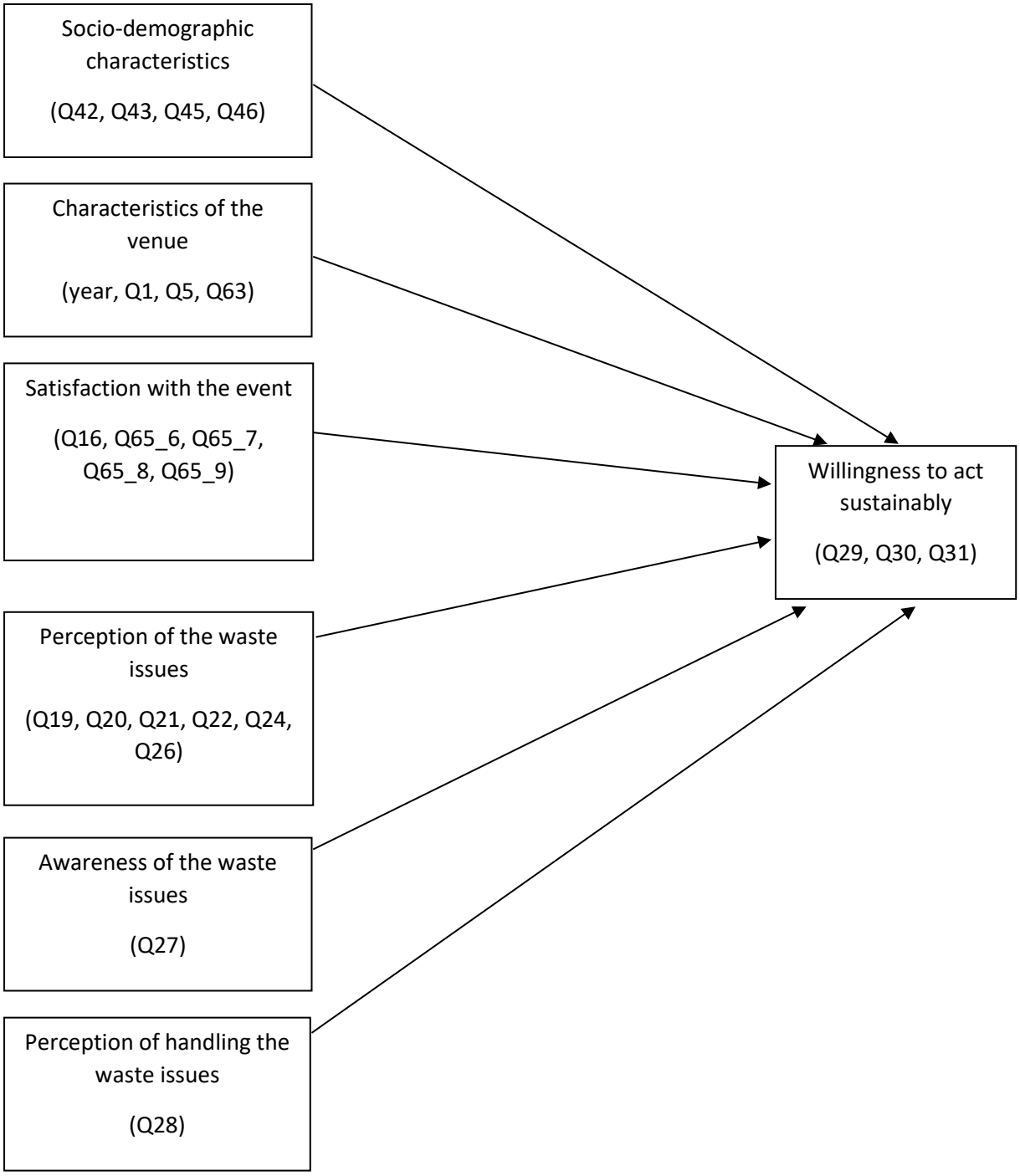


Fig. 1 Research model

Regression analysis was conducted to identify significant predictors of participation in each intervention. Using Chi Squared Automatic Interaction Detection (CHAID) analysis, a number of socio-demographic and psychological variables were used to identify the segments of spectators who are willing to engage in either of the two behaviours. CHAID is often used to detect profiles of the sample (Kass, 1980).

Results

Logistic regression analysis was used to test the research hypotheses. There were two analyses performed, for each dependent variable (willingness to help the organizers to clean the area after the event and willingness to donate money to the organizers in order for them to clean the area after the event), separately. The following predictors were used in each analysis: socio-demographic characteristics, characteristics of the venue, satisfaction with the event, perception of the waste issues, awareness of waste issues, and perception of handling the waste issues.

First, the logistic regression for willingness to help the organizers to clean the area after the event was computed. The determination coefficient was 0,142 – the predictors explain 14,2 % of the total variance of the model. Overall, the regression model is adequate ($F = 6{,}318$; $p < 0{,}001$). Regression coefficients are presented in Table 1. Statistically significant coefficients (at the 0.05 level) are presented in bold.

