





Article

Cars Racing, People Gazing: Residents' Perception During the Sierra Morena Rally at Its First European Rally Championship Edition

José E. Ramos-Ruiz ¹, M. Ángel Alcaide-Sillero ¹, Paula C. Ferreira-Gomes ^{2,*} and David Algaba-Navarro ²

¹ Applied Economics, Faculty of Law, Economics and Business Administration, University of Cordoba, 14002 Cordoba, Spain; d22raruj@uco.es (J.E.R.-R.); maalcaide@uco.es (M.Á.A.-S.)

² Faculty of Law, Economics and Business Administration, University of Cordoba, 14002 Cordoba, Spain; i02alnad@uco.es

* Correspondence: u92fegop@uco.es

Abstract

The analysis of perceived impacts of sporting events and sport tourism is a growing research field. The Sierra Morena Rally, held in Córdoba, Spain, and included for the first time in the European Rally Championship (ERC) in 2025, provides an opportunity to examine residents' perceptions of both positive and negative effects. This study aims to identify profiles of perception and support towards the event. The theoretical framework integrates the Triple Bottom Line (TBL), Social Exchange Theory (SET), and Social Representations Theory (SRT). Based on 479 valid surveys collected during the rally, an Exploratory Factor Analysis (EFA) identified five factors of perceived impact: positive economic–social, positive environmental, negative economic, negative social, and negative environmental. A non-hierarchical k-means cluster analysis revealed four distinct groups: Critics, who emphasize negative impacts; Enthusiasts, focused on economic–social benefits; Pragmatic Supporters, showing balanced but conditional support; and Supporters Environmentally Concerned, combining favorable views with ecological awareness. The results confirm the heterogeneity of residents' perceptions and align with previous findings in the literature of motorsport events. Overall, the study contributes to understanding the social sustainability of rally events and highlights the importance of incorporating perceptual diversity into their management.

Keywords: residents' perceptions; sport tourism; Triple Bottom Line (TBL); Social Exchange Theory (SET); Social Representations Theory (SRT); segmentation; motorsport events; European rally championship; Córdoba (Spain)



Academic Editors: Lewis Ting
On Cheung and Tatjana D. Pivac

Received: 15 October 2025

Revised: 31 October 2025

Accepted: 4 November 2025

Published: 6 November 2025

Citation: Ramos-Ruiz, J. E., Alcaide-Sillero, M. Á., Ferreira-Gomes, P. C., & Algaba-Navarro, D. (2025). Cars Racing, People Gazing: Residents' Perception During the Sierra Morena Rally at Its First European Rally Championship Edition. *Tourism and Hospitality*, 6(5), 234. <https://doi.org/10.3390/tourhosp6050234>

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Residents' perceptions are essential to ensuring community support and the viability of sporting events (Horne, 2015; Müller, 2012; Prayag et al., 2013). A lack of public support can compromise the organisation and sustainability of these events (Hiller & Wanner, 2018; Scheu & Preuss, 2018), so it is essential to understand how residents assess their impacts. This approach allows for the development of strategies that maximise benefits and reduce externalities (Baldock et al., 2011; Kaplanidou, 2020), both in mega-events and in smaller-scale and less frequent competitions (Kaplanidou, 2020; Ouyang et al., 2019; Scholtz, 2019).

The recent literature has consolidated the analysis of impact perceptions from three complementary theoretical frameworks. The Triple Bottom Line (Elkington, 1994, 1997) extends the evaluation of event success to economic, social and environmental dimensions (E. Fredline & Faulkner, 2000; W. Kim et al., 2015; Getz & Page, 2024). Social Exchange Theory (Homans, 1958; Blau, 1964) explains support as the result of the perceived balance between benefits and costs (Ap, 1992; Gursoy & Kendall, 2006), while Social Representations Theory (Moscovici, 1982) provides a cultural and symbolic interpretation of impacts (Pearce et al., 1996; Cheng & Jarvis, 2010). These perspectives have proven to be complementary in explaining citizen support for sporting events (L. Fredline et al., 2013; Hadinejad et al., 2019).

Despite advances in knowledge, gaps remain in the analysis of perceptions of motor sports events, especially in rally competitions, where empirical studies are scarce (Naess, 2014; Mackellar, 2013). Most research has focused on Formula 1, Formula E or the WRC, while continental competitions, such as the European Rally Championship (ERC), or national competitions, have hardly been examined (Custódio et al., 2018; Liberato et al., 2023). This lack of evidence limits our understanding of how residents value the economic, social and environmental impacts in contexts with different scales, local roots and international reach.

In this context, the Rally Sierra Morena (RSM), held in Córdoba (Andalusia, Spain), represents an ideal case study. Its incorporation into the ERC in 2025, after decades as a national event, offers a unique opportunity to analyse citizens' perceptions of its transition to an international competition. This study aims to identify residents' impact perception profiles and analyse their relationship with the dimensions of the Triple Bottom Line, integrating the principles of Social Exchange Theory and Social Representations Theory. In this way, it expands the limited literature on the ERC and contributes to the understanding of the factors that condition the social sustainability of motor racing events. Therefore, this article seeks to answer the following research question.

Research Question: How is the resident population structured according to impact perception based on the Triple Bottom Line during the celebration of the Sierra Morena Rally, being part of the European Rally Championship for the first time?

2. Literature Review

2.1. An Approach to the Perception of Impact

Residents' perceptions are a key element in ensuring community support and the viability of sporting events (Horne, 2015; Müller, 2012; Prayag et al., 2013). A lack of support can influence the organisation of major events due to public opposition (Hiller & Wanner, 2018; Scheu & Preuss, 2018). The understanding of these perceptions is essential for guiding sustainable management and adjusting strategies to maximise benefits and reduce externalities (Baldock et al., 2011; Kaplanidou, 2020). Citizen support is also decisive in recurring or smaller-scale events, whose legitimacy depends on favourable perceptions (Kaplanidou, 2020; Ouyang et al., 2019; Scholtz, 2019). Evidence confirms that residents' attitudes condition the continuity of events (W. Kim et al., 2015; Prayag et al., 2013). Sporting events have specific characteristics that influence community perception, which justifies their separate study (Getz & Page, 2016; Sharpley, 2014).

Academic analysis has focused on evaluating positive and negative impacts, referred to as reactions (L. Fredline et al., 2013), social effects (Baldock et al., 2011; Kaplanidou, 2020; Ohmann et al., 2006) or attitudes (Delamere, 2001), with the most commonly used term being perceptions (S. S. Kim & Petrick, 2005; Polcsik & Perényi, 2022). Some authors incorporate the temporal dimension and conceptualise impacts as short-term perceptions dependent on the moment of measurement (Oshimi et al., 2016). Recent reviews show, however, that perceptions are conditioned by the local context and determine citizen

support. Studies on mega-events show diverse social effects and the need for longitudinal approaches (Mair et al., 2021). In events of different scales, perceptions depend on economic, social and environmental factors (Polcsik & Perényi, 2022). Attitudes are also influenced by the distribution of benefits and the perceived legacy (Bazzanella et al., 2023). Economic impacts have the greatest effect on support, followed by social and environmental impacts (Liang et al., 2025).

The analysis of perceptions is mainly based on three theoretical frameworks. The Triple Bottom Line (TBL) (Elkington, 1994, 1997) broadens the assessment of success to include economic, social and environmental dimensions, distinguishing between positive and negative impacts (W. Kim et al., 2015; E. Fredline & Faulkner, 2000; Getz & Page, 2024). Social Exchange Theory (SET) (Homans, 1958, 1961; Blau, 1964) interprets support as the result of the balance between perceived benefits and costs (Ap, 1990, 1992; Perdue et al., 1990; Gursoy & Kendall, 2006), applied in studies on the Olympic Games, Formula 1 and rallies (Waite, 2003; L. Fredline et al., 2013; Mackellar, 2013). Finally, Social Representations Theory (SRT) (Moscovici, 1981, 1982) analyses the shared meanings that structure the community's interpretation of events (Pearce et al., 1996; E. Fredline & Faulkner, 2000), integrating symbolic and cultural dimensions into the understanding of perceptions (Cheng & Jarvis, 2010; Naess, 2014).

2.2. Review of Typologies of Impacts in Motorsports Events

The literature on motor sports events identifies a variety of impacts perceived by residents, which, although they share features with other types of sporting events, have particularities associated with their format, location and scale (Polcsik & Perényi, 2022). Studies agree on the existence of perceived benefits and costs, highlighting the need to incorporate residents' perspectives into the sustainable management of these events (Liang et al., 2025). The most analysed impacts are grouped into three dimensions: economic, social and environmental (Bazzanella et al., 2023).

Research on the Mandalika MotoGP (Indonesia) (Pahrudin et al., 2023), the Canberra GMC 400 (Australia) (Cegielski & Mules, 2002), the Targa Tasmania (Australia) (French & Wickham, 2018) and NASCAR (United States) (Berkowitz et al., 2011) point to economic effects linked to increased trade, employment and investment, as well as improved accessibility and tourism infrastructure. In the social dimension, studies highlight community pride and local cohesion, conditioned by proximity to the event and interest in motor racing. In the environmental sphere, concerns have been raised about noise, congestion and waste generation, which have been partially mitigated through communication and reputation management strategies aimed at maintaining institutional legitimacy and public support.

