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Clustering Residents' Perception of Rural Rally Tourism: An Inclusive Approach from the Sierra Morena Rally in Obejo, Spain

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Abstract: Motorsports tourism has a significant impact on host communities, especially when they are small communities. This research aims to segment the resident population of a very small rural municipality, Obejo, before the celebration of the Sierra Morena Rally in the province of Cordoba, Spain. The study is based on the principles of social exchange theory (SET) and the triple bottom line (TBL). In addition, it follows calls from the existing academic literature to explore a fourth dimension of impact perception, related to inclusion from the point of view of gender, age, and functional diversity. exploratory factor analysis (EFA) and non-hierarchical cluster analysis were used on a sample of 281 residents. A structure of four dimensions of impact perception is obtained: economic, social, environmental, and inclusive. Together, they explain just over 80% of the total variance. Three population segments are defined: motor enthusiasts, environmentally conscious fans, and admitted critics. This study underlines the need to expand the TBL framework with an inclusive dimension in motorsports tourism, emphasizing gender equality, intergenerational participation and functional diversity to foster more sustainable and socially cohesive events in rural areas.



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Keywords: sports tourism; sporting events; motorsports; rally; Cordoba (Spain); social exchange theory (SET); triple bottom line (TBL); exploratory factor analysis (EFA); cluster analysis; residents' perception

1. Introduction

Motorsports tourism events generate significant impacts on the communities that host them (Del Chiappa et al., 2014), with particular relevance in rural communities (MacKellar, 2013). Beyond their competitive nature, these events can transform the daily lives of residents on several levels (Prayag & Savalli, 2021). The Sierra Morena Rally, held annually in the province of Córdoba, Spain, was part of the S-CER (Spanish Championship) until 2024 and in 2025 is part of the European Rally Championship, so its ability to attract tourists to the territory is consolidated and growing. It is therefore a representative case for analyzing how the inhabitants of rural communities perceive the impacts of this type of event. For small rural municipalities such as Obejo, with around two thousand inhabitants dispersed in various locations, the celebration of the rally means a temporary alteration of the local routine, as rural roads are modified in competition sections. They are closed to traffic, and during those days, tourists multiply the population.

The academic literature on tourism, sporting events, and residents' perceptions of the impacts generated by these events is an established but constantly changing field (Bazzanella et al., 2023). However, in the case of motorsports events, the number of case studies is relatively small (Mair et al., 2023), with a traditional focus on Formula 1 events (Naess, 2014) and, in the case of rally-type events, large-scale events such as the WRC or the ERC, as opposed to smaller events (Parent & Chappelet, 2015). Since their origin, impact studies have mainly focused on the economic domain, later extended to the social and environmental domains (Elkington, 1994). This triple bottom line has acted as the core of impacts, to which other researchers have added others, such as cultural and political impacts (E. Fredline & Faulkner, 2000). However, in relation to motorsports and tourism, there have been several calls to broaden the field of knowledge, from the points of view of gender (Pflugfelder, 2009), age (Patterson & Balderas-Cejudo, 2022), and functional diversity (Darcy, 2012).

There is, therefore, a knowledge gap in the academic literature that this research aims to fill. This gap consists of exploring the existence of a fourth dimension of inclusive perception, compatible with the traditional structure of the triple bottom line approach (Elkington, 1994), in the context of a rally sport tourism event in a very small rural community. Furthermore, this study addresses the twin calls of Ramos-Ruiz et al. (2024) to increase the number of rally-type case studies and to segment the resident population on the basis of perceived impacts. Addressing these issues will enrich the scientific literature and thus make the academic discussion more flexible. It will also provide valuable information for stakeholders in the organization of the event.

2. Literature Review

2.1. Triple Bottom Line, Social Exchange Theory, and Sporting Events Tourism

Elkington, in 1994, introduced the triple bottom line (TBL) concept as a framework that transcends traditional economic evaluation to measure the impact of activities and events. In doing so, he proposed the need to provide impact information beyond the economic or financial domain, thus encompassing social and environmental aspects. Social exchange theory, first formulated by Homans (1961), describes human interactions as processes based on an evaluation of costs and benefits, where people seek to maximize rewards and minimize sacrifices. In the field of sport tourism events, the application of this theory is becoming increasingly important when analyzing the perception of the different dimensions of impact, as positive perceptions generate a climate of support and success for future editions (Dredge & Whitford, 2011).

TBL is based, thus, on economic, social, and environmental issues. Economic impact refers to the net change in an economy resulting from hosting an event, including increased visitor spending, tax revenue, business growth, and employment opportunities (Leiber & Alton, 1983; Ritchie et al., 2009; Konstantaki & Wickens, 2010; Del Chiappa et al., 2016a). Social impact encompasses changes in value systems, behavioral patterns, community structure, and quality of life while also considering issues such as security concerns, traffic congestion, and petty crime (Ritchie et al., 2009; E. Fredline, 2004; Konstantaki & Wickens, 2010; Kim et al., 2015). Environmental impact involves direct or indirect damage to natural ecosystems, yet events can also drive conservation efforts by public administrations (Getz & Page, 2024; Deccio & Baloglu, 2002).

There are, in fact, several research studies that are recently applying this theory to the field of tourism and sport events, as well as extending its scope beyond the triple bottom line. However, the research trend tends to be towards large sporting events. Yamashita and Hallmann (2024), studying the Tokyo Olympic and Paralympic Games, found that trust significantly influences perceived personal and social benefits, as well as strengthening

support for the event over time. For the same event, [Oshimi et al. \(2024\)](#) concluded that trust reduces perceived risk and enhances event support, while perceived risk increases negative experiences. On the other hand, [Gan and Dong \(2024\)](#) noted that perceived risk of postponement significantly affects perceived costs and benefits, conditioning residents' support. [Wang et al. \(2024\)](#) in New Zealand noted that events improve the well-being of residents and that local government plays a key role in the effective management of these activities. [Bakhsh et al. \(2024\)](#), in Canada, highlighted differences in perceived social value by locality, underlining the importance of integrating social and economic mechanisms. Returning to Japan, for the 2017 Sapporo Winter Games, [Matsuoka et al. \(2024\)](#) identified that civic pride and improved external image motivate support, although economic costs tend to reduce it.

2.2. Residents' Perception of Impacts in Rally Tourism

The scientific literature on sport tourism is a constantly evolving and growing body of literature ([Weed, 2003, 2006, 2009, 2014](#)). Despite this, there are constant calls for more case studies ([Gammon et al., 2017](#); [Mollah et al., 2021](#)), as they are useful to enrich the academic discussion and make it more flexible ([Hajer & Wagenaar, 2003](#)).

A rally is a motorsports competition held on open roads, where vehicles navigate timed stages, combining speed and navigation under real traffic conditions ([Rico-Bouza et al., 2021](#); [Naess, 2014](#)). Rally tourism is a form of sports tourism that involves travel motivated by the attendance and participation in rally events, which take place on closed-road circuits in diverse geographic settings ([Rico-Bouza et al., 2021](#)). From a spatial perspective, rally tourism can be classified into two main typologies: rural rally tourism and urban rally tourism. Rural rally tourism takes place on roads that traverse natural landscapes and connect different municipalities, often featuring gravel or mountainous terrain that challenges both drivers and vehicles. In contrast, urban rally tourism is staged within city environments, utilizing paved streets and incorporating urban infrastructure into the course design ([Naess, 2014](#)). Unlike recurring events within an annual cycle and in fixed locations, a rally event is part of a sequence of itinerant events. Nevertheless, this type of event requires flexible management in terms of community participation and logistical planning ([L. Fredline et al., 2013](#)). This dynamic affects local mobility, residents' perceptions, and volunteer participation, which are key factors in the community's acceptance of the event ([Hallmann & Zehrer, 2017](#)). Studies on motorsport events, such as the Macau Grand Prix, highlight disruptions to traffic and residents' daily lives and emphasize the importance of understanding the various dimensions of impact perception to enhance strategic planning and strengthen local population support ([Han et al., 2018](#)).