Table 1 Regression analysis of predictors of the willingness to clean up the event area after the event

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	-9795,436	2117,238	-4,627	<,001
year attended	**4,859**	**1,049**	**4,633**	**<,001**
Day attended: Thursday	3,890	2,582	1,506	,132
Day attended: Friday	**3,898**	**1,685**	**2,313**	**,021**
Day attended:Saturday	2,829	1,765	1,603	,109
Day attended:Sunday	2,498	1,661	1,504	,133
Staying overnight	1,174	1,978	,593	,553
Gender	2,696	1,543	1,748	,081
Age	**-,175**	**,058**	**-3,045**	**,002**
Highest level of education	**-1,282**	**,612**	**-2,096**	**,036**
Satisfaction: Price of the ticket	**1,831**	**,813**	**2,253**	**,024**
Satisfaction: Avaliability of garbage bins	-,248	1,348	-,184	,854
Satisfaction: Signalization of garbage bins	2,519	1,314	1,917	,055
Satisfaction: Availability of garbage bins for separate waste collection	,864	1,247	,693	,488

Satisfaction: Information about the options for organized arrival to Planica (carpooling)	,383	1,015	,377	,706
Satisfaction: Information about arrival with public transport	1,465	1,144	1,280	,201
Perception: The volume of waste	**,099**	**,038**	**2,568**	**,010**
Perception: How the waste is collected	,004	,040	,091	,927
Perception: How much did you personally contribute to the waste issues at the event?	**,042**	**,021**	**1,984**	**,047**
Perception: How much do you think other visitors contributed to the waste issues at the event?	,049	,033	1,473	,141
Perception: How much can you contribute to solving the issues of the waste at the event?	**,073**	**,030**	**2,443**	**,015**
Perception: In your opinion, how much do food and drink providers at the event, help maintaining clean environment?	,056	,036	1,557	,120
Perception: To what extent do you consider yourself morally obliged to manage your waste at the event responsibly?	**,152**	**,040**	**3,756**	**<,001**
Awareness: I may leave some waste, but it could be a lot worse.	**-3,277**	**1,668**	**-1,965**	**,050**
Awareness: Organizer is responsible for solving the waste issues.	**-3,847**	**1,577**	**-2,439**	**,015**
Awareness: Waste is produced by other members of my group (e.g. family, friends) and there is nothing I can do against it.	**-5,308**	**2,471**	**-2,148**	**,032**
Awareness: It is too expensive to handle waste more responsibly.	-1,020	3,247	-,314	,753
Awareness: I do not have time to handle waste more responsibly.	2,715	3,394	,800	,424
Awareness: I do not have enough information about how to handle waste more responsibly.	2,693	2,113	1,274	,203
Awareness: There is not enough infrastructure to handle waste more responsibly.	3,042	1,866	1,630	,103

Awareness: Attending Planica event is a special time of the year, so I do not want to be burdened by worrying about solving waste issues.	-1,372	2,053	-,669	,504
Awareness: I worry about waste issues at home, so I can relax a bit when I am attending events like Planica.	-,171	2,658	-,064	,949
Awareness: My attendance at Planica may contribute to waste issues, but the benefits I bring to the local community outweigh the environmental costs.	1,458	1,571	,928	,354
Perception (handling): There were sufficient number of waste bins.	,155	1,164	,133	,894
Perception (handling): There were sufficient opportunities for recycling/separating waste.	,660	1,173	,563	,574
Perception (handling): Waste bins were located at appropriate distance from most of spectator`s places.	-,983	1,185	-,830	,407
Perception (handling): Informing about responsible waste handling was appropriate.	1,005	1,116	,900	,368

When including all the variables (contextual and attitudinal) in the model, there are the following statistically significant, at the 0,05 level, predictors: the year of the event, if respondents came on Friday or not, the age of respondents, the highest level of education of respondents, satisfaction with the price of the ticket, the perception of the volume of the waste, the perception of personal contribution to the waste at the event, the perception of his/hers own contribution to solve the waste issue at the event, the perception of his/hers own moral obligation to solve the waste issue at the event, the agreement with the statements that they leave some waste but it could be worse, that the organizer is responsible for the waste, and that waste is produced by other spectators at the event. On average, respondents who attended the event in latest years on Friday, who are younger, with lower education, who are more satisfied with the price of the ticket, who perceive the volume of waste as being bigger, who perceive themselves as those who personally contributed a bigger amount of waste at the event but also contributed more to solve the waste issue at the event, who consider themselves as morally obliged to manage their waste more responsibly, that perceive themselves as those who leave some waste but it could not be worse, who do not think that the organizer is responsible to handle the waste at the event and who do not think that waste is produced by others and they cannot do anything against it, are more likely to help the organizer clean up the area of the event after the event.

Results for willingness to collect their waste and separate it at the exit from the event is presented. The determination coefficient was 0.231 – the predictors explain 23,1 % of the total variance of the model. The regression model is statistically significant at the 0,01 level ($F = 11,638$, sig. < 0.001). Regression coefficients are presented in Table 2. Statistically significant coefficients (at the 0.05 level) are presented in bold.