Formula 1 Grand Prix races have been used as instruments of territorial promotion and economic development, with mixed results (Chamberlain et al., 2019). In Australia, the Melbourne Grand Prix showed net losses despite high public funding (Fairley et al., 2011), while in Baku (Azerbaijan), positive effects on investment and consumption were observed (Mirzayeva et al., 2020). In Asia, profitability depends on the profile of attendees: in Shanghai (China), international visitors account for less than 6% of total attendance but generate a quarter of spending (M. K. Kim et al., 2017). Public-private partnerships and the hiring of local suppliers contribute to improving economic returns (Chamberlain et al., 2019). Along these lines, Formula E and Formula 3 in Macao have incorporated sustainability and green mobility measures (Bjerke & Naess, 2021; Zhou, 2010).

From a social perspective, residents associate these events with tourism promotion, local pride and community cohesion (Cheng & Jarvis, 2010; Mao & Huang, 2015), although tensions arising from congestion, noise and unequal distribution of benefits have also been documented (Añó-Sanz et al., 2012; J. Kim et al., 2022). In the environmental dimension,

the impacts are diverse: the Australian Grand Prix was criticised for the damage caused to green spaces (Fairley et al., 2011), while the Zurich E Prix integrated sustainable mobility measures and educational activities to reinforce its environmental orientation (Bjerke & Naess, 2021). Evidence suggests that inter-institutional planning, coordination with local actors and transparency in management are key factors in reducing negative effects and ensuring social acceptance of the event (Henderson et al., 2010; Roullet et al., 2020).

Studies on international rallies (WRC and ERC) highlight their economic and symbolic relevance. In Ourense (Spain), every euro of public investment generated a return of ten euros (Barajas et al., 2016); in Kenya (2021) and Portugal (2023), increases in employment, hospitality and hotel occupancy were observed (Wanyonyi et al., 2022; Liberato et al., 2023). Rallies also contribute to the international profile of destinations and the strengthening of local identity, as in Ireland, the Azores and Sardinia (Hassan & O'Connor, 2009; Custódio et al., 2018; Del Chiappa et al., 2016).

In the social sphere, these events promote community cohesion and pride, although they are also associated with nuisances such as dust, noise and mobility restrictions (Mackellar, 2013; Dredge & Whitford, 2011). In environmental terms, sustainability depends on the management implemented: from reforestation programmes in Kenya to environmental certifications and mitigation strategies applied in Portugal (Wanyonyi et al., 2022; Liberato et al., 2023). The literature agrees that coordination between public and private bodies, advance planning and the involvement of the local community are essential elements in balancing the benefits and costs and ensuring the social legitimacy of events.

2.3. Review of Clusters in Residents' Perception of Sports Events

Scientific evidence shows that residents do not constitute a homogeneous group when it comes to sporting events, but rather express diverse perceptions and attitudes (Kaplanidou, 2020). This heterogeneity requires management strategies to be adapted to specific population segments in order to maximise benefits, mitigate negative impacts and optimise social and economic legacies (Calabuig-Moreno et al., 2014; Del Chiappa et al., 2016; Parra-Camacho et al., 2020a).

The first studies on residents' perceptions emerged with the 1988 Winter Olympics in Calgary (Ritchie & Lyons, 1987), focusing on attitudinal differences according to sociodemographic variables and contact with the event. The results showed that greater exposure generated more positive attitudes, while a lack of information or interest was associated with negative perceptions. Subsequently, Faulkner and Tideswell (1997) and E. Fredline and Faulkner (2000) explored the influence of residential proximity, interest, and the perception of benefits and costs in greater depth. Kaplanidou (2020) extended this approach to the perceived legacies of different Olympic venues, highlighting the influence of time elapsed since the event and socioeconomic variables on the assessment of tangible and intangible benefits.

The systematic use of cluster analysis to segment the resident population became established in the second decade of the 21st century. Presenza and Sheehan (2013) identified four groups in Termoli (Italy) with attitudes ranging from "Haters" to "Favourers", including "Disenchanted" and "Realists" profiles. Other studies analysed temporal variations in perception: Ma et al. (2013) observed a shift towards more neutral positions after the event at the World Games in Kaohsiung (Taiwan); Ma and Rotherham (2016) found a similar pattern in the Tour of Taiwan; and Vegara-Ferri et al. (2020), in the Vuelta a España cycling race, confirmed the stability of three clusters, "Positive", "Moderate" and "Opponents", before and during the competition.

The literature generally shows recurring patterns. Chiam and Cheng (2013) identified three groups at the Youth Olympic Games in Singapore: "Sceptics", "Reserved Enthusi-

asts" and "Enthusiasts"), while Wallstam and Kronenberg (2022) identified "Enthusiasts", "Prouds" and "Critics" profiles at the World Ski and Biathlon Championships in Jämtland (Sweden), with greater polarisation near the venues. Complementarily, Vegara-Ferri et al. (2021) classified residents of the Vuelta a Burgos as "Safe", "Neutral", and "Unsafe", highlighting the influence of the post-pandemic context.

Motor racing events have also been the subject of attention. L. Fredline et al. (2013) identified five clusters ranging from "very negative" to "very positive" at the Australian Formula 1 Grand Prix, observing a reduction in extreme perceptions and an increase in neutrality over time. In Valencia, Calabuig-Moreno et al. (2014) detected three groups: "Unfavourable", "Moderately unfavourable" and "Moderately favourable", differentiated by interest in the sport, gender and length of residence. In Santiago de Chile, Parra-Camacho et al. (2020b) distinguished between "Favourable", with high educational levels and high incomes, and "Realistic", with lower incomes and greater sensitivity to negative impacts.

Within this typology, rally events have received little attention. The only precedent identified corresponds to the study by Del Chiappa et al. (2016) on the 2013 WRC in Sardinia (Italy), which distinguished four profiles: "Supporters", "Neutrals", "Enthusiasts but culturally and environmentally concerned" and "Critics", differentiated both by their perceptions and by their sociodemographic characteristics.

2.4. Research Gaps in Academic Literature on Residents' Perception of Motorsports Events

Sports tourism is a growing field of study that requires integrating economic, social, and environmental dimensions to understand the diversity of its impacts (Bazzanella et al., 2023) and incorporate both tangible and intangible effects (Tadini et al., 2021). Recent literature highlights the need for more robust research designs that combine objective and subjective metrics, capable of capturing the complexity and diversity of the contexts in which events are held (Arici et al., 2023). Along these lines, it is proposed to move towards analytical frameworks that integrate contextual and temporal variables to explain the evolution of perceptions (Mair et al., 2021; Polcsik & Perényi, 2022).

There are still gaps in the analysis of the structures and processes of cooperation between public, private and community actors, especially in the sustainable management of events (Dredge & Whitford, 2011). It is recommended to further explore how socio-political changes, power relations and inter-institutional coordination condition decision-making and the achievement of common objectives (Mollah et al., 2021).

From the perspective of the host community, the perception of impacts depends on demographic, cultural and emotional factors, such as attachment to the territory or community identity (Del Chiappa et al., 2016). It is therefore necessary to incorporate contextual variables that allow for the segmentation and explanation of the heterogeneity of host communities (Polcsik & Perényi, 2022) and to include indicators related to social cohesion, connectivity and well-being (Mair et al., 2021). On the economic level, the aim is to identify the factors that maximise the return on events, volume and profile of attendees, average expenditure or multiplier effect (Barajas et al., 2016), and analyse how these impacts are perceived by residents (Hassan & O'Connor, 2009). Economic and social perceptions directly influence the improvement of the destination's image and the assessment of legacies (Polcsik & Perényi, 2022; Tadini et al., 2021). Likewise, sustainability is addressed through the contribution of events to the image of the destination, resident satisfaction and the mitigation of environmental impacts, considering risks such as climate change or the vulnerability of certain environments (Arici et al., 2023; Mackellar, 2013). In this regard, there is a clear need to study how communication and resident involvement in planning influence their acceptance (Reis & Sperandei, 2014).

In the field of motor events, and especially rallies, the literature shows a knowledge gap regarding their impacts on host communities, despite their growing relevance as a tourism product (Naess, 2014). It is recommended that they be addressed from an integrated perspective that considers the interactions between economic, social and environmental dimensions, and the influence of proximity, experience or involvement with the event (Liberato et al., 2023; Mackellar & Reis, 2014). Case studies are proposed as an effective way to expand knowledge and enrich academic discussion (Mollah et al., 2021).

Existing research has been conducted mainly in Australia (Dredge & Whitford, 2011; Mackellar, 2013; Mackellar & Reis, 2014; Phi et al., 2014; Reis & Sperandei, 2014), Kenya (Wanyonyi et al., 2022), Italy (Del Chiappa et al., 2016), Croatia (Perić & Vitezić, 2023) and Portugal (Custódio et al., 2018; Liberato et al., 2023). However, most focus on the WRC, leaving continental or national competitions, such as the ERC or the Spanish Super Rally Championship (S-CER), largely unexplored. This limitation reinforces the gap highlighted by previous literature, which calls for more diverse and comparative empirical studies (Naess, 2014).