The application of social exchange theory to rally tourism events remains scarce and diffuse ([Ramos-Ruiz et al., 2024](#)). Furthermore, studies addressing residents' perceptions of the impacts of rally events on their communities have traditionally focused on large-scale events ([Mair et al., 2023](#); [Bazzanella et al., 2023](#)) as well as other sports ([Parent & Chappelet, 2015](#)). Considering previous research on residents' perceptions of rally events, some common themes can be identified regarding both positive and negative perceptions. Economic impact is often cited as a justification for soliciting support from public and private entities to organize such events ([Chang et al., 2015](#); [Crompton, 2020](#)).

Therefore, understanding residents' perceptions of these impacts is crucial. In this context, studies by [Peric and Vitezic \(2023\)](#) on the WRC in Croatia, [Custódio et al. \(2018\)](#) on the ERC in the Azores (Portugal), and [Liberato et al. \(2023\)](#) on the WRC Vodafone Rally of Portugal indicate that residents generally support the economic benefits generated by these events. In the case of WRC in Kyogle (Australia), residents highlighted benefits such as increased tourism, support for small businesses, and fundraising for local services

(MacKellar, 2013). Another common theme across studies is the positive perception of enhanced entertainment and leisure offerings (MacKellar, 2013; Custódio et al., 2018; Peric & Vitezic, 2023).

From an environmental perspective, Custódio et al. (2018) and MacKellar (2013) reported residents’ concerns about increased dust and pollution. Additionally, MacKellar (2013) noted complaints about noise and disturbances to local wildlife. In contrast, Peric and Vitezic (2023) found that residents perceived the environmental impact of the event as moderate. Regarding intangible factors, residents had positive perceptions of rally events for fostering social cohesion (MacKellar, 2013), boosting community pride and local self-esteem (MacKellar, 2013; Custódio et al., 2018; Liberato et al., 2023; Peric & Vitezic, 2023), and enhancing the community’s image as a tourist destination (MacKellar, 2013; Custódio et al., 2018; Liberato et al., 2023).

Negative perceptions primarily affected residents living near rally routes (MacKellar, 2013) and centered on traffic and parking issues (Peric & Vitezic, 2023), restricted access to private property (MacKellar, 2013), price increases during the event (Custódio et al., 2018), and environmental impacts (MacKellar, 2013; Custódio et al., 2018; Peric & Vitezic, 2023). Another notable issue is the generation of conflicts and divisions within the community due to a lack of prior consultation and the perception of the event being imposed on them (Dredge et al., 2011; MacKellar, 2013).

Some studies have identified patterns in residents’ perceptions. For example, Del Chiappa et al. (2016b) categorized residents of Sardinia (Italy) during the WRC into four groups: concerned enthusiasts, neutrals, supporters, and critics. Enthusiasts, primarily men, highly valued economic impacts, were skeptical of cultural and social benefits, were environmentally conscious, and showed the highest level of support for the event. Neutrals, mostly women, gave average ratings to the impacts and showed no intention to support the event. Supporters, also mostly women, attributed moderately positive ratings to the economic, social, and cultural benefits, coupled with moderate support. Critics, predominantly women, gave very low ratings to positive impacts, gave high ratings to negative impacts, and expressed no support for the event. Recently, in the context of the Sierra Morena Rally in the capital of the province of Cordoba, Ramos-Ruiz et al. (2024) found a gender bias when applying a combination of social exchange theory and social representations theory, such that male residents tended to give higher ratings than females to the dimensions of perceived positive impact and support, and conversely, females tended to give higher ratings than males to the dimensions of perceived negative impact. Table 1 shows the existing results on the studies of perception of impact and support of residents for rally-type events.

Table 1. Studies on rally tourism and residents’ perception and support.

Reference	Event	Results
Peric and Vitezic (2023)	WRC Croatia	Residents recognize the economic benefits but perceive the environmental impact as moderate. Traffic and parking issues are also noted as concerns.
Custódio et al. (2018)	ERC in the Azores (Portugal)	Residents acknowledge economic benefits, particularly increased tourism, but express concerns over dust, pollution, noise, and restricted access to private property.
Liberato et al. (2023)	WRC Vodafone Rally (Portugal)	Residents highlight the event’s contribution to community pride and local self-esteem, as well as improving the region’s image as a tourist destination.

Table 1. Cont.

Reference	Event	Results
MacKellar (2013)	WRC in Kyogle (Australia)	Residents appreciate the increase in tourism, support for small businesses, and additional funding for local services. However, concerns about environmental impact and noise disruptions are prevalent.
Del Chiappa et al. (2016b)	WRC in Sardinia (Italy)	Residents are categorized into four groups: enthusiasts (high economic valuation, environmentally conscious), neutrals (average ratings, no strong opinions), supporters (moderate positive impact perception), and critics (low ratings for positive impacts, high concern for negative impacts).
Ramos-Ruiz et al. (2024)	Sierra Morena Rally (Spain)	Gender bias in perception: male residents rate economic and social benefits higher, while female residents are more critical, particularly regarding environmental and social inclusivity aspects.

Therefore, following the consistent calls of Naess (2014) and Ramos-Ruiz et al. (2024), there is a need to increase case studies of rally-type sporting events, their relationship with tourism, and the perception of residents of host communities.

2.3. The Perception of Inclusive Impact: Gender and Other Considerations

Sporting events can either foster social inclusion or reinforce exclusion, depending on how they are managed within broader social, political, and economic frameworks (Koenigstorfer et al., 2023). Some groups of residents often face physical or social barriers to attending or participating, as accessibility remains an afterthought rather than an integral part of event planning (McGillivray et al., 2019), or they find internal constraints to feeling identified with the event (Pflugfelder, 2009). Additionally, perceived exclusivity can generate resistance among residents, particularly when local communities are excluded from decision-making processes, leading to opposition against the event (Boykoff, 2017). Examining the inclusivity of motorsports events is therefore relevant to understanding their broader social impact and ensuring equitable community engagement.

Social representations theory (SRT), developed by Moscovici (1981), expands on the notion of collective representations proposed by Durkheim by explaining how shared beliefs and values are constructed through everyday communication and behavior. Pearce et al. (1996) argued that these representations offer a broader framework than social exchange theory (SET) for studying residents' perceptions and attitudes towards tourism events by emphasizing their social and historical context. Although they may appear to be divergent approaches, Faulkner and Tideswell (1997) proposed complementarity between the two theories by linking them through an intrinsic-extrinsic dichotomy. While the extrinsic dimension considers aspects such as seasonality and tourist/resident ratios, the intrinsic dimension highlights heterogeneity among subgroups of residents according to their attachment to tourism, community attachment, and socio-demographic characteristics such as gender. In addition, E. Fredline and Faulkner (2000) identified sources of social representations, such as direct experience, social interaction, and the media, that influence residents' perceptions and attitudes towards tourism and events.

Although both theories have been interrelated in various tourism studies (Hadinejad et al., 2019), their application to motorsports is limited. Naess (2014) noted that research on the World Rally Championship (WRC) is scarce and classified its contributions into three blocks: historical, economic-social-environmental, and subcultural and identity issues. He stressed the need to differentiate between Formula 1, characterized by controlled circuits,

and the WRC, which takes place on natural terrain with unpredictable conditions that foster a unique subculture. According to Naess, WRC fans identify themselves through a portrait of masculinity, either heroic and positive, associated with physical and emotional endurance in the face of extreme conditions, or negative and marginal, linked to excluded young men seeking affirmation through illegal night racing (Vaaranen, 2004).

Thus, as explored by Pflugfelder (2009) and Matthews and Pike (2016), gender is a crucial dimension in motorsports. Pflugfelder identified a dissonance between the female-automobile representation and the dominant male representation, which hinders women's success in the sport despite competing on equal terms. Matthews and Pike explained this dissonance through two factors: deterministic biological discourses arising in male-dominated industrial contexts and the media's perpetuation of narratives of exclusion and sexualization. More recently, Howe (2022) extended these perspectives by noting that historical attitudes, assumptions of physical and mental inferiority, sexualization, economic barriers, and the invisibility of women contribute to their marginalization. This last factor also creates a vicious cycle in which the lack of female role models discourages girls from getting involved in motorsport, except in rare cases where they are initiated by father figures (Kochanek et al., 2020).