Table 2 Regression analysis of predictors of willingness to separate the waste at the exit from the event

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	-2610,651	1620,390	-1,611	,107
year attended	1,315	,803	1,638	,102
Day attended: Thursday	3,628	1,989	1,824	,068
Day attended: Friday	-,148	1,290	-,114	,909
Day attended:Saturday	-,891	1,351	-,660	,509
Day attended:Sunday	-,868	1,275	-,681	,496
Staying overnight	1,691	1,515	1,116	,265
Gender	**6,229**	**1,186**	**5,251**	**<,001**
Age	**,198**	**,044**	**4,474**	**<,001**
Highest level of education	**-1,875**	**,470**	**-3,988**	**<,001**
Satisfaction: Price of the ticket	,885	,622	1,423	,155
Satisfaction: Avaliability of garbage bins	,750	1,033	,726	,468
Satisfaction: Signalization of garbage bins	-,295	1,006	-,293	,770
Satisfaction: Availability of garbage bins for separate waste collection	,009	,958	,009	,993
Satisfaction: Information about the options for organized arrival to Planica (carpooling)	,073	,777	,094	,925
Satisfaction: Information about arrival with public transport	1,080	,875	1,234	,217
Perception: The volume of waste	**,068**	**,029**	**2,321**	**,020**
Perception: How the waste is collected	,015	,030	,501	,617
Perception: How much did you personally contribute to the waste issues at the event?	**-,041**	**,016**	**-2,497**	**,013**
Perception: How much do you think other visitors contributed to the waste issues at the event?	**,055**	**,026**	**2,150**	**,032**

Perception: How much can you contribute to solving the issues of the waste at the event?	**,050**	**,023**	**2,178**	**,030**
Perception: In your opinion, how much do food and drink providers at the event, help maintaining clean environment?	,009	,027	,317	,752
Perception: To what extent do you consider yourself morally obliged to manage your waste at the event responsibly?	**,260**	**,031**	**8,354**	**<,001**
Awareness: I may leave some waste, but it could be a lot worse.	**-5,336**	**1,280**	**-4,168**	**<,001**
Awareness: Organizer is responsible for solving the waste issues.	-,685	1,213	-,565	,572
Awareness: Waste is produced by other members of my group (e.g. family, friends) and there is nothing I can do against it.	-1,986	1,900	-1,045	,296
Awareness: It is too expensive to handle waste more responsibly.	-1,824	2,505	-,728	,467
Awareness: I do not have time to handle waste more responsibly.	**-5,860**	**2,602**	**-2,252**	**,024**
Awareness: I do not have enough information about how to handle waste more responsibly.	-,359	1,620	-,222	,825
Awareness: There is not enough infrastructure to handle waste more responsibly.	1,404	1,437	,977	,329
Awareness: Attending Planica event is a special time of the year, so I do not want to be burdened by worrying about solving waste issues.	-1,562	1,584	-,986	,324
Awareness: I worry about waste issues at home, so I can relax a bit when I am attending events like Planica.	-1,793	2,050	-,875	,382
Awareness: My attendance at Planica may contribute to waste issues, but the benefits I bring to the local community outweigh the environmental costs.	,603	1,207	,500	,617
Perception (handling): There were sufficient number of waste bins.	-1,242	,890	-1,395	,163
Perception (handling): There were sufficient opportunities for recycling/separating waste.	,445	,900	,494	,622

Perception (handling): Waste bins were located at appropriate distance from most of spectator`s places.	**2,254**	**,911**	**2,473**	**,014**
Perception (handling): Informing about responsible waste handling was appropriate.	,206	,851	,242	,809

The next predictors were statistically significant at the 0,01 level when predicting the willingness of respondents to collect their waste and separate it at their exit from the event: the gender, age and highest educational level of respondents, the perception of the volume of the waste, the perception of personal contribution to the waste at the event, the perception of other spectators handling the waste, the perception of his/hers own contribution to solve the waste issue at the event, the perception of his/hers own moral obligation to solve the waste issue at the event, the agreement with the statements that they leave some waste but it could be worse, the agreement with the statement that they do not have time to handle waste more responsibly and that the bins were located at appropriate distance. On average, respondents who are more likely to collect their waste during the event and separate in at the exit from the event, are older, less educated females, who see the volume of the waste at the event as bigger, who think they have not contributed much of waste at the event but think other spectators did, who think that they can solve the waste issue at the event, who consider themselves morally obliged to solve the waste issue at the event, who do not think that they leave some waste but it could be worse, who have time to handle waste more responsibly and think that bins were located appropriately.

Results for willingness to donate money to the organizers in order for them to clean the area after the event are presented. The determination coefficient was 0.188 – the predictors explain 18,8 % of the total variance of the model. The regression model is statistically significant at the 0.01 level (F = 8,715, sig. < 0.001). Regression coefficients are presented in Table 3. Statistically significant coefficients (at the 0.05 level) are presented in bold.