3. Methodology

3.1. Case Study: The Rally Sierra Morena in the European Rally Championship

The Sierra Morena Rally (RSM) is an asphalt rally-type motorsport event (Rico-Bouza et al., 2021) which reached its 42nd edition in 2025 and returned to the European Rally Championship (ERC) for the first time since 1990, being the only event in this international category held in the Autonomous Community of Andalusia, in southern Spain. It is, therefore, a car tourism product (Cudny, 2018), intangible and simple, which takes the form of a route (Cudny & Jolliffe, 2019).

Academic research on sporting events in Andalusia has been limited and has focused predominantly on economics or tourism. The Web of Science and Scopus only list studies on the Spanish Motorcycle Grand Prix (WorldSBK), held in Jerez (Fernández-Alles, 2014), and a descriptive approach to the Algar Rally in Cadiz (Fernández-Alles & Gutiérrez-Arance, 2014). Fernández-Alles (2014) showed that international motor racing events have a significant economic and tourism impact on the region, while recent research highlights the influence of fan enthusiasm and attitudes towards the event on the effectiveness of sports sponsorship (Carol et al., 2023).

Outside of motor racing, international championships such as the Women's Tennis World Championships held in Seville (Ramírez Hurtado et al., 2007), the European and World Badminton Championships held in Huelva (Seguí-Urbaneja & Cabello Manrique, 2023; Quirante et al., 2024) and the 2015 Winter University Games in Granada (Roca-Cruz et al., 2018, 2019), which showed positive social and economic impacts, albeit with possible overestimations. Recurring or local events have also been studied, such as the marathons in Seville and Malaga (García-Vallejo et al., 2020), the Córdoba Half Marathon (Ramos-Ruiz et al., 2024) and the Guzmán el Bueno MTB (Ramos-Ruiz et al., 2025), focusing on motivations, satisfaction and perception of the destination. Other studies on the Seville-Betis Regatta (Gavala, 2018), the promotion of Córdoba C.F. to the first division of La Liga de Fútbol Profesional (Amador et al., 2017) and the popular races in Granada (Quirante-Mañas et al., 2023) highlight the importance of local roots and satisfaction as determining factors for the continuity of events.

The literature on sporting events in Andalusia remains limited and fragmented, with little attention paid to residents' perception of impact. This case study therefore contributes to enriching the academic literature and discussion on sporting events held in southern Spain.

3.2. Design of the Questionnaire

A self-administered questionnaire was developed using a structured and closed-ended format. The design of the measurement instrument drew on previous research concerning tourism, event impacts, and motorsport-related studies (Custódio et al., 2018; Del Chiappa et al., 2016; Liberato et al., 2023; Mackellar, 2013; Perić & Vitezić, 2023). Its development followed three sequential refinement stages. These procedures enhanced the reliability and validity of the data collection tool (Moore et al., 2021; Hair et al., 2020). Initially, the items were examined by a specialist in tourism research, a Full Professor of Applied Economics at the University of Córdoba (Spain), to ensure conceptual consistency. Subsequently, the instrument was evaluated by academic experts in tourism and by professionals with experience in the organization of sporting events. Finally, a pilot test involving 42 residents was carried out to verify the clarity of wording, assess response time, and ensure the adequacy of the instrument for the study's objectives.

The final version of the questionnaire (Table 1) consisted of two main parts. The first section included six categorical items referring to the respondents' sociodemographic characteristics. The second section comprised Likert-type statements grouped into three thematic blocks. The first block evaluated residents' perceptions of event impacts, structured according to the Triple Bottom Line framework, distinguishing between positive and negative impacts in the economic, social, and environmental dimensions. Responses were collected using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). The seven-point format was chosen to incorporate a neutral midpoint and to increase sensitivity in capturing attitudinal differences compared to shorter scales (Hair et al., 2020).

Table 1. Questionnaire.

[+ECO1]	The RSM attracts tourists to Córdoba
[+ECO2]	The RSM generates a positive economic impact for the city
[+ECO3]	The RSM stimulates the economic development of Córdoba
[+ECO4]	The RSM creates new job opportunities in Córdoba
[+ECO5]	The RSM generates new business opportunities in Córdoba
[−ECO1]	During the event, companies take advantage to raise the prices of goods and services
[−ECO2]	The economic benefit for Córdoba is limited
[−ECO3]	Hosting the RSM requires excessive financial investment
[−ECO4]	The jobs created during the event are precarious
[−ECO5]	The economic benefit reaches very few people
[+SOC1]	The RSM provides new leisure opportunities for residents
[+SOC2]	The RSM facilitates interaction among residents
[+SOC3]	The RSM strengthens social identity
[+SOC4]	The RSM reinforces social cohesion
[+SOC5]	The RSM increases pride in belonging to the city
[−SOC1]	The RSM causes division between residents who support and oppose the event
[−SOC2]	The RSM generates occasional inconvenience due to crowding
[−SOC3]	The RSM creates mobility difficulties in the city due to road closures
[−SOC4]	The RSM generates a sense of insecurity in the streets among residents
[−SOC5]	The RSM encourages inappropriate driving styles

Table 1. *Cont.*

[+ENV1]	This event raises awareness about noise pollution
[+ENV2]	This event raises awareness about the importance of reducing waste generation
[+ENV3]	This event increases environmental awareness among residents
[+ENV4]	This event raises awareness of the need to adopt a sustainable lifestyle as a society
[+ENV5]	This event stimulates the implementation of environmental planning and management controls
[−ENV1]	This event increases noise levels and acoustic pollution in the area
[−ENV2]	The RSM harms local wildlife and its habitat
[−ENV3]	The RSM increases the generation of waste and litter in undesired areas
[−ENV4]	The RSM increases air pollution
[−ENV5]	Overall, it damages the space where it takes place
[SUP1]	I will support the hosting of the RSM
[SUP2]	I will say positive things about the RSM if asked
[SUP3]	I will say positive things about the RSM even if not asked
[SUP4]	I will attend the RSM if I am in the area
[SUP5]	I will attend the RSM even if I need to travel
[SUP6]	I will recommend attending the RSM to others if asked
[SUP7]	I will recommend attending the RSM to others even if not asked

3.3. Collection of Data

Fieldwork was carried out during the celebration of the event, between 3 and 7 April 2025, coinciding with the official schedule of the Rally Sierra Morena (RSM). Data collection took place both in Córdoba city, where the rally's headquarters and ceremonial start were located, and in the municipalities hosting competitive stages. Conducting the survey during the event allowed researchers to capture residents' perceptions in real time, reflecting immediate experiences and interactions with the rally environment.

To ensure adequate territorial representation, postal codes from Córdoba and the participating municipalities were evenly distributed among a team of 40 field collaborators, enabling balanced coverage across urban and rural areas. The questionnaire was self-administered in digital format via Google Forms, which minimized interviewer bias and facilitated respondent anonymity and accessibility (Díaz de Rada, 2012). A non-probability convenience sampling approach was adopted, following established practices in perception studies where respondents are selected based on their availability and proximity to the event (Finn et al., 2000). The fieldwork was conducted in the open areas surrounding the spaces where the event took place, which included both attendees and non-attendees present in the vicinity. This sampling context may explain the relatively high percentage of respondents professionally linked to motorsports.

In total, 479 valid and complete questionnaires were collected. Although the sampling method was non-probabilistic, for reference purposes, the sample size achieved would correspond to a 95% confidence level and a sampling error of approximately 4.475%.

3.4. Processing Data

First, the Kolmogorov–Smirnov test (Kolmogorov, 1933; Smirnov, 1948) confirmed that the data distribution was non-normal, leading to the subsequent use of non-parametric tests. The reliability of the scales was verified through Cronbach's Alpha and McDonald's Omega values above 0.7 (Nunnally & Bernstein, 1994). An exploratory factor analysis (EFA) was conducted on the 30 items designed to measure residents' perceptions based on the Triple Bottom Line (TBL) framework. This technique allows the identification of underlying latent dimensions within a set of observed variables (Kahn, 2006; Pérez & Medrano, 2010) and has

been increasingly applied in recent research on residents' perceptions of rally events (Perić & Vitezić, 2023). The adequacy of the sample was verified according to methodological standards: a minimum ratio of ten valid observations per item (Nunnally & Bernstein, 1994) and an overall sample size of at least 300 cases (Tabachnick & Fidell, 2001). The suitability of the data for factor analysis was confirmed through the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (≥ 0.70) (Hair et al., 2018, 2020) and Bartlett's test of sphericity ($p < 0.05$) (Everitt & Wykes, 2001). Following standard criteria, factors were retained when eigenvalues exceeded 1 (Kaiser, 1960), item loadings were greater than 0.40 (Glutting, 2002), and the total variance explained (TVE) surpassed 50% (Merenda, 1997).