In a different vein, Stončkaitė (2022) analyses the impact of population aging on socio-economic transformations, highlighting its influence on tourism, the leisure industry, and sporting events. Older adults, especially baby boomers, are a key segment for leisure tourism due to their considerable share of holiday spending and their potential to energize hospitality markets. However, senior tourism remains a marginal field within studies on aging, tourism, and leisure. Patterson and Balderas-Cejudo (2022) stress that demographic ageing poses both challenges and opportunities for the economy, services, and society in general. They stress the need to implement innovative strategies to keep older people active and mitigate problems such as loneliness. In this framework, tourism and travel emerge as essential tools to promote the well-being of older people.

Last, Darcy (2012) notes that people with functional diversity are influenced by various barriers that affect their experience and equal access. Among the limitations identified is the lack of accessible information in formats such as Braille, sign language interpreters, and websites compliant with international accessibility protocols. In addition, assembly areas and facilities are often not accessible to people with reduced mobility, including problems in seating design and sight lines that limit an equitable experience. Other notable shortcomings include the absence of accessible restrooms and dressing rooms, as well as the lack of consideration of disability-specific experiences such as audio-description systems, sign language interpreters, or hearing enhancement systems. In addition, policies on additional costs for caregivers or companions are often insufficient to ensure equity, while registration procedures often do not include options for attendees to identify their specific access needs. Table 2 shows studies focusing on inequalities.

The motorsport industry continues to be a highly masculinized space, where women face structural barriers in both sports participation and management and decision-making (Piggott et al., 2024). Ensuring an inclusive approach in the organization of these events can encourage the participation of women and minorities in leadership roles (Piggott et al., 2024). In addition, marketing strategies and sustainable tourism policies with a gender perspective can improve the acceptance of the event and its social impact (Cerezo-Esteve et al., 2024). From a community perspective, events perceived as inclusive tend to generate greater support and backing from sponsors and key stakeholders, strengthening their long-term sustainability (Farinloye & Mogaji, 2024). The implementation of accessibility and equitable mobility policies can also expand the participation of women and other excluded groups, ensuring a more inclusive legacy (Riley et al., 2008).

Table 2. Studies on inequalities in events and tourism activity.

Reference	Conclusion	Focus	Field
Pflugfelder (2009)	Dissonance between female representation in motorsports and dominant male narratives, limiting women’s success.	Gender	Motorsports
Matthews and Pike (2016)	Dissonance through deterministic biological discourses and media-driven exclusion and sexualization.	Gender	Motorsports
Howe (2022)	Historical attitudes, assumptions of inferiority, economic barriers, and invisibility as key factors in female marginalization in motorsport.	Gender	Motorsports
Kochanek et al. (2020)	Lack of female role models in motorsports perpetuates gender disparities, as girls are rarely encouraged to participate unless influenced by father figures.	Gender	Motorsports
Stončikaitė (2022)	Impact of demographic aging on tourism and leisure, emphasizing the economic potential of senior travelers.	Aging	Tourism
Patterson and Balderas-Cejudo (2022)	Challenges and opportunities of aging populations for the economy, tourism, and society, stressing the need for innovative strategies to keep older adults engaged.	Aging	Tourism
Darcy (2012)	Multiple accessibility barriers for people with disabilities in tourism and sporting events, including inadequate infrastructure, information, and policies.	Disabilities	Sporting events

2.4. Research Questions

This study poses the following two research questions:

1. Research Question 1 (RQ1). In the context of holding a rally event in a small rural community, is there a dimension of inclusive impact perception by residents that is compatible with the traditional impact perception structure (economic, social, environmental)?
2. Research Question 2 (RQ2). What is the structure of the resident population of a rural community in terms of these four dimensions of impact perception?

3. Methodology

This section is structured under four headings: description of the case study, questionnaire design, sample collection, and data processing, with the latter establishing the methodological criteria to be applied in the study to validate the results obtained.

3.1. The Sierra Morena Rally in Obejo, Cordoba, Spain

The Sierra Morena Rally is an annual competition with a long tradition in the province of Córdoba. The 41st edition took place during the first week of April 2024. Until that date, the championship was part of the S-CER or Supercampeonato de España de Rallyes (national level). However, beginning with the 2025 edition, it has been promoted for three years to the European Rally Championship (ERC, continental level), consolidating itself as a growing sporting event with great capacity to attract tourists to the small towns of the Sierra Morena that it passes through.

This study is based on the principles of social exchange theory to analyze the various dimensions of the perception of impact among residents of a very small rural community in the province of Cordoba, Spain: Obejo. Obejo is a small rural municipality located in the Guadiato Valley, to the north of the capital of the province of Córdoba (Figures 1 and 2). The resident population is divided into three different population centers and slightly exceeds two thousand inhabitants. Its economy is significantly influenced by the primary sector. This inland tourism destination is located just over 40 kilometers from the city of Cordoba, with no direct access to motorways, which sets it apart from other areas of the province.

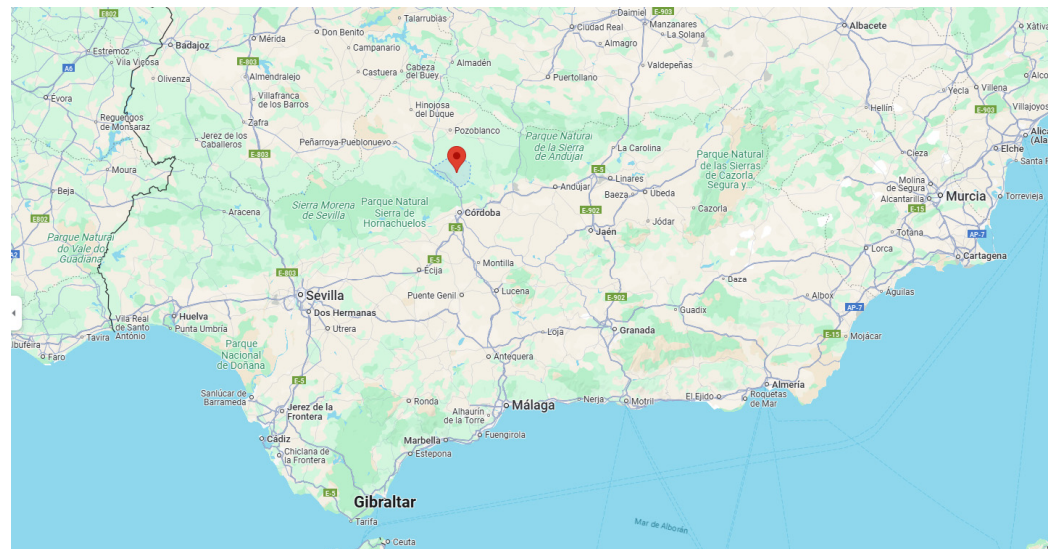


Figure 1. Obejo, Southern Spain. Source: [Google \(2025\)](#).

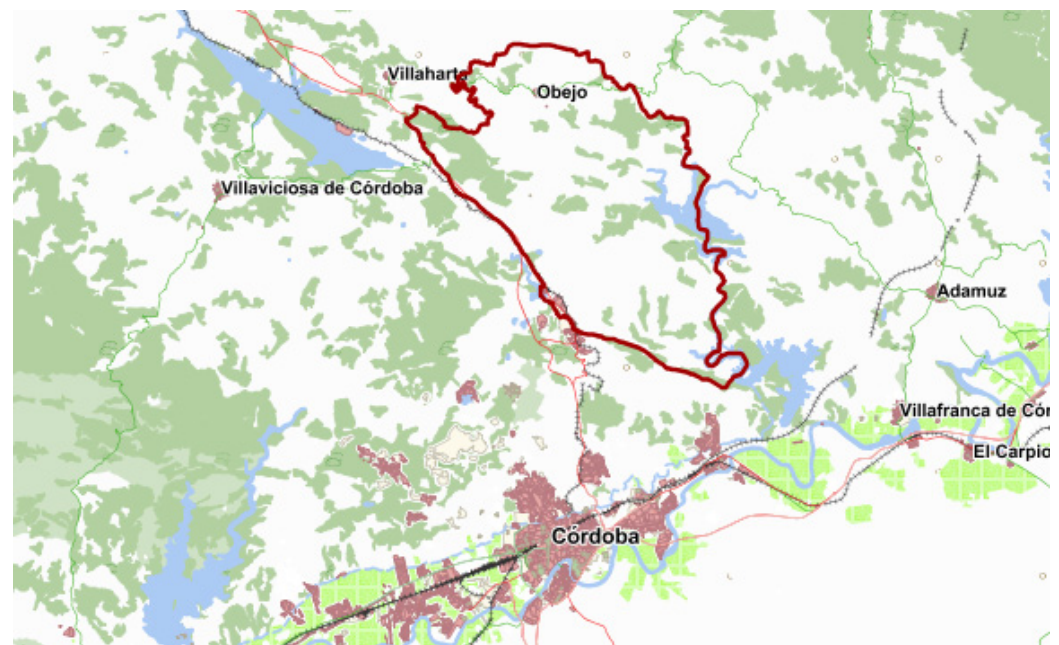


Figure 2. Obejo in rural area of Cordoba, Spain. Source: Instituto de Estadística y Cartografía de Andalucía, ([IECA, 2025](#)).