Table 3 Regression analysis of predictors of willingness to donate to the environmental fund

	Unstandardized Coefficients			
Model	B	Std. Error	t	Sig.
(Constant)	-8352,598	2266,532	-3,685	<,001
year attended	**4,132**	**1,123**	**3,680**	**<,001**
Day attended: Thursday	**5,625**	**2,739**	**2,053**	**,040**
Day attended: Friday	-2,748	1,796	-1,531	,126
Day attended:Saturday	,646	1,873	,345	,730
Day attended:Sunday	-2,211	1,762	-1,255	,210
Staying overnight	-3,551	2,100	-1,691	,091

Gender	,897	1,638	,548	,584
Age	**-,264**	**,061**	**-4,315**	**<,001**
Highest level of education	-,770	,649	-1,187	,235
Satisfaction: Price of the ticket	**6,444**	**,858**	**7,510**	**<,001**
Satisfaction: Avaliability of garbage bins	,224	1,431	,156	,876
Satisfaction: Signalization of garbage bins	2,243	1,390	1,614	,107
Satisfaction: Availability of garbage bins for separate waste collection	-,227	1,330	-,170	,865
Satisfaction: Information about the options for organized arrival to Planica (carpooling)	**2,911**	**1,072**	**2,714**	**,007**
Satisfaction: Information about arrival with public transport	**-2,763**	**1,207**	**-2,289**	**,022**
Perception: The volume of waste	,045	,041	1,089	,276
Perception: How the waste is collected	-,028	,043	-,657	,511
Perception: How much did you personally contribute to the waste issues at the event?	,021	,023	,903	,367
Perception: How much do you think other visitors contributed to the waste issues at the event?	,030	,036	,852	,394
Perception: How much can you contribute to solving the issues of the waste at the event?	,059	,032	1,848	,065
Perception: In your opinion, how much do food and drink providers at the event, help maintaining clean environment?	**,127**	**,038**	**3,342**	**<,001**
Perception: To what extent do you consider yourself morally obliged to manage your waste at the event responsibly?	**,111**	**,043**	**2,607**	**,009**
Awareness: I may leave some waste, but it could be a lot worse.	1,171	1,769	,662	,508
Awareness: Organizer is responsible for solving the waste issues.	**-5,648**	**1,681**	**-3,361**	**<,001**
Awareness: Waste is produced by other members of my group (e.g. family, friends) and there is nothing I can do against it.	1,904	2,630	,724	,469

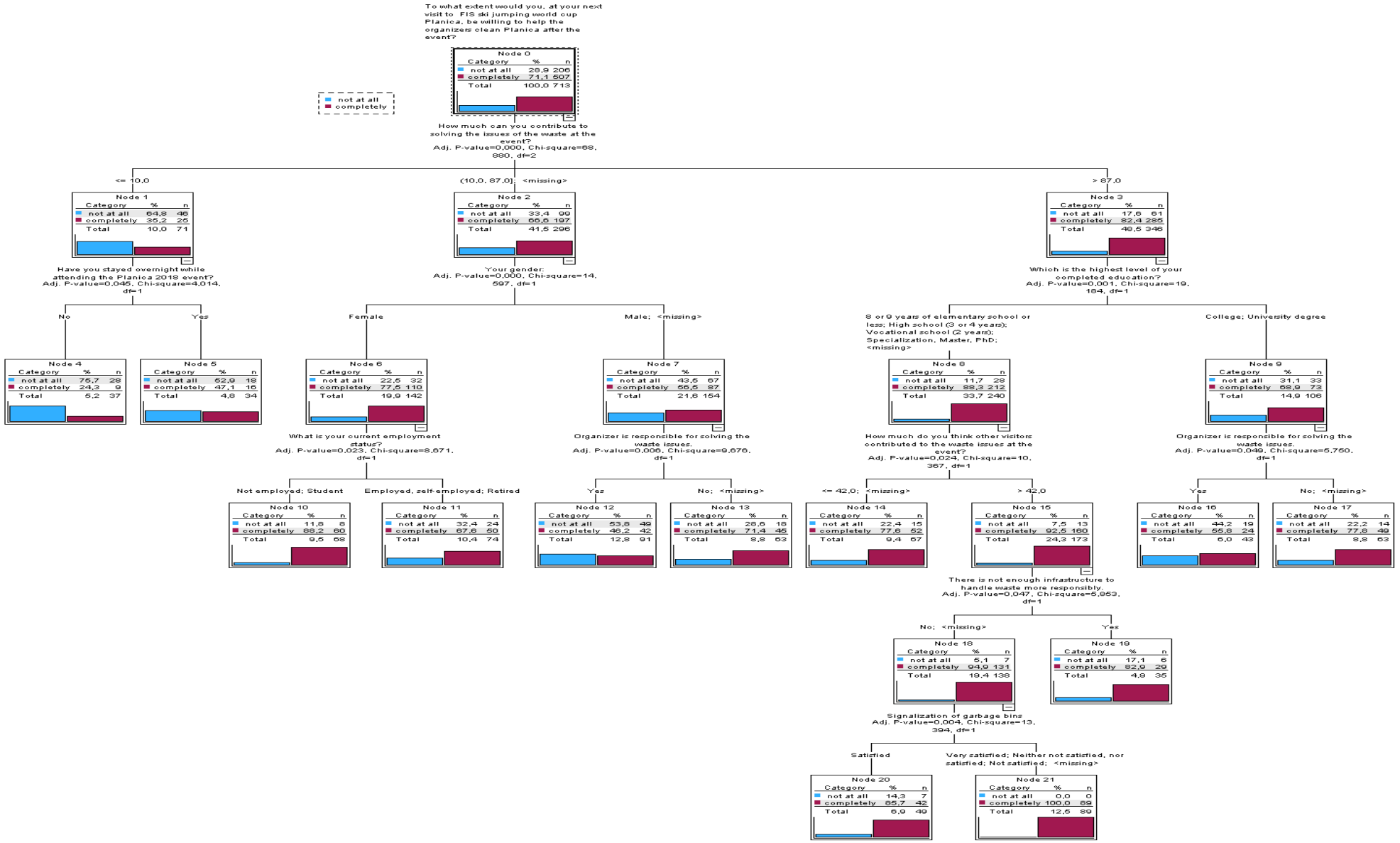
Awareness: It is too expensive to handle waste more responsibly.	3,639	3,425	1,063	,288
Awareness: I do not have time to handle waste more responsibly.	2,827	3,577	,790	,429
Awareness: I do not have enough information about how to handle waste more responsibly.	-,571	2,231	-,256	,798
Awareness: There is not enough infrastructure to handle waste more responsibly.	**6,291**	**1,989**	**3,163**	**,002**
Awareness: Attending Planica event is a special time of the year, so I do not want to be burdened by worrying about solving waste issues.	-1,709	2,182	-,783	,434
Awareness: I worry about waste issues at home, so I can relax a bit when I am attending events like Planica.	-,201	2,805	-,072	,943
Awareness: My attendance at Planica may contribute to waste issues, but the benefits I bring to the local community outweigh the environmental costs.	,215	1,674	,128	,898
Perception (handling): There were sufficient number of waste bins.	-1,430	1,232	-1,161	,246
Perception (handling): There were sufficient opportunities for recycling/separating waste.	,674	1,241	,543	,587
Perception (handling): Waste bins were located at appropriate distance from most of spectator`s places.	2,283	1,258	1,815	,070
Perception (handling): Informing about responsible waste handling was appropriate.	**2,581**	**1,187**	**2,173**	**,030**