Resident segmentation was performed through a non-hierarchical k-means cluster analysis (Singh-Kuarav et al., 2021), a method commonly employed in sport tourism research to classify individuals based on shared perceptual or attitudinal patterns (Chiam & Cheng, 2013; Del Chiappa et al., 2016). The algorithm seeks to minimize within-group variance while maximizing differentiation between clusters (MacQueen, 1967), using Euclidean distance as the similarity measure (Tan et al., 2019). The number of clusters was set at four ($K = 4$), following several complementary criteria: (1) theoretical expectations of distinct resident typologies identified in the previous literature (Del Chiappa et al., 2016); (2) the stability of cluster centroids across repeated runs, which confirmed robustness to random initialization (Lloyd, 1982); and (3) the interpretability of results in relation to sociodemographic and attitudinal features (Hair et al., 2018). Each resulting segment was then characterized according to its sociodemographic composition, and descriptive labels were assigned to facilitate the interpretation of residents' perceptions of rally events and their implications for event management and planning (Cadima-Ribeiro et al., 2023). To verify statistical differentiation between groups, a one-way analysis of variance (ANOVA) (Fisher, 1919) was conducted to test for significant differences in cluster means ($p < 0.05$) (Everitt et al., 2011). Additionally, given the non-normal distribution of the event support variable, inter-cluster differences were further examined using the Kruskal–Wallis H test (Kruskal & Wallis, 1952).

4. Results

Table 2 shows the sociodemographic profile of the sample collected. It shows a balanced distribution by gender, with the majority of respondents under 45 years old (61.38%). Overall, the sample offers an even distribution across the variables.

Table 2. Sociodemographic profile of the sample.

Variable	Category	n	%
Gender	Male	245	51.15%
	Female	234	48.85%
Age	Up to 45 years old	294	61.38%
	Over 45 years old	185	38.62%
University degree	Yes	145	30.27%
	No	334	69.73%
Monthly income level	More than €2000 net per month	142	29.65%
	Up to €2000 net per month	337	70.35%
Occupation directly related to motor sport	Yes	139	29.02%
	No or not employed	340	70.98%

The descriptive results (Table 3) show an overall positive assessment of the impacts of the Sierra Morena Rally (RSM), especially in the economic dimension, where items [+ECO1 to ECO5] have the highest means (between 4.81 and 5.40). In the positive social dimension, perceptions are also favourable (means between 4.59 and 5.18), with pride [+SOC5] and interaction among residents [+SOC2] standing out. In contrast, positive environmental impacts score more moderately (means between 3.93 and 4.18), reflecting less identification with the ecological benefits of the event.

Table 3. Descriptive statistics of Triple Bottom Line items.

Item	Mean	SD ¹	Item	Mean	SD ¹	Item	Mean	SD ¹
[+ECO1]	5.40	1.686	[+SOC1]	5.18	1.823	[+ENV1]	4.13	1.833
[+ECO2]	5.36	1.776	[+SOC2]	4.81	1.854	[+ENV2]	4.03	1.828
[+ECO3]	5.25	1.776	[+SOC3]	4.62	1.901	[+ENV3]	4.08	1.824
[+ECO4]	4.81	1.846	[+SOC4]	4.59	1.896	[+ENV4]	3.93	1.817
[+ECO5]	4.99	1.776	[+SOC5]	4.89	1.921	[+ENV5]	4.18	1.777
[−ECO1]	4.52	1.699	[−SOC1]	4.47	1.745	[−ENV1]	5.07	1.673
[−ECO2]	4.54	1.666	[−SOC2]	4.91	1.745	[−ENV2]	4.45	1.824
[−ECO3]	4.56	1.591	[−SOC3]	5.18	1.728	[−ENV3]	4.90	1.716
[−ECO4]	4.46	1.718	[−SOC4]	3.61	1.984	[−ENV4]	4.88	1.783
[−ECO5]	4.71	1.683	[−SOC5]	3.93	1.960	[−ENV5]	4.42	1.896

Note: ¹ = Standard deviation.

As for the negative impacts, the values are around the midpoint of the scale, with a somewhat more critical perception of high acoustic pollution and noise ([−ENV1] = 5.07) and in social and mobility aspects ([−SOC3] = 5.18), indicating some awareness of the adverse effects, although without a predominance of an openly negative attitude. Overall, residents recognise more benefits than harms, with particular emphasis on the economic effects.

However, the item [−SOC3] was removed after the first EFA, as it showed cross-loadings greater than 0.5 on more than one factor (Glutting, 2002). In the second execution, the total variance explained increased from 68.316% to 68.923%. This slight improvement also justified the removal of item [−SOC3]. The resulting EFA yielded five factors of perceived impact, as the positive perception of economic and social impacts merged into a single dimension, labelled as positive perception of socioeconomic impact (ESO+). Within this dimension, the items loaded first on economic indicators and subsequently on social ones, indicating a slight internal differentiation within the factor. Nevertheless, the statistical criterion of extracting factors only when their eigenvalues exceeded 1 (Kaiser, 1960) was maintained. Accordingly, and ordered by explained variance, the five factors were named as follows: positive perception of socioeconomic impact (ESO+), 25.609%; negative perception of environmental impact (ENV−), 13.86%; positive perception of environmental impact (ENV+), 13.048%; negative perception of social impact (SOC−), 8.373%; and negative perception of economic impact (ECO−), 8.034%. Table 4 shows these results in detail.

Table 5 shows all *p*-values below 0.05 and *F*-values above 1. Therefore, all factors were significant for conducting the segmentation, thus justifying the validity and suitability of retaining the factor ESO+ as a single dimension.

Table 4. Rotated component matrix.

Items	Factors				
	1	2	3	4	5
[+ECO3]	0.849				
[+ECO2]	0.848				
[+ECO5]	0.818				
[+ECO4]	0.817				
[+ECO1]	0.809				
[+SOC3]	0.800				
[+SOC1]	0.776				
[+SOC4]	0.773				
[+SOC5]	0.773				
[+SOC2]	0.745				
[−ENV4]		0.839			
[−ENV3]		0.800			
[−ENV5]		0.772			
[−ENV2]		0.771			
[−ENV1]		0.752			
[+ENV3]			0.848		
[+ENV2]			0.833		
[+ENV4]			0.817		
[+ENV1]			0.795		
[+ENV5]			0.722		
[−SOC1]				0.754	
[−SOC4]				0.680	
[−SOC5]				0.632	
[−SOC2]				0.581	
[−ECO4]					0.710
[−ECO5]					0.685
[−ECO2]					0.639
[−ECO3]					0.537
[−ECO1]					0.516
Alpha	0.957	0.908	0.917	0.802	0.715
Omega	0.956	0.911	0.918	0.804	0.714
Eigenvalues	7.426	4.019	3.784	2.428	2.330
EV ¹	25.609%	13.860%	13.048%	8.373%	8.034%
TEV ²			68.923%		
KMO ³			0.938		
Chi-square			10,425.38		
DoF ⁴			406		
p-value			0.000		

Notes: ¹ = Explained variance; ² = Total explained variance; ³ = Kaiser-Meyer-Olkin; ⁴ = Degree of Freedom.

Table 5. ANOVA of cluster analysis.

Factors	Cluster		Error		F	p-Value
	Sq. Mean ¹	DoF ²	Sq. Mean ¹	DoF ²		
ESO+	46.392	3	0.713	475	65.037	<0.001
ENV+	32.737	3	0.800	475	40.944	<0.001
ECO−	19.799	3	0.881	475	22.467	<0.001
SOC−	81.635	3	0.491	475	166.354	<0.001
ENV−	70.148	3	0.563	475	124.535	<0.001

Notes: ¹ = Square Mean; ² = Degree of Freedom.

In fact, the four clusters identified correspond to distinct profiles consistent with the literature review conducted for this research, as shown in Table 6. The low standard deviation values indicate the necessary homogeneity of opinions within each segment.

Table 6. Characterisation of each cluster according to impact perception.

Factor	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
	Mean	SD ¹	Mean	SD ¹	Mean	SD ¹	Mean	SD ¹
ESO+	3.90	2.073	5.51	0.972	5.68	1.022	4.71	1.317
ENV+	3.79	2.099	4.06	1.422	3.75	1.309	4.65	1.266
ECO–	5.90	0.686	4.79	0.769	4.07	0.801	3.73	0.929
SOC–	5.97	0.870	3.09	0.979	4.51	1.079	3.48	1.078
ENV–	3.79	2.099	4.06	1.422	3.75	1.309	4.65	1.266

Note: ¹ = Standard Deviation.

Subsequently, a post hoc analysis was performed on the items related to support for the event, using the non-parametric Kruskal–Wallis H test. Statistically significant differences were found for all items in the support variable, both in relation to support in general and to active and passive recommendation and intention to attend. Table 7 shows these results and the values associated with each cluster.

Table 7. Kruskal–Wallis H test on support.

Items	<i>p</i> -Value	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
		Mean	SD ¹	Mean	SD ¹	Mean	SD ¹	Mean	SD ¹
[SUP1]	<0.001	3.20	2.428	5.10	2.031	4.78	1.955	4.75	1.929
[SUP2]	<0.001	3.50	2.466	5.68	1.599	5.43	1.611	5.06	1.804
[SUP3]	<0.001	3.32	2.471	4.75	2.131	4.49	2.084	4.54	1.974
[SUP4]	<0.001	3.42	2.457	4.82	2.109	4.54	2.130	4.58	2.057
[SUP5]	0.01	3.11	2.428	3.53	2.278	3.53	2.288	4.02	2.201
[SUP6]	<0.001	3.48	2.515	5.11	2.043	4.97	1.950	4.83	1.975
[SUP7]	<0.001	3.09	2.369	4.33	2.229	4.23	2.124	4.46	1.933

Note: ¹ = Standard Deviation.