3.2. Design of the Questionnaire

The questionnaire used in this study is shown in Table 3. It is a self-administered questionnaire divided into two parts. The first part offers 17 questions on a seven-point Likert-type scale, where 1 means “strongly disagree”, 4 means “neither agree nor disagree”,

and 7 means “strongly agree”. The reason for choosing this scale is that it is an odd scale with a central measurement that offers a better fit than five-point Likert-type scales (Hair et al., 2020). Moreover, it is a scale already successfully used in other rally impact perception studies (Custódio et al., 2018; Ramos-Ruiz et al., 2024). The 17 questions cover the four dimensions of impact perception intended to be explored in the study: economic (ECO), social (SOC), environmental (ENV), and inclusive (INC). The second part of the questionnaire addresses certain features of the socio-demographic profile (gender, age, and education), as well as two intrinsic dimensions (liking motorsports events and daily use of the routes closed to traffic due to the event). The references that have inspired the questionnaire correspond to research on residents’ perception of the impact and applications of social exchange theory to rally-type motorsports events, to ensure the consistency of the questionnaire. The questionnaire underwent a pre-test phase with a sample of 16 participants and a pilot study with another sample of 42 individuals. This was intended to adjust the wording to respondent comprehension and improve fluency to ensure the quality of the research findings (Hair et al., 2020; Moore et al., 2021).

Table 3. Questionnaire.

Items	“The Sierra Morena Rally. . .	References
ECO01	Helps to make local businesses more visible”	Kim et al. (2015) Custódio et al. (2018) Liberato et al. (2023) Ramos-Ruiz et al. (2024)
ECO02	Helps to attract more customers to local businesses”	
ECO03	Helps to improve the income of local businesses”	
ECO04	Helps to improve the economy of Obejo”	
ECO05	Helps to improve the economy of municipalities around Obejo”	
SOC01	Helps neighbors interact with each other”	MacKellar (2013) Del Chiappa et al. (2016b) Peric and Vitezic (2023) Ramos-Ruiz et al. (2024)
SOC02	Helps the neighbors of Obejo cooperate with each other by doing activities they would not do if the Rally had not taken place”	
SOC03	Contributes to generate a climate of respect among neighbors”	
SOC04	Contributes to generate collective awareness and community feeling in Obejo”	
SOC05	Contributes to generate pride of belonging to Obejo”	
ENV01	Inconvenience to the neighbors through damage to the natural environment, flora, and fauna during the rally”	Collins et al. (2009) Dwyer et al. (2010) Guizzardi et al. (2017) Ramos-Ruiz et al. (2024)
ENV02	Inconvenience to the neighbors through the presence of large crowds that reduce mobility”	
ENV03	Discomfort to neighbors through damage to cultural heritage and street furniture”	
ENV04	Disturbs the neighbors through the risk of vandalism”	
INC01	Promotes the sport among all ages of people”	Darcy (2012) Pflugfelder (2009) Matthews and Pike (2016) Stončikaitė (2022) Patterson and Balderas-Cejudo (2022)
INC02	Promotes the sport in an inclusive manner from a gender perspective”	
INC03	Promotes this sport in an inclusive way for people with functional diversity”	
SDP01	Gender	MacKellar (2013) Del Chiappa et al. (2016b) Peric and Vitezic (2023)
SDP02	Age	
SDP03	Educational Level	
IND01	Do you use the roads and paths closed for the Rally on a daily basis?	Custódio et al. (2018) Liberato et al. (2023) Ramos-Ruiz et al. (2024)
IND02	Are you a motorsports fan?	

3.3. Data Collection

The fieldwork was carried out during the celebration of the event, from 5 to 7 April 2024. It was carried out by researchers from the University of Cordoba specialized in tourism and sporting events. In addition, several student collaborators with habitual residence in Obejo participated. Convenience sampling was used through a QR code with access to Google Forms, and, to avoid coverage problems, it was possible to complete the questionnaire on paper. A total of 281 valid and complete questionnaires were collected. This figure is approximately 13.54% of the total population of Obejo considering its three nuclei and the scattered population.

3.4. Data Processing

Data analysis was carried out using SPSS v28.0 and JASP v0.19 statistical software. Firstly, an analysis of the total sample was carried out, determining the distribution of the sample by gender, age, and education, as well as by their declaration as fans of motorsports events and their daily use of the roads and paths closed for the event. After this, a preliminary analysis of the distribution of the data in the Likert-type scale questions was carried out in order to test for normality. The Kolmogorov–Smirnov test (Kolmogorov, 1933; Smirnov, 1948) was used for this purpose. In addition, an analysis of internal consistency was carried out through Cronbach's alpha (Cronbach, 1951) considering a minimum acceptable threshold of 0.7 (Nunnally & Bernstein, 1994).

3.4.1. Methodology for Addressing Research Question 1 (RQ1)

To answer RQ1, an exploratory factor analysis (EFA) was carried out with the 17 items on a Likert-type scale. This methodology, which serves as a first analysis of the underlying structure of a measurement instrument (Kahn, 2006; Pérez & Medrano, 2010), has recently been successfully used in research on residents' perceptions of rally events (Peric & Vitezic, 2023; Ramos-Ruiz et al., 2024). To determine the minimum sample size, we used the criteria of Nunnally and Bernstein (1994), who recommend a minimum of 10 valid cases for each item. The Kaiser–Meyer–Olkin index (KMO) was considered valid at 0.7 (Hair et al., 2018, 2020) and significant below 0.05 (Everitt & Wykes, 2001), thus ensuring the suitability of the database to apply this methodology (Comrey & Lee, 1992; Pérez & Medrano, 2010). Each extracted factor or component had to have an initial eigenvalue greater than 1 (Kaiser, 1960; Kahn, 2006), and the loading of each item within the factor had to be greater than 0.4 (Glutting, 2002). In addition, the total explained variance of the model had to exceed 50% (Merenda, 1997).

Additionally, a confirmatory factor analysis (CFA) was applied to test the validity of EFA (Brown, 2015; Kline, 2015) and test whether a hypothesized measurement model fits the collected data and allows for a statistical evaluation of the proposed factor structure (Byrne, 2016). The CFA was conducted using the maximum likelihood (ML) estimation method (Bentler & Bonett, 1980; Bentler, 2007). Model fit was assessed using standard indices: the comparative fit index (CFI) and Tucker–Lewis index (TLI), where values ≥ 0.90 indicate acceptable fit (Hu & Bentler, 1999); the root mean square error of approximation (RMSEA), where values ≤ 0.08 indicate acceptable fit (Steiger, 1990); and the standardized root mean square residual (SRMR), where values ≤ 0.08 indicate a good fit (Hu & Bentler, 1999), as well as considering the theory supporting this research. Moreover, to ensure the reliability and validity of the measurement model, the following psychometric properties were evaluated: construct reliability, assessed through McDonald's omega (ω) and Cronbach's alpha (α), both expected to be ≥ 0.70 (Nunnally & Bernstein, 1994); convergent validity, verified through average variance extracted (AVE), requiring values ≥ 0.50 (Fornell & Larcker,

1981); and discriminant validity, ensured through heterotrait–monotrait ratio (HTMT), where values < 0.85 indicate distinct constructs (Henseler et al., 2015).