When checking for the groups that best define the willingness and not willingness to donate money to the organizer so he could clean the site after the event, there can be seen the next predictors that have statistically significant (at the 0,05 level) regression coefficients: the year of the event, Thursday as the day of the event, the age of the respondent, the satisfaction with the price of the ticket, satisfaction with the information about the organized arrival and public transport at the event, the agreement that food and drink providers help to maintain the environment clean, the perception that they feel morally obliged to manage their waste at the event, the agreement that the organizer is responsible for handling the waste at the event, the perception that there is not enough infrastructure to handle the waste more responsibly, and agreement with the statement that informing about responsible waste handling was appropriate. On average, who attended the event on Thursday in the latest editions of the event, who were younger, more respondents were more satisfied with the price of the ticket and with information about options of organized arrival and arrival with public transport to the event, who think that food and drink providers help maintain the environment at the event clean, who consider

themselves as morally obliged to manage their waste at the event, who do not think that the organizer is responsible for handling waste at the event, who think there is not enough infrastructure for handling the waste more responsibly at the event, and think that informing about handling the waste at the event was appropriate,, are more willing to help the organizers to clean the area after the event.

CHAID analysis was used to prepare the profile of respondents about their willingness to help clean the area of the event. As such, a dichotomous variable was computed, with 0 meaning not at all, and 1 meaning completely. Results are presented in Figure 2.

Fig. 2 Profiles of respondents about their willingness to help clean the area of the event.