Both analyses allow us to characterise the clusters from the point of view of perceived impact and support for the event. In addition, the four clusters have distinct sociodemographic characteristics.

Cluster 1 has been named “Critics” (22.34%). It is characterised by the most negative perceptions of the event, with high values for negative economic (ECO–) and social (SOC–) impacts. It also has low values for positive impacts, both socio-economic (ESO+) and environmental (ENV+). This cluster has the lowest scores on all support items, showing a lack of willingness to support, recommend or attend the event. However, since none of the items have averages below 3 points, a certain level of tolerance can be suggested. This cluster corresponds to a predominantly female profile, with low-to-medium incomes and not necessarily a university degree. This cluster is associated with the population that is most critical of the impacts and most unsupportive.

Cluster 2 has been named “Enthusiasts” (23.80%). This cluster is characterised by the most positive perceptions of the event. It mainly highlights the positive economic and social impact (ESO+), while the negative impacts are generally perceived as low or moderate. They show the highest support scores. In other words, their attitude reflects a strong intention to support the event, speak positively about it and recommend it. This cluster is mainly represented by a male, young audience, without a university degree and

with low-to-medium incomes. They thus represent the most enthusiastic and proactive residents of the rally.

Cluster 3 has been named “Pragmatic Supporters” (27.77%). They maintain a balanced view of the event. They show high scores in positive economic and social impacts (ESO+). However, they also moderately recognise the negative economic (ECO−) and social (SOC−) impacts. In addition, they show medium-high support. They are favourable to the event but in a more rational and restrained way, with a predominance of recommendation and passive attendance, i.e., if it does not require additional effort. The most representative profile of this cluster is that of people of both sexes, mostly young, with a university education and an average income level. This cluster is associated with people who have a moderately critical view but are favourable to the event.

Cluster 4 has been named “Supporters Environmentally Concerned” (26.10%). This cluster is characterised by relatively high scores for both positive (ENV+) and negative (ENV−) perceptions of environmental impact. It perceives low negative social (SOC−) and economic (ECO−) impacts and a favourable socio-economic perception (ESO+). It thus offers high and consistent levels of support intention, particularly attendance and recommendation of the event. The most representative sociodemographic profile corresponds to both men and women under the age of 45, with university studies and professional links to the sector. This population group is distinctly characterised by environmental awareness and a balanced view of impacts.

Table 8 shows the socio-demographic characteristics of the members of each cluster.

Table 8. Socio-demographic profile of residents by cluster membership.

Variable	Category	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
		107	22.34%	114	23.80%	133	27.77%	125	26.10%
Gender	Male	46	42.99%	63	55.26%	67	50.38%	69	55.20%
	Female	61	57.01%	51	44.74%	66	49.62%	56	44.80%
Age	18 to 45	60	56.07%	72	63.16%	90	67.67%	72	57.60%
	More than 45	47	43.93%	42	36.84%	43	32.33%	53	42.40%
University degree completed	Yes	53	49.53%	27	23.68%	26	19.55%	39	31.20%
	No	54	50.47%	87	76.32%	107	80.45%	86	68.80%
Job related to sector	Yes	23	21.50%	11	9.65%	20	15.04%	85	68.00%
	No	84	78.50%	103	90.35%	113	84.96%	40	32.00%
Net income per month	More than €2000	27	25.23%	40	35.09%	39	29.32%	36	28.80%
	Less than €2000	80	74.77%	74	64.91%	94	70.68%	89	71.20%

5. Discussion

The results of this study confirm that residents do not form a homogeneous group regarding the Sierra Morena Rally. Instead, their perceptions and intentions to support the event are distributed across four distinct segments: “Critics”, “Enthusiasts”, “Pragmatic Supporters”, and “Supporters Environmentally Concerned”. This heterogeneity supports the principles of the Triple Bottom Line (TBL) by illustrating the coexistence of positive and negative assessments across economic, social, and environmental dimensions, and aligns with the Social Exchange Theory (SET), which posits that residents weigh perceived benefits and costs before expressing support or opposition (Ap, 1990; E. Fredline & Faulkner, 2000). Likewise, the diversity of perceptions and their relationship with sociodemographic and professional factors reflect the influence of shared social representations, as proposed by

the Social Representations Theory (SRT) (Moscovici, 1982; Cheng & Jarvis, 2010), whereby collective interpretations of impacts are shaped by shared experiences, contextual factors, and levels of involvement with the event.

The “Critics” cluster shows the most skeptical profile, characterized by negative evaluations of economic and social impacts and the lowest willingness to support the event. This group, composed mainly of women with low-to-medium incomes and lower levels of higher education, mirrors patterns observed in the “Critics” of the WRC Sardinia (Del Chiappa et al., 2016) and the “Unfavourable” group of the Formula 1 European Grand Prix in Valencia (Calabuig-Moreno et al., 2014). In both cases, negative perceptions are associated with limited engagement and heightened sensitivity to social and environmental impacts, suggesting that symbolic or emotional distance from motorsport reinforces a perception of costs outweighing benefits. From a SET perspective, this group perceives an unfavourable cost–benefit balance, while under SRT, it reflects cultural representations in which motor racing is associated with urban inconvenience or limited social return.

The “Enthusiasts” cluster represents the opposite end of the spectrum. Predominantly composed of young men with medium educational attainment and lower-middle incomes, this group expresses the highest ratings for positive impacts and the strongest levels of support. Its profile is comparable to the “Moderately Favourable” cluster identified by Calabuig-Moreno et al. (2014) and the “Supporters” in the WRC Sardinia study (Del Chiappa et al., 2016), where affinity with the sport and local pride were decisive factors. From the TBL framework, this cluster emphasises the economic and social dimensions as sources of perceived benefit, while from the SET perspective, it exemplifies a positive exchange relationship in which symbolic benefits, such as reputation or community identity, offset potential costs. Moreover, their youth and lower educational level align with patterns described in Formula E in Santiago (Parra-Camacho et al., 2020b), where emotional identification with the event strengthened support despite awareness of moderate negative impacts.

The “Pragmatic Supporters” cluster occupies an intermediate position, acknowledging both benefits and costs while demonstrating moderate but consistent support. This group, composed of young men and women with university education and average incomes, resembles the “Realists” identified in Santiago, Chile (Parra-Camacho et al., 2020b), and to a lesser extent, the “Neutral” group from the WRC Sardinia study (Del Chiappa et al., 2016). Their balanced perceptions reflect a rational stance consistent with TBL principles, by weighing the three pillars more symmetrically, and with SET, by maintaining a neutral cost–benefit evaluation. From the SRT viewpoint, this profile represents a more informed and critically engaged socialisation process, which fosters a less polarised assessment.

Finally, the “Supporters Environmentally Concerned” cluster stands out for its environmental sensitivity combined with sustained support for the event. Men and women under the age of 45, with higher education and professional links to the sector, constitute a group that values the economic and social benefits of the rally while remaining aware of its environmental implications. This profile recalls the “Enthusiasts but Culturally and Environmentally Concerned” identified by Del Chiappa et al. (2016), although in the Sierra Morena Rally context, the balance between positive and negative perceptions translates into active support rather than skepticism. This result can be interpreted through the lenses of TBL and SRT: environmental awareness does not preclude the recognition of social and economic benefits but instead produces a more nuanced representation of the event as an opportunity to foster sustainable practices.

6. Conclusions

6.1. Theoretical Conclusion

From a theoretical perspective, the results of this research confirm the validity of the Triple Bottom Line (TBL) model as a comprehensive framework for analysing perceptions of impact in sporting events, by demonstrating the coexistence of positive and negative assessments in the economic, social and environmental dimensions.

Likewise, Social Exchange Theory (SET) is confirmed as a solid explanatory approach for understanding how residents weigh benefits and costs before expressing support or rejection of events. Finally, Social Representations Theory (SRT) proves particularly useful for interpreting how individual perceptions are shaped by shared experiences, local identities and cultural frameworks, allowing for a deeper reading of the symbolic meanings associated with motor racing.

6.2. Empirical Conclusion

At the empirical level, the study identifies four distinct profiles of impact perception among residents: "Critics", "Enthusiasts", "Pragmatic Supporters" and "Supporters Environmentally Concerned". This segmentation shows that the host population is not a homogeneous group, but rather that their attitudes are distributed along a continuum ranging from enthusiastic support to active criticism, with intermediate positions of pragmatism or environmental awareness. The results are consistent with previous research on Formula 1, Formula E and WRC events, reinforcing the consistency of the model and expanding the empirical evidence in the field of rallies, an area that has been little explored until now.

6.3. Practical Implications

From an applied perspective, the results offer useful information for the design of communication, management and citizen participation strategies aimed at improving the social sustainability of motor sport events. It is recommended that transparent information campaigns be implemented that highlight the tangible and symbolic benefits for the community, together with actions to mitigate the most sensitive impacts, particularly those related to the environment and mobility. It is also suggested that local participation mechanisms be promoted to integrate different segments of residents, especially the most critical ones, through volunteer programmes, community forums and educational activities that link the event with values of sustainability and territorial pride.