3.4.2. Methodology for Addressing Research Question 2 (RQ2)

To address RQ2, a non-hierarchical cluster analysis (k-means) was conducted to classify residents into distinct groups based on their perceptions of rally events (Singh et al., 2021). Clustering techniques allow for identifying homogenous yet distinct population segments, which has been successfully applied within the framework of social exchange theory in sports tourism research (Chiam & Cheng, 2013; Del Chiappa et al., 2016b). The k-means algorithm was selected because it is an efficient method for partitioning data into K distinct groups while minimizing within-group variance (MacQueen, 1967). The Euclidean distance metric was used to measure the similarity between cases, as it is the default and most widely recommended approach for clustering numerical data (Tan et al., 2019). Following Jain (2010), the optimal number of clusters was determined. While techniques such as the elbow method (Kodinariya & Makwana, 2013) and the silhouette coefficient (Rousseeuw, 1987) are commonly used in other fields, in this study, the number of clusters ($K = 3$) was chosen based on the following: (1) theoretical considerations regarding distinct resident impact perception profiles (Del Chiappa et al., 2016b); (2) the stability of cluster centers after multiple iterations, so it could be ensured that the segmentation was not sensitive to random initialization (Lloyd, 1982); and (3) interpretability of the resulting clusters, allowing for meaningful profiling of residents based on socio-demographic and attitudinal traits (Hair et al., 2018). Thus, once the clusters were formed, the socio-demographic composition of each group was analyzed to determine their distinguishing characteristics. Additionally, a one-way ANOVA was conducted to assess whether differences between clusters were statistically significant ($p < 0.05$) (Everitt et al., 2011). Finally, a denomination was attributed to each group. According to Cadima-Ribeiro et al. (2023), this methodological process enables a more nuanced understanding of resident perceptions of rally-type events, facilitating targeted decision-making in event planning and community engagement.

4. Results

Firstly, Table 4 gives a breakdown of the socio-demographic profile of the sample and the distribution of the sample in terms of intrinsic dimensions.

Table 4. Sociodemographic profile and intrinsic dimensions of the sample and population.

Variables			Sample		Population ¹	
			<i>n</i>	%	<i>n</i>	%
Sociodemographic profile	Gender	Male	157	55.87%	1093	52.30%
		Female	154	44.13%	997	47.70%
	Age (adults)	18–29 years old	53	18.86%	328	20.32%
		30–39 years old	69	24.56%	377	23.36%
		40–49 years old	45	16.01%	315	19.52%
		50–59 years old	80	28.47%	225	13.94%
		At least 60 years old	34	12.10%	369	22.86%
	Bachelor completed	Yes	77	27.40%	n/a	
		Any other situation	204	72.60%	n/a	
Intrinsic dimensions	Usually use the paths	Yes	185	65.84%	n/a	
		No	96	34.16%	n/a	
	Motorsports fans	Yes	199	70.82%	n/a	
		No	82	29.18%	n/a	

¹ Source: Instituto Nacional de Estadística, (INE, 2025)

The sample collected offers a relative parity in terms of gender. In terms of age, the most represented group is the 50–59 age group, followed by those in their thirties. In terms of education, slightly less than one in three have completed higher education. Regarding the daily use of the roads that are closed to traffic during the rally, two-thirds of the sample answered in the affirmative. With regard to motorsports enthusiasm, almost one in three residents expressly stated that they are not fans of motorsports events.

4.1. Preliminar Analysis

Table 5 below provides a statistical-descriptive analysis for each item, as well as the results of the Kolmogorov–Smirnov test for each item and the internal consistency through Cronbach’s alpha for each of the expected dimensions.

Table 5. Descriptive statistics.

Items	Mean	St.Dv.	Med.	Mode	St.Er.	Var.	Sk.	Ku.	Range	Min.	Max.	K.S.	C.A.
ECO01	5.99	1.27	6	7	0.08	1.614	−1.765	3.693	6	1	7	<0.001	0.958
ECO02	6.20	0.97	6	7	0.06	0.948	−1.188	0.826	4	3	7	<0.001	
ECO03	6.26	0.94	7	7	0.06	0.877	−1.242	1.127	4	3	7	<0.001	
ECO04	6.28	0.99	7	7	0.06	0.983	−1.482	1.483	4	3	7	<0.001	
ECO05	6.14	1.17	7	7	0.07	1.363	−1.263	0.490	4	3	7	<0.001	
SOC01	6.13	0.99	6	7	0.06	0.984	−0.857	−0.045	4	3	7	<0.001	0.912
SOC02	5.66	1.36	6	7	0.08	1.861	−0.732	−0.232	5	2	7	<0.001	
SOC03	5.61	1.35	6	7	0.08	1.824	−0.441	−1.216	4	3	7	<0.001	
SOC04	5.93	1.16	6	7	0.07	1.349	−0.887	−0.193	4	3	7	<0.001	
SOC05	6.25	1.03	7	7	0.06	1.068	−1.597	2.152	4	3	7	<0.001	
ENV01	4.29	2.24	4	7	0.13	4.999	−0.171	−1.451	6	1	7	<0.001	0.894
ENV02	2.95	2.08	2	1	0.12	4.308	0.880	−0.544	6	1	7	<0.001	
ENV03	4.16	2.16	4	6	0.13	4.656	−0.129	−1.448	6	1	7	<0.001	
ENV04	4.21	2.3	5	7	0.14	5.304	−0.187	−1.577	6	1	7	<0.001	
INC01	4.92	1.770	5	7	0.11	3.133	−0.408	−0.961	6	1	7	<0.001	0.958
INC02	4.94	1.770	5	7	0.11	3.132	−0.404	−0.989	6	1	7	<0.001	
INC03	4.28	1.94	4	4	0.12	3.753	0.028	−1.163	6	1	7	<0.001	

These results reflect several patterns in residents’ responses. The average scores give similar ratings within each block and different ratings for other expected dimensions, and it is similar for the standard deviations. Furthermore, the skewness and kurtosis values show evidence that the data are not always normally distributed, as confirmed by the normality test performed. These indications justify the need to carry out the EFA in order to continue with the development of the research.

4.2. Result of Research Question 1 (RQ1)

4.2.1. Exploratory Factor Analysis (EFA)

The results of the EFA carried out to answer RQ1 offer values that allow the analysis to be validated. Thus, the KMO was 0.857, and the Bartlett’s Chi-Square test of sphericity was 5226.229, with 136 degrees of freedom and significance less than 0.05 and close to 0. Table 6 provides the EFA results in more detail.

The rotated component matrix shows the grouping of the different items in each factor or component. The items were grouped as expected, so there is no contradiction from a theoretical point of view. Moreover, all factors grouped at least three items, and none of them had a loading below 0.500, so from a methodological point of view, the results are consistent. The internal consistency of each item grouping was tested in the preliminary analysis of the study through Cronbach’s alpha for each subscale. As no items have been deleted, the results of the preliminary analysis remain valid.

Table 6. Rotated component matrix.

Items	Factors				Eigenvalues	% Explained Var.	Cronbach's Alpha
	1	2	3	4			
ECO03	0.890				7.751	23.91%	0.958
ECO02	0.829						
ECO05	0.822						
ECO04	0.794						
ECO01	0.690						
SOC02		0.861			2.984	20.24%	0.912
SOC01		0.826					
SOC03		0.742					
SOC05		0.680					
SOC04		0.666					
ENV04			0.923		1.868	18.35%	0.894
ENV03			0.916				
ENV02			0.823				
ENV01			0.701				
INC01				0.889	1.132	18.28%	0.958
INC03				0.886			
INC02				0.883			
Total						80.79%	0.760

Factor 1 has been labeled “Perception of economic impact”. It comprises, from highest to lowest loading, items ECO03, ECO02, ECO05, ECO04, and ECO01. It has an eigenvalue of 7.751 and alone explains 23.91% of the total variance.

Factor 2 has been labeled “Perception of social impact”. It comprises, from highest to lowest loading, items SOC02, SOC01, SOC03, SOC05, and SOC04. It has an eigenvalue of 2.984 and alone explains 20.24% of the total variance.