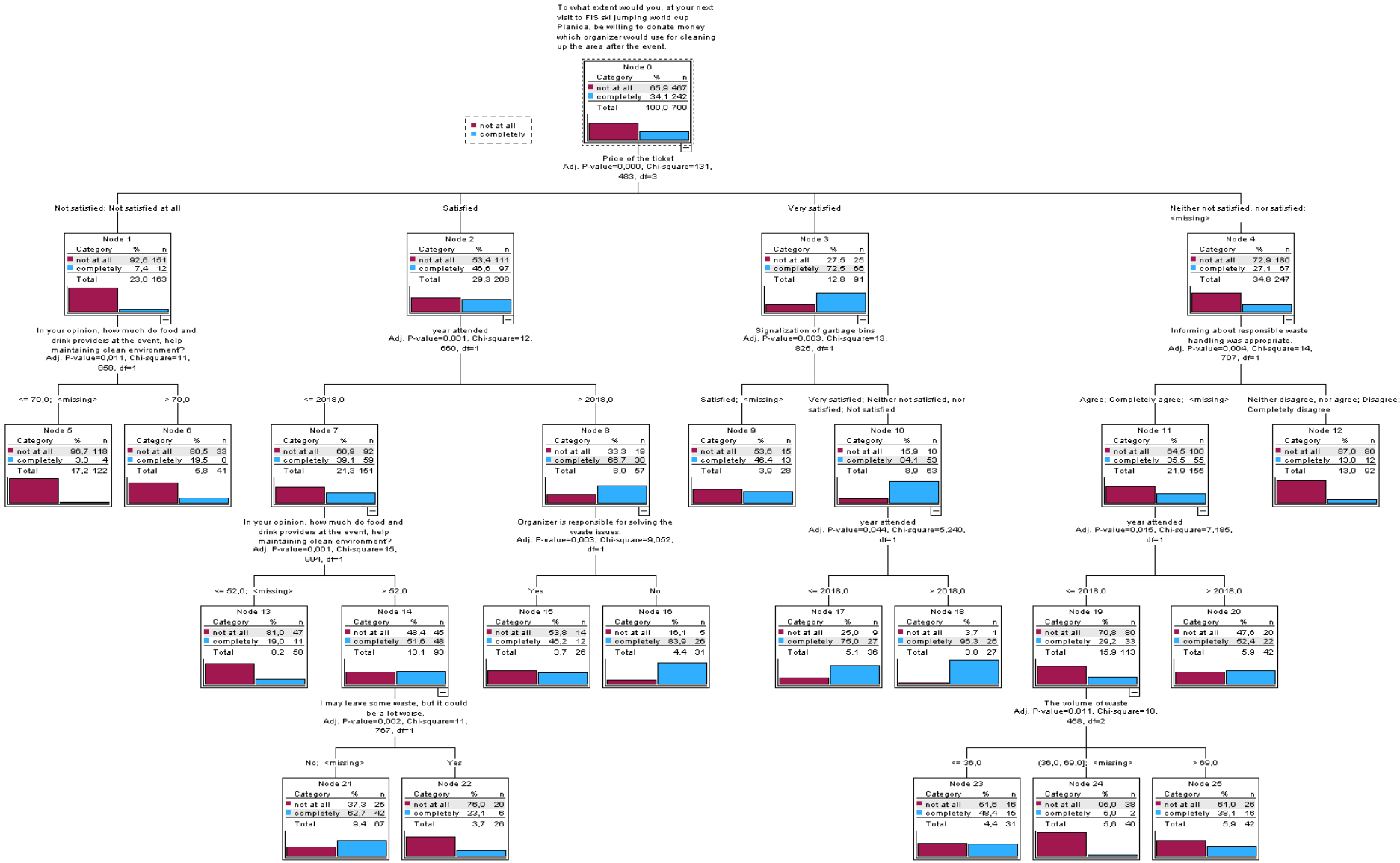

To what extent would you, at your next visit to FIS ski jumping world cup Planica, be willing to help the organizers clean Planica after the event?
not at all
completely
Node 0
Category % n
not at all 28,9 206
completely 71,1 507
Total 100,0 713
How much can you contribute to solving the issues of the waste at the event?
Adj. P-value=0,000, Chi-square=68,880, df=2
<= 10,0
(10,0, 87,0); <missing>
> 87,0
Node 1
Category % n
not at all 64,8 46
completely 35,2 25
Total 10,0 71
Have you stayed overnight while attending the Planica 2018 event?
Adj. P-value=0,045, Chi-square=4,014, df=1
Node 2
Category % n
not at all 33,4 99
completely 66,6 197
Total 41,5 296
Your gender:
Adj. P-value=0,000, Chi-square=14,597, df=1
Node 3
Category % n
not at all 17,6 61
completely 82,4 285
Total 48,5 346
Which is the highest level of your completed education?
Adj. P-value=0,001, Chi-square=19,184, df=1
No
Yes
Female
Male; <missing>
8 or 9 years of elementary school or less; High school (3 or 4 years); Vocational school (2 years); Specialization, Master, PhD; <missing>
College; University degree
Node 4
Category % n
not at all 75,7 28
completely 24,3 9
Total 5,2 37
Node 5
Category % n
not at all 52,9 18
completely 47,1 16
Total 4,8 34
Node 6
Category % n
not at all 22,5 32
completely 77,5 110
Total 19,9 142
Node 7
Category % n
not at all 43,5 67
completely 56,5 87
Total 21,6 154
Node 8
Category % n
not at all 11,7 28
completely 88,3 212
Total 33,7 240
Node 9
Category % n
not at all 31,1 33
completely 68,9 73
Total 14,9 106
What is your current employment status?
Adj. P-value=0,023, Chi-square=8,671, df=1
Organizer is responsible for solving the waste issues.
Adj. P-value=0,006, Chi-square=9,676, df=1
How much do you think other visitors contributed to the waste issues at the event?
Adj. P-value=0,024, Chi-square=10,367, df=1
Organizer is responsible for solving the waste issues.
Adj. P-value=0,049, Chi-square=5,750, df=1
Not employed; Student
Employed, self-employed; Retired
Yes
No; <missing>
<= 42,0; <missing>
> 42,0
Yes
No; <missing>
Node 10
Category % n
not at all 11,8 8
completely 88,2 60
Total 9,5 68
Node 11
Category % n
not at all 32,4 24
completely 67,6 50
Total 10,4 74
Node 12
Category % n
not at all 53,8 49
completely 46,2 42
Total 12,8 91
Node 13
Category % n
not at all 28,6 18
completely 71,4 45
Total 8,8 63
Node 14
Category % n
not at all 22,4 15
completely 77,6 52
Total 9,4 67
Node 15
Category % n
not at all 7,5 13
completely 92,5 160
Total 24,3 173
Node 16
Category % n
not at all 44,2 19
completely 55,8 24
Total 6,0 43
Node 17
Category % n
not at all 22,2 14
completely 77,8 49
Total 8,8 63
There is not enough infrastructure to handle waste more responsibly.
Adj. P-value=0,047, Chi-square=5,853, df=1
No; <missing>
Yes
Node 18
Category % n
not at all 5,1 7
completely 94,9 131
Total 19,4 138
Node 19
Category % n
not at all 17,1 6
completely 82,9 29
Total 4,9 35
Signalization of garbage bins
Adj. P-value=0,004, Chi-square=13,394, df=1
Satisfied
Very satisfied; Neither not satisfied, nor satisfied; Not satisfied; <missing>
Node 20
Category % n
not at all 14,3 7
completely 85,7 42
Total 6,9 49
Node 21
Category % n
not at all 0,0 0
completely 100,0 89
Total 12,5 89