6.4. Limitations

Among the main limitations of the study is the use of non-probabilistic convenience sampling, which restricts the generalisation of the results. In addition, the analysis was based on perceptions collected only during the event, without comparing them with previous or subsequent measurements, which prevents the examination of the evolution of attitudes over time. Moreover, the fieldwork was conducted in the open areas surrounding the spaces where the event took place, which included both attendees and non-attendees present in the vicinity. This sampling context may explain the relatively high percentage of respondents professionally linked to the motor sector. Finally, although the factorial model and segmentation have adequate levels of validity, complementary psychosocial variables, such as satisfaction, attachment to the territory, or local identity, that could enrich the understanding of support mechanisms were not incorporated.

6.5. Future Lines of Research

Given these limitations, it is proposed to expand the model by incorporating emotional and contextual variables, such as resident satisfaction, emotional solidarity or attachment to

the territory, as well as applying advanced methodologies such as PLS-SEM and multilayer perceptron artificial neural networks.

It is also recommended that longitudinal studies be conducted before, during and after the event, over several years, in order to analyse the evolution of perceptions and the possible effects of continued contact with the rally. Finally, replicating the study in other geographical contexts and sports typologies will strengthen the external validity of the model and contribute to the development of an international comparative basis on the perception of impact in motor sports events.

6.6. Main Contribution of This Research

The main contribution of this study lies in expanding the limited existing work on the European Rally Championship (ERC), providing unprecedented empirical evidence from a unique case: the first participation of the Sierra Morena Rally in this championship after more than three decades as a national event with limited international exposure. This circumstance offered a unique opportunity to analyse how joining a higher-level competition changes residents' perceptions and support for the event.

Author Contributions: Conceptualization, J.E.R.-R.; methodology, J.E.R.-R., M.Á.A.-S. and D.A.-N.; validation, J.E.R.-R.; formal analysis, J.E.R.-R. and D.A.-N.; investigation, J.E.R.-R. and P.C.F.-G.; data curation, J.E.R.-R., and D.A.-N.; writing—original draft preparation, J.E.R.-R.; writing—review and editing, J.E.R.-R.; visualization, P.C.F.-G.; supervision, J.E.R.-R., P.C.F.-G. and M.Á.A.-S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Ethical review and approval were waived for this study due to receiving an exemption from the University of Cordoba.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors on request.

Conflicts of Interest: The authors declare no conflict of interest.

References

- Amador, L., Campoy-Muñoz, P., Cardenete, M. A., & Delgado, M. C. (2017). Economic impact assessment of small-scale sporting events using social accounting matrices: An application to the Spanish Football League. *Journal of Policy Research in Tourism, Leisure and Events*, 9(3), 1–17. [\[CrossRef\]](#)
- Añó-Sanz, V., Calabuig-Moreno, F., & Parra-Camacho, D. (2012). The social impact of a major event: The European Grand Prix of Formula One. *Cultura, Ciencia y Deporte*, 7(19), 53–65. [\[CrossRef\]](#)
- Ap, J. (1990). Residents' perceptions research on the social impacts of tourism. *Annals of Tourism Research*, 17, 610–616. [\[CrossRef\]](#)
- Ap, J. (1992). Residents' perceptions on tourism impacts. *Annals of Tourism Research*, 19(4), 665–690. [\[CrossRef\]](#)
- Arici, H. E., Aydin, C., Koseoglu, M. A., & Sökmen, A. (2023). Sports tourism research: A bibliometric analysis and agenda for further inquiry. *Tourism and Hospitality Research*, 25(3), 406–420. [\[CrossRef\]](#)
- Baldock, A. L., Maes, M., & Buelens, M. (2011). The social impact of the Tour de France: Comparisons of residents' pre- and post-event perceptions. *European Sport Management Quarterly*, 11(2), 91–113. [\[CrossRef\]](#)
- Barajas, A., Coates, D., & Sanchez-Fernandez, P. (2016). Beyond retrospective assessment. Sport event economic impact studies as a management tool for informing event organization. *European Research on Management and Business Economics*, 22(3), 124–130. [\[CrossRef\]](#)
- Bazzanella, F., Schnitzer, M., Peters, M., & Bichler, B. F. (2023). The role of sports events in developing tourism destinations: A systematized review and future research agenda. *Journal of Sport & Tourism*, 27(2), 77–109. [\[CrossRef\]](#)
- Berkowitz, J. P., Depken, C. A., II, & Wilson, D. P. (2011). When going in circles is going backward: Outcome uncertainty in NASCAR. *Journal of Sports Economics*, 12(3), 253–283. [\[CrossRef\]](#)
- Bjerke, R., & Naess, H. E. (2021). Toward a co-Creation framework for developing a green sports event brand: The case of the 2018 Zürich E Prix. *Journal of Sport and Tourism*, 25(2), 129–154. [\[CrossRef\]](#)

- Blau, P. (1964). *Exchange and power in social life*. John Wiley. [CrossRef]
- Cadima-Ribeiro, J. A., Vareiro, L., Remoaldo, P., & Monjardino, I. C. (2023). Residents' perceptions of the impacts of tourism in the Azores archipelago (Portugal): A cluster analysis. *Tourism and Hospitality Research*, 25(2), 274–288. [CrossRef]
- Calabuig-Moreno, F., Parra-Camacho, D., Añó-Sanz, V., & Ayora-Pérez, D. (2014). Analysis of resident's perception on the cultural and sport impact of a Formula 1 Grand Prix. *Movimento*, 20(1), 261–280. [CrossRef]
- Carol, M. V., de Blas Foix, X., & Abadia i Naudi, S. (2023). Analysis of the efficacy of sponsorship of WorldSBK from the perspective of attendees the Jerez championship. *Retos*, 50, 205–214. [CrossRef]
- Cegielski, M., & Mules, T. (2002). Aspects of residents' perceptions of the GMC 400—Canberra's V8 Supercar Race. *Current Issues in Tourism*, 5(1), 54–70. [CrossRef]
- Chamberlain, D. A., Edwards, D., Lai, J., & Thwala, W. D. (2019). Mega event management of Formula One Grand Prix: An analysis of literature. *Facilities*, 37(13–14), 1166–1184. [CrossRef]
- Cheng, E., & Jarvis, N. (2010). Residents' perception of the social-cultural impacts of the 2008 Formula 1 Singtel Singapore Grand Prix. *Event Management*, 14(2), 91–106. [CrossRef]
- Chiam, M., & Cheng, E. (2013). Residents' perceptions of the Inaugural Youth Olympic Games 2010: A cluster analysis. *Event Management*, 17(4), 377–389. [CrossRef]
- Cudny, W. (2018). *Car tourism*. Springer. [CrossRef]
- Cudny, W., & Jolliffe, L. (2019). Car tourism—Conceptualization and research advancement. *Geografický Časopis/Geographical Journal*, 71(4), 319–340. [CrossRef]
- Custódio, M. J. F., Azevedo, A., & Perna, F. P. (2018). Sport events and local communities: A partnership for placemaking. *Journal of Place Management and Development*, 11(1), 6–25. [CrossRef]
- Delamere, T. A. (2001). Development of a scale to measure resident attitudes toward the social impacts of community festivals, Part II. Verification of the scale. *Event Management*, 7(1), 25–38. [CrossRef]
- Del Chiappa, G., Presenza, A., & Yücelen, M. (2016). Profiling residents based on their perceptions and attitudes toward sport event: Insights from the FIA World Rally Championship. *Tourism: An International Multidisciplinary Journal of Tourism*, 11(5), 25–51.
- Díaz de Rada, V. (2012). Ventajas e inconvenientes de la encuesta por Internet. *Papers: Revista de Sociología*, 97(1), 193–223. [CrossRef]
- Dredge, D., & Whitford, M. (2011). Event tourism governance and the public sphere. *Journal of Sustainable Tourism*, 19(4–5), 479–499. [CrossRef]
- Elkington, J. (1994). Towards the sustainable corporation. Win-Win-Win business strategies for sustainable development. *California Management Review*, 36(2), 90–100. [CrossRef]
- Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. Capstone.
- Everitt, B. S., Landau, S., Leese, M., & Stahl, D. (2011). *Cluster analysis* (5th ed.). Wiley. [CrossRef]
- Everitt, B. S., & Wykes, T. (2001). *Diccionario de estadística para psicólogos*. Ariel.
- Fairley, S., Tyler, B. D., Kellett, P., & D'Elia, K. (2011). The formula one Australian grand prix: Exploring the triple bottom line. *Sport Management Review*, 14(2), 141–152. [CrossRef]
- Faulkner, B., & Tideswell, C. (1997). A framework for monitoring community impacts of tourism. *Journal of Sustainable Tourism*, 5(1), 3–28. [CrossRef]
- Fernández-Alles, M. T. (2014). Sports events tourist impact: A case study. *Cuadernos de Turismo*, (33), 59–76.
- Fernández-Alles, M. T., & Gutiérrez-Arance, E. P. (2014). Los eventos deportivos como dinamizadores turísticos: El caso del Rally de Algar en la provincia de Cádiz. *Revista de Estudios Fronterizos del Estrecho de Gibraltar*, 1(1), 1–20.
- Finn, M., Elliott-White, M., & Walton, M. (2000). *Tourism and leisure research methods: Data collection, analysis and interpretation*. Pearson Education.
- Fisher, R. A. (1919). XV.-The Correlation between Relatives on the supposition of mendelian inheritance. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh*, 52(2), 399–433. [CrossRef]
- Fredline, E., & Faulkner, B. (2000). Host community reactions: A cluster analysis. *Annals of Tourism Research*, 27(3), 763–784. [CrossRef]
- Fredline, L., Deery, M., & Jago, L. (2013). A longitudinal study of the impacts of an annual event on local residents. *Tourism Planning y Development*, 10(4), 416–432. [CrossRef]
- French, L., & Wickham, M. (2018). Exploring the reputation management process for events: The case of Targa Tasmania. *Event Management*, 22(2), 213–235. [CrossRef]
- García-Vallejo, A. M., Albahari, A., Añó-Sanz, V., & Garrido-Moreno, A. (2020). What's behind a marathon? Process management in sports running events. *Sustainability*, 12(15), 6000. [CrossRef]
- Gavala, J. (2018). Sevilla-Betis regatta: Past, present and future. *Revista de Humanidades*, (34), 129–154. [CrossRef]
- Getz, D., & Page, S. J. (2016). Progress and prospects for event tourism research. *Tourism Management*, 52, 593–631. [CrossRef]
- Getz, D., & Page, S. J. (2024). *Event studies: Theory and management for planned events* (5th ed.). Routledge. [CrossRef]
- Glutting, J. (2002). Some psychometric properties of a system to measure ADHD among college students: Factor pattern, reliability, and one-year predictive validity. *Measurement and Evaluation in Counseling and Development*, 34, 194–209. [CrossRef]