Factor 3 has been labeled “Perception of environmental impact”. From highest to lowest loading, it encompasses items ENV04, ENV03, ENV02, and ENV01. It has an eigenvalue of 1.868 and alone explains 18.35% of the total variance.

Factor 4 has been labeled “Perception of inclusive impact”. The items that make up this component are, from highest to lowest loading, INC01, INC03, and INC02. It has an eigenvalue of 1.132 and explains 18.28% of the total variance.

Overall, the model explains more than 80% of the total variance, so it is considered an adequate structure to perform the cluster analysis.

4.2.2. Confirmatory Factor Analysis (CFA)

The confirmatory factor analysis (CFA) was conducted in three phases: model fit evaluation, factor loadings and reliability, and validity assessment.

The model fit was assessed using standard indices following the recommendations of [Hu and Bentler \(1999\)](#) and [Schreiber et al. \(2006\)](#): the comparative fit index (CFI) = 0.884; the Tucker–Lewis index (TLI) = 0.860; the root mean square error of approximation (RMSEA) = 0.139; and the standardized root mean square residual (SRMR) = 0.073. The analysis of the above results requires the following considerations. CFI and TLI are slightly below the conventional 0.90 threshold. However, values above 0.85 are still considered acceptable in models with complex factorial structures ([Marsh et al., 2004](#)). RMSEA is slightly higher than 0.10, which may indicate moderate misfit, but previous studies suggest that RMSEA tends to overestimate model error in complex models with multiple latent variables ([Kenny et al., 2015](#)). SRMR is below 0.08, confirming a reasonable fit ([Hu & Bentler,](#)

1999). Thus, despite the moderate RMSEA, the overall fit indices offer an acceptable model, especially when considering the consolidated theoretical framework on the triple bottom line (Hair et al., 2018).

The standardized factor loadings of all items were above 0.50. This indicates a strong relationship between observed variables and their respective latent constructs (Brown, 2015). Cronbach's alpha (α) was calculated in EFA, and McDonald's omega (ω) was calculated to reinforce the assessment of internal consistency. All values exceeded the 0.70 threshold, confirming strong reliability (Nunnally & Bernstein, 1994): F1 ω = 0.961; F2 ω = 0.918; F3 ω = 0.897; and F4 ω = 0.960.

Finally, convergent and discriminant validity were tested to ensure the robustness of the model. Convergent validity was assessed through average variance extracted (AVE), with all factors exceeding the 0.50 threshold, indicating that the constructs adequately explain item variance (Fornell & Larcker, 1981). Discriminant validity was tested using the heterotrait–monotrait ratio (HTMT), where all values were below the 0.85 threshold, confirming that each construct measures a distinct dimension (Henseler et al., 2015). Figure 3 shows the model plot.

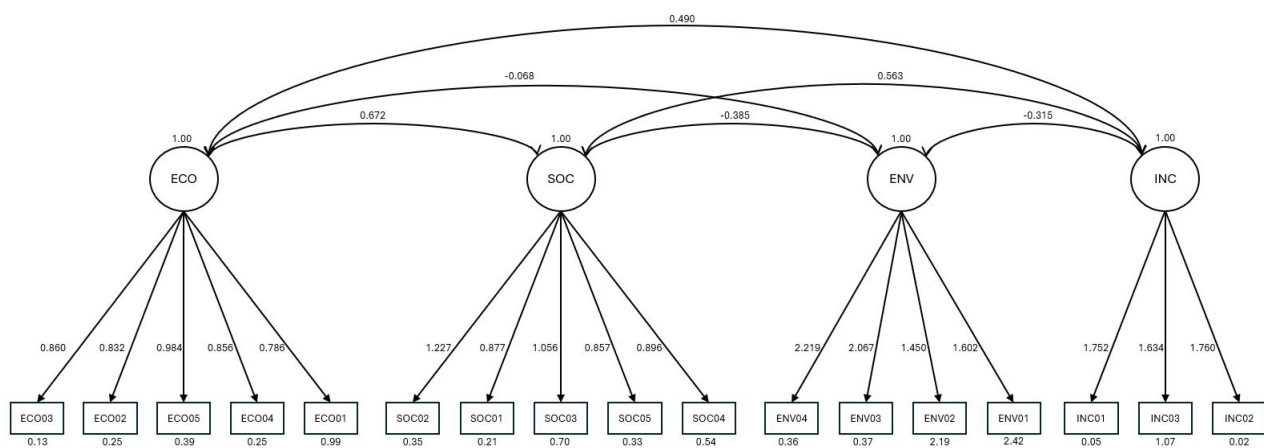


Figure 3. Model plot.

This responds to RQ1, indicating that there is a dimension of perceived inclusive impact among the resident population of a rural community when a rally-type tourist sporting event is held and that this dimension of perceived inclusive impact is compatible with the traditional triple bottom line dimension of economic, social, and environmental impact.

4.3. Result of Research Question 2 (RQ2)

The results of cluster analysis offer cluster stability and theoretical coherence. The initial cluster centers showed clear differences between the groups, consistent with the existence of different profiles in relation to the model factors (Lloyd, 1982). Furthermore, convergence in only four iterations indicates that the algorithm converged quickly to a stable solution (Hartigan & Wong, 1979). The latter was confirmed by the final distances between the cluster centers (Everitt et al., 2011), shown in Table 7.

Table 7. Distances between cluster centers.

Cluster	1	2	3
1		2.999	2.966
2	2.999		1.755
3	2.966	1.755	

The cluster analysis carried out has made it possible to differentiate between three homogeneous, non-hierarchical population groups that differ from each other. Table 8 supports the analysis carried out.

Table 8. Cluster analysis. ANOVA table.

	Cluster		Error		F	Sig.
	RMS	DoF	RMS	DoF		
Perception of economic impacts	58.350	2	0.587	278	99.336	<0.001
Perception of social impacts	63.564	2	0.550	278	115.591	<0.001
Perception of environmental impacts	35.167	2	0.754	278	46.629	<0.001
Inclusive impacts perception	21.812	2	0.850	278	25.653	<0.001

Next, to answer RQ2, Table 9 combines the information collected in Table 2, on socio-demographic profile and intrinsic dimensions, with that in Table 4, on the rotated component matrix. In addition, following the criteria and methodological guidelines established in this work, for each factor, the mean and standard deviation have been calculated.

Table 9. Elements for defining and structuring population clusters.

Elements to Define Clusters			Cluster 1 <i>n</i> = 135		Cluster 2 <i>n</i> = 125		Cluster 3 <i>n</i> = 21	
			48.04%		44.48%		7.47%	
			Mean	St.Dv.	Mean	St.Dv.	Mean	St.Dv.
Factors	Economic		6.44	0.550	6.25	0.786	4.04	0.625
	Social		5.84	0.852	6.36	0.696	3.82	0.973
	Environmental		2.94	1.712	4.61	1.633	5.86	1.276
	Inclusive		5.42	1.475	4.25	1.718	2.94	1.489
Sociodemographic profile	Average age		38.30		43.37		38.00	
	Gender	Male	80.00%		33.60%		33.33%	
		Female	20.00%		66.40%		66.67%	
	Bachelor completed	Yes	33.33%		25.60%		0.00%	
		Any other situation	66.67%		74.40%		100.00%	
Intrinsic dimensions	Usually use path	Yes	64.44%		72.80%		80.95%	
		No	35.56%		27.20%		19.05%	
	Motorsports fans	Yes	88.89%		58.40%		28.57%	
		No	11.11%		41.60%		71.43%	

Cluster 1 has been named “Motor Enthusiasts”. It is made up of 48.04% of the population and consists mainly of men who perceive themselves as motor enthusiasts. Despite the fact that most of them need to use the roads closed for the rally in their daily lives, they are the group with the highest average score for the perceived economic impact of the event on the community. In addition, this segment perceives a high social dynamization impact and a high inclusive impact, with scores in both cases above 5. However, the perception of the environmental impact of holding this type of event for the community is the lowest among the clusters.