The highest percentage (28 or 75,4 %) of respondents who do not wish to help the organizers to clean the area of the event after the event, did not stayed overnight in order to attend the event and think that they do contribute very little (on average less than 10, on a scale from 0 to 100) to solving the waste issue at the event.

Regarding respondents who are completely willing to help the organizers of the event to clean the area of the event after the event, we can find several groups of them. 89 or 100 % of the group of respondents completely willing to do so, are very satisfied, neither satisfied nor not satisfied, not satisfied with the signalization of garbage bins, think there is enough infrastructure to handle waste more responsibly at the event, think that other spectators (on average more than 42, on a scale from 0 to 100) contribute much waste at the event, are poorly or highly educated (do not have college or university degree), and think (on average more than 87 on a scale from 0 to 100) that they can contribute a lot to solve the waste issue at the event. 60 or 88,2 % of the second group of respondents are willing to help the organizer clean the area of the event after the event. They are not employed or students, females who think (on average between 10 and 87 on a scale from 0 to 100) that they can contribute or not a lot to solve the waste issue at the event. Another large group of respondents (42 or 85,7 % of the group) are willing to help the organizer clean the area of the event after the event. They are satisfied with the signalization of garbage bins, think there is enough infrastructure to handle waste more responsibly at the event, think that other spectators (on average more than 42, on a scale from 0 to 100) contribute much waste at the event, are poorly or highly educated (do not have college or university degree), and think (on average more than 87 on a scale from 0 to 100) that they can contribute a lot to solve the waste issue at the event.

In the following, CHAID analysis was used in order to prepare the profile of respondents about their willingness to donate the money to the organizer in order to clean the area after the event. As such, a dichotomous variable was computed, with 0 meaning not at all, and 1 meaning completely. Results are presented in Figure 3.

Fig. 3 Profiles of respondents about their willingness to donate the money to the organizer in order to clean the area after the event.