- Gursoy, D., & Kendall, K. (2006). Hosting mega events: Modelling locals' support. *Annals of Tourism Research*, 33(3), 603–623. [CrossRef]
- Hadinejad, A., D. Moyle, B., Scott, N., Kralj, A., & Nunkoo, R. (2019). Residents' attitudes to tourism: A review. *Tourism Review*, 74(2), 150–165. [CrossRef]
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2018). *Multivariate data analysis* (8th ed.). Cengage Learning.
- Hair, J. F., Page, M., & Brunsveld, N. (2020). *Essentials of business research methods* (4th ed.). Routledge. [CrossRef]
- Hassan, D., & O'Connor, S. (2009). The socio-economic impact of the FIA World Rally Championship 2007. *Sport in Society*, 12(6), 709–724. [CrossRef]
- Henderson, J. C., Foo, K., Lim, H., & Yip, S. (2010). Sports events and tourism: The Singapore Formula One Grand Prix. *International Journal of Event and Festival Management*, 1(1), 60–73. [CrossRef]
- Hiller, H. H., & Wanner, R. A. (2018). Public opinion in Olympic cities: From bidding to retrospection. *Urban Affairs Review*, 54(5), 962–993. [CrossRef]
- Homans, G. C. (1958). Social behavior as exchange. *American Journal of Sociology*, 63(6), 597–606. [CrossRef]
- Homans, G. C. (1961). *Social behavior in elementary forms*. Harcourt, Brace y World.
- Horne, J. (2015). Assessing the sociology of sport: On sports mega-events and capitalist modernity. *International Review for the Sociology of Sport*, 50(4–5), 466–471. [CrossRef]
- Kahn, J. H. (2006). Factor analysis in Counselling Psychology research, training and practice. *The Counselling Psychologist*, 34, 1–36. [CrossRef]
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20, 141–151. [CrossRef]
- Kaplanidou, K. (2020). Sport events and community development: Resident considerations and community goals. *International Journal of Sports Marketing and Sponsorship*, 22(1), 53–66. [CrossRef]
- Kim, J., Han, J., Kim, E., & Kim, C. (2022). Quality of life subjective expectations and exchange from hosting mega-events. *Sustainability*, 14(17), 11079. [CrossRef]
- Kim, M. K., Kim, S.-K., Park, J.-A., Yu, J.-G., & Na, K. (2017). Measuring the economic impacts of major sports events: The case of Formula One Grand Prix (F1). *Asia Pacific Journal of Tourism Research*, 22(1), 64–73. [CrossRef]
- Kim, S. S., & Petrick, J. F. (2005). Residents' perceptions on impacts of the FIFA 2002 World Cup: The case of Seoul as a host city. *Tourism Management*, 26(1), 25–38. [CrossRef]
- Kim, W., Jun, H. M., Walker, M., & Drane, D. (2015). Evaluating the perceived social impacts of hosting large-scale sport tourism events: Scale development and validation. *Tourism Management*, 48, 21–32. [CrossRef]
- Kolmogorov, A. (1933). Sulla determinazione empirica di una legge di distribuzione. *Giornale dell'Istituto Italiano degli Attuari*, 4, 83–91.
- Kruskal, W. H., & Wallis, W. A. (1952). Use of ranks in one-criterion variance analysis. *Journal of the American Statistical Association*, 47(260), 583–621. [CrossRef]
- Liang, S., Li, J., & Xu, S. (2025). Residents' perceptions of impacts and support for sports events: A meta-analysis based on social exchange theory and triple bottom line. *Journal of Leisure Research*. [CrossRef]
- Liberato, D., Costa, E., Ferraz, A., Liberato, P., & Ribeiro, J. (2023). WRC Vodafone Rally de Portugal fostering tourism development. In Á. Rocha, H. Adeli, & A. Dzemyda (Eds.), *Smart innovation, systems and technologies*. Springer. [CrossRef]
- Lloyd, S. (1982). Least squares quantization in PCM. *IEEE Transactions on Information Theory*, 28(2), 129–137. [CrossRef]
- Ma, S. C., Ma, S. M., Wu, J. H., & Rotherham, I. D. (2013). Host residents' perception changes on major sport events. *European Sport Management Quarterly*, 13(5), 511–536. [CrossRef]
- Ma, S. C., & Rotherham, I. D. (2016). Residents' changed perceptions of sport event impacts: The case of the 2012 Tour de Taiwan. *Leisure Studies*, 35(5), 616–637. [CrossRef]
- Mackellar, J. (2013). World Rally Championship 2009: Assessing the community impacts on a rural town in Australia. *Sport in Society: Cultures, Commerce, Media, Politics*, 16(9), 1149–1163. [CrossRef]
- Mackellar, J., & Reis, A. C. (2014). World Rally Championships 2009 and 2011: Assessing the tourism value in Australia. *Journal of Vacation Marketing*, 20(1), 17–28. [CrossRef]
- MacQueen, J. (1967). Some methods for classification and analysis of multivariate observations. *Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability*, 1, 281–297.
- Mair, J., Chien, P. M., Kelly, S. J., & Derrington, S. (2021). Social impacts of mega-events: A systematic narrative review and research agenda. *Journal of Sustainable Tourism*. [CrossRef]
- Mao, L. L., & Huang, H. (2015). Social impact of Formula One Chinese Grand Prix: A comparison of local residents' perceptions based on the intrinsic dimension. *Sport Management Review*, 19(3), 306–318. [CrossRef]
- Merenda, P. (1997). A guide to the proper use of Factor Analysis in the conduct and reporting of research: Pitfalls to avoid. *Measurement and Evaluation in Counselling and Evaluation*, 30, 156–163. [CrossRef]
- Mirzayeva, G., Turkay, O., Akbulaev, N., & Ahmadov, F. (2020). The impact of mega-events on urban sustainable development. *Entrepreneurship and Sustainability Issues*, 7(3), 1653–1666. [CrossRef]