Cluster 2 has been named “Environmentally Conscious Fans”. It is made up of 44.48% of the population and is mainly made up of women who declare themselves to be either fans or non-fans of motorsports. Although they give a high score to the perception of economic impact, for this segment, the highest average rating is found in the perception of social impact, with a standard deviation that suggests a broad consensus in this sense. The perception of inclusive impact for this group is above the midpoint of the scale. In the

context of this segment's assessment of the perception of social impact, it is determined that this cluster has a slight tendency to consider that the celebration of the event fosters the love of rallying from a gender perspective, without age discrimination and among people with functional diversity. However, this cluster is reluctant to consider the environmental impact of the rally on the rural community and its surroundings, as the average scores are also above the central point of the scale.

Cluster 3 is called "Admitted Critics". This is a small segment of the population, less than 10%. It is the group that makes the most daily use of the roads closed due to the rally. For the most part, they declare themselves to be people who are not fans of motorsports events. Two out of three people in this cluster are women. The people in this segment have not completed university studies, and although they appreciate a certain economic impact for their rural community due to the event, they do not consider the rally to be a dynamizing element of society and consider it not at all inclusive. They are also rather pessimistic about the environmental impact of the event.

5. Discussion

5.1. Discussion on RQ1

The results obtained confirm the existence of an inclusive impact dimension compatible within the framework of the traditional triple bottom line (TBL) model. The exploratory factor analysis (EFA) demonstrated that inclusivity, encompassing gender, age, and functional diversity, constitutes a distinct yet complementary dimension to the established economic, social, and environmental impact categories. The recognition of an inclusive dimension of residents' perception aligns with broader discussions on the importance of accessibility in sports tourism, as highlighted in studies on functional diversity in event participation (Darcy, 2012). Additionally, the inclusion of this dimension is particularly relevant in rally tourism, a traditionally male-dominated space where gender imbalances persist in both participation and leadership roles (Matthews & Pike, 2016; Piggott et al., 2024). The results suggest that women perceive rally events as less inclusive, reinforcing previous findings on gender biases in motorsport fandom and event engagement (Pflugfelder, 2009; Ramos-Ruiz et al., 2024) and according to SRT. Addressing this perception gap is critical for ensuring long-term community support for these events and fostering a more inclusive motorsports culture.

5.2. Discussion on RQ2

The cluster analysis identified three distinct resident profiles based on their perceptions of rally event impacts: motor enthusiasts, environmentally conscious fans, and admitted critics. These findings align with existing literature on segmentation in motorsport tourism, particularly the classification proposed by Del Chiappa et al. (2016b) in the WRC Sardinia, where residents were grouped into "enthusiasts", "supporters", "neutrals", and "critics".

The analysis of the "Motor Enthusiasts" cluster, formed mainly by men and characterized by a high degree of identification with motorsports, coincides with the results of MacKellar (2013) in the context of the WRC in Australia, where men assigned the highest values to the positive economic and social impacts of the event. In addition, both studies share the small-scale rural nature of the host community. This cluster also reflects patterns observed in the group of "concerned enthusiasts" described by Del Chiappa et al. (2016b) in WRC Sardinia, who showed strong support for the event despite some awareness of negative environmental impacts. However, in this study, the perception of environmental impact is significantly lower compared to other clusters, interpreted as a lower priority factor for this group.

On the other hand, the cluster “Environmentally Conscious Fans”, mostly composed of women, shows a balanced perception of impacts and highlights the importance of social impact and the recognition of an above-average inclusive impact. There are some similarities with the “supporters” cluster identified by [Del Chiappa et al. \(2016b\)](#), with women assigning moderately positive ratings to social and cultural benefits. Furthermore, this cluster also stands out for a sensitivity towards environmental impacts, which is also in line with the observations of [Custódio et al. \(2018\)](#) in the ERC Azores. Furthermore, the interest in social inclusion in this cluster is compatible with [Darcy’s \(2012\)](#) discussions on the need to address the structural barriers faced by people with reduced mobility at sport events.

Finally, the “Admitted Critics” cluster represents a small yet significant segment of the population that warrants special attention. Predominantly composed of women with no affinity for motorsports, this group holds largely negative perceptions of the event’s impacts. Their profile closely aligns with the “critics” identified by [Del Chiappa et al. \(2016b\)](#). Additionally, their stance reinforces the findings of [Ramos-Ruiz et al. \(2024\)](#), who observed a gender bias in impact perception, with women tending to rate rally-associated impacts more negatively. The perceived lack of social dynamism and inclusivity within this cluster may also be linked to insufficient community consultation and engagement, a key factor identified by [MacKellar \(2013\)](#) as a source of division within host communities, based on interviews with residents of Kyogle, a similar rural town in Australia.

These results highlight the need to adopt management and communication strategies that integrate the perspectives of different segments of residents, fostering greater inclusion and sustainability in the organization of sporting events in rural communities. They reinforce the consistent calls of previous studies to expand research on rally events, particularly in local contexts, to better understand the social and environmental dynamics they generate.

6. Conclusions

This study has explored the perception of rally event impacts in rural communities, introducing inclusivity as a fourth dimension alongside the traditional triple bottom line (TBL) framework. The findings contribute to both theoretical discussions and practical applications in rally tourism management while also highlighting research limitations and future directions.

6.1. Theoretical Conclusion

The results suggest the existence of an inclusive impact dimension within rural rally tourism, demonstrating that gender, accessibility, and social representation significantly influence residents’ perceptions. Previous studies have largely focused on economic, environmental, and social dimensions, while this study shows that inclusivity is an independent factor affecting community acceptance of rally events. Additionally, the findings align with existing segmentation models in motorsport tourism, confirming that different resident profiles hold distinct perceptions of impact. This research further supports prior studies showing that gender biases affect motorsport event perceptions, with women being more critical of environmental and social issues. By introducing inclusivity as a key dimension, this research extends the theoretical framework of rally tourism and provides a more comprehensive understanding of how different social groups perceive these events.

6.2. Practical Implications

The results suggest that rally event organizers must adopt more inclusive management strategies to improve community perception. To enhance it, organizers and public adminis-

trations involved could focus their attention on the following: (1) inclusive communication and engagement by involving women, senior citizens, and marginalized groups in decision-making processes to foster a sense of belonging; (2) accessibility improvements, by ensuring proper infrastructure for people with disabilities and expanding public transport options; and (3) environmental sustainability, by getting the population concerned about pollution, noise, and land degradation and communicating the policies carried out. Additionally, it is necessary to ensure that measures fostering inclusion are effectively communicated to society, aiming to reduce the perception of negative impacts generated by the event and thus contribute to its success in future editions.

6.3. Limitations

The study focuses on a single rural case study, limiting its generalizability to larger or urban rally events. The data collected rely on self-reported perceptions, which may be subject to response biases or limited by the phrasing of the questions. Moreover, the study captures perceptions at a single point in time, without considering how support for the event evolves over different editions.

6.4. Future Research

Tourism strategies should consider gender biases in impact perception to optimize the benefits of rally events as a tourism resource. Paying greater attention to these differences would enable the development of more inclusive and effective strategies. To this end, it is important to deepen case studies to build a solid body of knowledge and facilitate the generalization of findings. It is recommended to diversify the techniques employed, incorporating both advanced quantitative approaches, such as structural equation modeling (PLS-SEM) and multilayer perceptron artificial neural networks, and qualitative methods, such as in-depth interviews and focus groups. These approaches would enrich the academic literature and provide more comprehensive insights into the impacts of rally events. Finally, it is proposed to incorporate new variables related to social exchange theory (SET) and social representations theory (SRT), such as quality of life, subjective well-being and social solidarity. These variables, already studied in other tourism contexts, are absent in research on rally events at the national level. Analyzing their mediating effect between perceptions of impact and support for the event would enrich the understanding of the social and economic dynamics associated with this type of event. In this sense, this research suggests studying the relationship between perception of impacts, support and involvement, emotional solidarity, and attachment to the territory.