To what extent would you, at your next visit to FIS ski jumping world cup Planica, be willing to donate money which organizer would use for cleaning up the area after the event.
not at all
completely
Node 0
Category % n
not at all 65,9 467
completely 34,1 242
Total 100,0 709
Price of the ticket
Adj. P-value=0,000, Chi-square=131, 483, df=3
Not satisfied; Not satisfied at all
Satisfied
Very satisfied
Neither not satisfied, nor satisfied; <missing>
Node 1
Category % n
not at all 92,6 151
completely 7,4 12
Total 23,0 163
In your opinion, how much do food and drink providers at the event, help maintaining clean environment?
Adj. P-value=0,011, Chi-square=11, 858, df=1
Node 2
Category % n
not at all 53,4 111
completely 46,6 97
Total 29,3 208
year attended
Adj. P-value=0,001, Chi-square=12, 660, df=1
Node 3
Category % n
not at all 27,5 25
completely 72,5 66
Total 12,8 91
Signalization of garbage bins
Adj. P-value=0,003, Chi-square=13, 826, df=1
Node 4
Category % n
not at all 72,9 180
completely 27,1 67
Total 34,8 247
Informing about responsible waste handling was appropriate.
Adj. P-value=0,004, Chi-square=14, 707, df=1
<= 70,0; <missing>
> 70,0
Node 5
Category % n
not at all 96,7 118
completely 3,3 4
Total 17,2 122
Node 6
Category % n
not at all 80,5 33
completely 19,5 8
Total 5,8 41
<= 2018,0
> 2018,0
Node 7
Category % n
not at all 60,9 92
completely 39,1 59
Total 21,3 151
Node 8
Category % n
not at all 33,3 19
completely 66,7 38
Total 8,0 57
Satisfied; <missing>
Very satisfied; Neither not satisfied, nor satisfied; Not satisfied
Node 9
Category % n
not at all 53,6 15
completely 46,4 13
Total 3,9 28
Node 10
Category % n
not at all 15,9 10
completely 84,1 53
Total 8,9 63
Agree; Completely agree; <missing>
Neither disagree, nor agree; Disagree; Completely disagree
Node 11
Category % n
not at all 64,5 100
completely 35,5 55
Total 21,9 155
Node 12
Category % n
not at all 87,0 80
completely 13,0 12
Total 13,0 92
In your opinion, how much do food and drink providers at the event, help maintaining clean environment?
Adj. P-value=0,001, Chi-square=15, 994, df=1
Organizer is responsible for solving the waste issues.
Adj. P-value=0,003, Chi-square=9,052, df=1
year attended
Adj. P-value=0,044, Chi-square=5,240, df=1
year attended
Adj. P-value=0,015, Chi-square=7,185, df=1
<= 52,0; <missing>
> 52,0
Node 13
Category % n
not at all 81,0 47
completely 19,0 11
Total 8,2 58
Node 14
Category % n
not at all 48,4 45
completely 51,6 48
Total 13,1 93
Yes
No
Node 15
Category % n
not at all 53,8 14
completely 46,2 12
Total 3,7 26
Node 16
Category % n
not at all 16,1 5
completely 83,9 26
Total 4,4 31
<= 2018,0
> 2018,0
Node 17
Category % n
not at all 25,0 9
completely 75,0 27
Total 5,1 36
Node 18
Category % n
not at all 3,7 1
completely 96,3 26
Total 3,8 27
<= 2018,0
> 2018,0
Node 19
Category % n
not at all 70,8 80
completely 29,2 33
Total 15,9 113
Node 20
Category % n
not at all 47,6 20
completely 52,4 22
Total 5,9 42
I may leave some waste, but it could be a lot worse.
Adj. P-value=0,002, Chi-square=11, 767, df=1
The volume of waste
Adj. P-value=0,011, Chi-square=18, 458, df=2
No; <missing>
Yes
Node 21
Category % n
not at all 37,3 25
completely 62,7 42
Total 9,4 67
Node 22
Category % n
not at all 76,9 20
completely 23,1 6
Total 3,7 26
<= 36,0
(36,0, 69,0]; <missing>
> 69,0
Node 23
Category % n
not at all 51,6 16
completely 48,4 15
Total 4,4 31
Node 24
Category % n
not at all 95,0 38
completely 5,0 2
Total 5,6 40
Node 25
Category % n
not at all 61,9 26
completely 38,1 16
Total 5,9 42

Discussion and Conclusion

The study's findings underscore the complex interplay between personal predispositions and structural opportunities in shaping sustainable tourism behavior (Weaver, 2011). The high willingness to engage in direct cleanup efforts suggests that tourists are more inclined toward visible, hands-on sustainability actions (Buckley, 2012). Conversely, the lower participation in financial contributions indicates a need for greater transparency and communication regarding the impact of such initiatives (Font & McCabe, 2017). From a policy perspective, destination managers and event organizers should prioritize infrastructure investments that facilitate waste separation and encourage participatory engagement (Hall & Gössling, 2013). Targeted communication strategies tailored to diverse tourist profiles can enhance awareness and motivation for sustainable behavior (Gössling & Hall, 2006).

The findings of this study emphasize the need for a multidimensional approach to promoting sustainability at sporting events. While direct engagement strategies, such as site cleanup, received strong support, financial incentives were less effective in encouraging sustainable behavior. This underscores the importance of aligning sustainability initiatives with tourists' motivations and behavioral tendencies.

To effectively promote sustainable sporting events, stakeholders must integrate behavioral insights into tourism governance frameworks. Future research should examine the long-term effectiveness of these interventions, considering factors such as habitual behavior formation and policy reinforcement. Additionally, infrastructure investments should prioritize convenience-driven waste management solutions, as ease of participation significantly influences engagement levels.

Ultimately, sustainable event management must strike a balance between ecological conservation and visitor experience enhancement. By leveraging social influence, targeted messaging, and policy innovation, tourism stakeholders can foster a culture of environmental responsibility, ensuring that sporting events contribute to both local sustainability and global environmental goals.

Finally, this study contributes to the theoretical discourse on environmentally sustainable tourism by empirically validating Stern's Theory of Environmentally Significant Behavior within the context of major sporting events (Stern, 2000, 2005). By integrating behavioral insights into sustainable tourism frameworks, stakeholders can foster environmentally responsible visitor behaviors while ensuring the long-term viability of tourism destinations (Scott, Gössling, & Hall, 2012).

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