- Mollah, M. R. A., Cuskelly, G., & Hill, B. (2021). Sport tourism collaboration: A systematic quantitative literature review. *Journal of Sport & Tourism*, 25(1), 3–25. [\[CrossRef\]](#)
- Moore, Z., Harrison, D. E., & Hair, J. (2021). Data quality assurance begins before data collection and never ends: What marketing researchers absolutely need to remember. *International Journal of Market Research*, 63, 693–714. [\[CrossRef\]](#)
- Moscovici, S. (1981). On Social Representations. In J. Forgas (Ed.), *Social cognition: Perspectives on everyday understanding* (pp. 181–210). Academic Press.
- Moscovici, S. (1982). The coming era of social representations. In J. P. Codol, & J. P. Leyens (Eds.), *Cognitive approaches to social behaviour* (pp. 115–150). Nijhoff.
- Müller, M. (2012). Popular perception of urban transformation through mega events: Understanding support for the 2014 Winter Olympics in Sochi. *Environment and Planning C: Government and Policy*, 30(4), 693–711. [\[CrossRef\]](#)
- Naess, H. E. (2014). *A sociology of the world rally championship: History, identity, memories and place*. Springer Nature. [\[CrossRef\]](#)
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Ohmann, S., Jones, I., & Wilkes, K. (2006). The perceived social impacts of the 2006 Football World Cup on Munich residents. *Journal of Sport & Tourism*, 11(2), 129–152. [\[CrossRef\]](#)
- Oshimi, D., Harada, M., & Fukuhara, T. (2016). Residents' perceptions on the socio-economic impacts of an international sporting event: Applying panel data design and a moderate variable. *Journal of Convention & Event Tourism*, 17(4), 294–317. [\[CrossRef\]](#)
- Ouyang, Z., Gursoy, D., & Chen, K. C. (2019). It's all about life: Exploring the role of residents' quality of life perceptions on attitudes toward a recurring hallmark event over time. *Tourism Management*, 75, 99–111. [\[CrossRef\]](#)
- Pahrudin, P., Liu, L.-W., Royanow, A. F., & Kholid, I. (2023). A large-sport event and its influence on tourism destination image in Indonesia. *Tourism and Hospitality Management*, 29(3), 335–348. [\[CrossRef\]](#)
- Parra-Camacho, D., Alguacil, M., & Calabuig-Moreno, F. (2020a). Perception of the fair social distribution of benefits and costs of a sports event: An analysis of the mediating effect between perceived impacts and future intentions. *Sustainability*, 12(11), 4413. [\[CrossRef\]](#)
- Parra-Camacho, D., Bastías, D. M. D., Ramírez, F. G., & López-Carril, S. (2020b). Evaluation of the perceived social impacts of the Formula E Grand Prix of Santiago de Chile. *European Journal of Government and Economics*, 9(2), 155–169. [\[CrossRef\]](#)
- Pearce, P., Moscardo, G., & Ross, G. (1996). *Tourism community relationships*. Pergamon.
- Perdue, R. R., Long, P. T., & Allen, P. (1990). Resident support for tourism development. *Annals of Tourism Research*, 17, 586–599. [\[CrossRef\]](#)
- Perić, M., & Vitezić, V. (2023). WRC 2021 Croatia during the pandemic: Do environmental consciousness of residence affect respondents' perception of impact and support? *Event Management*, 27(5), 713–728. [\[CrossRef\]](#)
- Pérez, E. R., & Medrano, L. (2010). Análisis factorial exploratorio: Bases conceptuales y metodológicas. *Revista Argentina de Ciencias del Comportamiento*, 2(1), 58–66. [\[CrossRef\]](#)
- Phi, G., Dredge, D., & Whitford, M. (2014). Understanding conflicting perspectives in event planning and management using Q method. *Tourism Management*, 40, 406–415. [\[CrossRef\]](#)
- Polcsik, B., & Perényi, S. (2022). Residents' perceptions of sporting events: A review of the literature. *Sport in Society*, 25(4), 748–767. [\[CrossRef\]](#)
- Prayag, G., Hosany, S., Nunkoo, R., & Alders, T. (2013). London residents' support for the 2012 Olympic Games: The mediating effect of overall attitude. *Tourism Management*, 36, 629–640. [\[CrossRef\]](#)
- Prezenza, A., & Sheehan, L. (2013). Planning tourism through sporting events. *International Journal of Event and Festival Management*, 4(3), 236–247. [\[CrossRef\]](#)
- Quirante, M., Seguí-Urbaneja, J., Guevara-Pérez, J. C., & Cabello-Manrique, D. (2024). Direct economic short-term impact of public spending in sporting events: The case of the Elite and Senior Badminton World Championship. *Tourism and Hospitality*, 5(2), 381–394. [\[CrossRef\]](#)
- Quirante-Mañas, M., Fernández-Martínez, A., Nuviala, A., & Cabello-Manrique, D. (2023). Event quality: The intention to take part in a popular race again. *Apunts. Educación Física y Deportes*, 151, 70–78.
- Ramírez Hurtado, J. M., Ordaz Sanz, J. A., & Rueda Cantuche, J. M. (2007). Social and economic impact assessment of relevant sporting events in local communities: The case of the ITF Female Tennis Championship held in Seville in 2006. *Revista de Métodos Cuantitativos para la Economía y la Empresa*, 3, 20–39.
- Ramos-Ruiz, J. E., Muñoz-Fernández, G. A., García-García, L., & Arteaga-Sánchez, R. (2025). Pedalling towards satisfaction: The power of motivation and emotions in shaping tourism perception in cycle tourism events. *Journal of Sport and Tourism*. Advance online publication.
- Ramos-Ruiz, J. E., Solano-Sanchez, M. A., Castaño-Prieto, L., & García-García, L. (2024). Why do we run in a sporting event? A gender perspective through the Half-Marathon of Cordoba, Spain. *Social Sciences*, 13(4), 209. [\[CrossRef\]](#)
- Reis, A., & Sperandei, S. (2014). Support for sport events and the economy of appearances: A case study of the 2011 World Rally Championship in Australia. *Event Management*, 18(3), 231–245. [\[CrossRef\]](#)

- Rico-Bouza, C., Araújo Vila, N., & Fraiz Brea, J. A. (2021). Aproximación al perfil sociodemográfico y comportamiento del asistente a rallies. *Investigaciones Turísticas*, (22), 377–404. [[CrossRef](#)]
- Ritchie, J. B., & Lyons, M. M. (1987). Olympulse III/Olympulse IV: A mid-term report on resident attitudes concerning the XV Olympic Winter Games. *Journal of Travel Research*, 26(1), 18–26. [[CrossRef](#)]
- Roca-Cruz, A., Cabello Manrique, D., Gonzalez, J., & Courel-Ibáñez, J. (2018). Study on attendees' satisfaction at the Winter University Games of Granada 2015 | Estudio de satisfacción de los asistentes a la Universiada de Invierno Granada 2015. *Retos*, 33, 247–251. [[CrossRef](#)]
- Roca-Cruz, A., González-Ruiz, J., Porcel-Rodríguez, P., & Cabello-Manrique, D. (2019). Economic impact of the attendees to the Winter Universiade 2015 in the city of Granada | Impacto económico de los asistentes a la Universiada de Invierno del 2015 en la ciudad de Granada. *Sport Tk*, 8(1), 7–12. [[CrossRef](#)]
- Roult, R., Auger, D., & Lafond, M.-P. (2020). Formula 1, city and tourism: A research theme analyzed on the basis of a systematic literature review. *International Journal of Tourism Cities*, 6(4), 813–830. [[CrossRef](#)]
- Scheu, A., & Preuss, H. (2018). Residents' perceptions of mega sport event legacies and impacts. *German Journal of Exercise and Sport Research*, 48(3), 376–386. [[CrossRef](#)]
- Scholtz, M. (2019). One ultramarathon, two cities: Differences in social impact perceptions. *Journal of Sport y Tourism*, 23(4), 181–202. [[CrossRef](#)]
- Seguí-Urbaneja, J., & Cabello Manrique, D. (2023). The economic impact of elite and senior badminton European championships | El impacto económico de los campeonatos de Europa de bádminton elite y senior. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*, 23(89), 471–495.
- Sharpley, R. (2014). Host perceptions of tourism: A review of the research. *Tourism Management*, 42, 37–49. [[CrossRef](#)]
- Singh-Kuarav, R. P., Chowdarhy, N., & Gursoy, D. (Eds.). (2021). *An SPSS guide for tourism hospitality and events researchers*. Routledge.
- Smirnov, N. (1948). Table for estimating the goodness of fit of empirical distributions. *The Annals of Mathematical Statistics*, 19(2), 279–281. [[CrossRef](#)]
- Tabachnick, B., & Fidell, L. (2001). *Using multivariate statistics*. Harper & Row.
- Tadini, R., Ruiz De León, C. G., Gándara, J. M., & Sacramento Pereira, E. C. (2021). Sports events and tourism: Systematic review of the literature | Eventos deportivos y turismo: Revisión sistemática de la literatura. *Investigaciones Turísticas*, 21, 1–28. [[CrossRef](#)]
- Tan, P. N., Steinbach, M., & Kumar, V. (2019). *Introduction to data mining* (2nd ed.). Pearson.
- Vegara-Ferri, J. M., López-Gullón, J. M., Ibañez-Pérez, R. J., Carboneros, M., & Angosto, S. (2020). Segmenting the older resident's perception of a major cycling event. *Sustainability*, 12(10), 4010. [[CrossRef](#)]
- Vegara-Ferri, J. M., Pallarés, J. G., & Angosto, S. (2021). Differences in residents' social impact perception of a cycling event based on the fear of the COVID-19 pandemic. *European Sport Management Quarterly*, 21(3), 374–390. [[CrossRef](#)]
- Waite, G. (2003). Social impacts of the Sydney Olympics. *Annals of Tourism Research*, 30(1), 194–215. [[CrossRef](#)]
- Wallstam, M., & Kronenberg, K. (2022). The role of major sports events in regional communities: A spatial approach to the analysis of social impacts. *Event Management*, 26(3), 407–422. [[CrossRef](#)]
- Wanyonyi, L., Njoroge, J., & Juma, R. (2022). Beating odds in post pandemic times: Lessons from World Rally Championship 2021. *Events and Tourism Review*, 5(1), 29–39. [[CrossRef](#)]
- Zhou, J. Y. (2010). Resident perceptions toward the impacts of the Macao Grand Prix. *Journal of Convention and Event Tourism*, 11(2), 138–153. [[CrossRef](#)]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.