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References

- Bakhsh, J. T., Taks, M., & Parent, M. M. (2024). Modeling residents' mega sport event social value: Integrating social and economic mechanisms. *Journal of Sport Management*, 38(3), 168–179. [\[CrossRef\]](#)
- Bazzanella, F., Schnitzer, M., Peters, M., & Bichler, B. (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. [\[CrossRef\]](#)
- Bentler, P. M. (2007). On tests and indices for evaluating structural models. *Personality and Individual Differences*, 42(5), 825–829. [\[CrossRef\]](#)
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588–606. [\[CrossRef\]](#)
- Boykoff, J. (2017). Protest, activism, and the Olympic Games: An overview of key issues and iconic moments. *The International Journal of the History of Sport*, 34(3–4), 162–183. [\[CrossRef\]](#)
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). Guilford Press.
- Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (3rd ed.). Routledge.
- 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*. [\[CrossRef\]](#)
- Cerezo-Esteve, S., De Blas, X., & Solanellas, F. (2024). The social impact of sports habits on sustainable tourism perceptions: A case study in Alt Urgell. *Societies*, 14(12), 257. [\[CrossRef\]](#)
- Chang, S., Kim, H. K., & Petrovcikova, K. (2015). Uses and abuses of economic impact studies in tourism. *Event Management*, 19(3), 421–428. [\[CrossRef\]](#)
- Chiam, M., & Cheng, E. (2013). Residents' perceptions of the Inaugural Youth Olympic Games 2010: A cluster analysis. *Event Management*, 17(4), 377–389. [\[CrossRef\]](#)
- Collins, A., Jones, C., & Munday, M. (2009). Assessing the environmental impacts of mega sporting events: Two options? *Tourism Management*, 30(6), 828–837. [\[CrossRef\]](#)
- Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis*. Psychology Press. [\[CrossRef\]](#)
- Crompton, J. (2020). Uses and abuses of IMPLAN in economic impact studies of tourism events and facilities in the United States: A perspective article. *Tourism Review*, 75(1), 187–190. [\[CrossRef\]](#)
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334. [\[CrossRef\]](#)
- Custódio, M. J. F., Azevedo, A., & Perna, F. P. (2018). Sport events and local communities: A partnership for placemaking. *Journal of Place Management Development*, 11(1), 6–25. [\[CrossRef\]](#)
- Darcy, S. (2012). Disability, access, and inclusion in the event industry: A call for inclusive event research. *Event Management*, 16, 259–265. [\[CrossRef\]](#)
- Deccio, C., & Baloglu, S. (2002). Non-host community resident reactions to the 2002 Winter Olympics: The spillover impacts. *Journal of Travel Research*, 41(1), 46–56. [\[CrossRef\]](#)
- Del Chiappa, G., Atzeni, M., & Ghasemi, V. (2016a). Community-based collaborative tourism planning in island destinations. *Current Issues in Tourism*, 19(3), 213–230.
- Del Chiappa, G., Presenza, A., & Yücelen, M. (2016b). Profiling residents based on their perceptions and attitudes toward sport event: Insights from the FIA World Rally Championship. *Tourismos: An International Multidisciplinary Journal of Tourism*, 11(5), 25–51.
- Del Chiappa, G., Tinaz, C., & Turco, D. M. (2014). Driving first-time and repeat spectators to a motor sport event. *International Journal of Culture, Tourism and Hospitality Research*, 8(4), 388–400. [\[CrossRef\]](#)
- Dredge, D., Ford, E. J., & Whitford, M. (2011). Managing local tourism: Building sustainable tourism management practices across local government divides. *Tourism and Hospitality Research*, 11(2), 101–116. [\[CrossRef\]](#)
- Dredge, D., & Whitford, M. (2011). Event tourism governance and the public sphere. *Journal of Sustainable Tourism*, 19(4–5), 479–499. [\[CrossRef\]](#)
- Dwyer, L., Forsyth, P., Spurr, R., & Hoque, S. (2010). Estimating the carbon footprint of Australian tourism. *Journal of Sustainable Tourism*, 18(3), 355–376. [\[CrossRef\]](#)
- Elkington, J. (1994). Towards the sustainable corporation: Win-Win-Win business strategies for sustainable development. *California Management Review*, 36(2), 90–100. [\[CrossRef\]](#)
- Everitt, B. S., Landau, S., Leese, M., & Stahl, D. (2011). *Cluster analysis* (5th ed.). Wiley.
- Everitt, B. S., & Wykes, T. (2001). *Diccionario de Estadística para Psicólogos*. Ariel. ISBN 84-344-0893-7.
- Farinloye, T., & Mogaji, E. (2024). Strategic marketing for sustainable sports travel experiences. *Journal of Strategic Marketing*, 1–15. [\[CrossRef\]](#)
- Faulkner, B., & Tideswell, C. (1997). A framework for monitoring community impacts of tourism. *Journal of Sustainable Tourism*, 5(1), 3–28. [\[CrossRef\]](#)
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. [\[CrossRef\]](#)

- Fredline, E. (2004). Host community reactions to motorsport events: The perception of impact on quality of life. In B. Ritchie, & D. Adair (Eds.), *Sport tourism: Interrelationships, impacts and issues*. Channel View Publications. [CrossRef]
- Fredline, E., & Faulkner, B. (2000). Host community reactions: A cluster analysis. *Annals of Tourism Research*, 27, 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 & Development*, 10(4), 416–432. [CrossRef]
- Gammon, S., Ramshaw, G., & Wright, R. (2017). Theory in sport tourism: Some critical reflections. *Journal of Sport & Tourism*, 21(2), 69–74. [CrossRef]
- Gan, W., & Dong, Q. (2024). Residents' support for major sporting events in the postponement context: A case study of the 31st summer universiade. *International Journal of Tourism Research*, 26(5), e2788. [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]
- Google. (2025). *Map of Obejo, Córdoba* [Google Maps]. Available online: <https://www.google.com/maps> (accessed on 8 March 2025).
- Guizzardi, A., Mariani, M., & Prayag, G. (2017). Environmental impacts and certification: Evidence from the Milan World Expo 2015. *International Journal of Contemporary Hospitality Management*, 29(3), 1052–1071. [CrossRef]
- Hadinejad, A., Moyle, B. D., Scott, N., Kralj, A., & Nunkoo, R. (2019). Residents' attitudes to tourism: A review. *Tourism Review*, 74(2), 157–172. [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.
- Hajer, M., & Wagenaar, H. (2003). *Deliberative policy analysis: Understanding governance in the network society*. Cambridge University Press. [CrossRef]
- Hallmann, K., & Zehrer, A. (2017). Event and community involvement of sport event volunteers. *International Journal of Event and Festival Management*, 8(3), 308–323. [CrossRef]
- Han, A. F., Wong, K. I., & Ho, S. N. (2018). Residents' perceptions on the traffic impact of a special event: A case of the Macau Grand Prix. *Asia Pacific Journal of Tourism Research*, 23(1), 42–55. [CrossRef]
- Hartigan, J. A., & Wong, M. A. (1979). Algorithm AS 136: A k-means clustering algorithm. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 28(1), 100–108. [CrossRef]
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135.
- Homans. (1961). *Social behavior in elementary forms*. Harcourt, Brace & World.
- Howe, O. R. (2022). Hitting the barriers—Women in formula 1 and W series racing. *European Journal of Women's Studies*, 29(3), 454–469. [CrossRef]
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. [CrossRef]
- Instituto de Estadística y Cartografía de Andalucía. (2025). *Sistema de Información Multiterritorial de Andalucía (SIMA)—Obejo*. Available online: <https://www.juntadeandalucia.es/institutodeestadisticaycartografia/sima/nucleos.htm?CodMuni=14047> (accessed on 8 March 2025).
- Instituto Nacional de Estadística. (2025). *Población por municipios*. Available online: <https://www.ine.es> (accessed on 8 March 2025).
- Jain, A. K. (2010). Data clustering: 50 years beyond K-means. *Pattern Recognition Letters*, 31(8), 651–666. [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]
- Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research*, 44(3), 486–507. [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]
- Kline, R. B. (2015). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
- Kochanek, J., Davis, M., Erickson, K., & Ferguson, D. (2020). More than 'just a driver': A study of professional women racecar drivers' agency in motorsport. *Psychology of Sport and Exercise*, 52(4), 101838. [CrossRef]
- Kodinariya, T. M., & Makwana, P. R. (2013). Review on determining the number of clusters in K-means clustering. *International Journal of Computer Science and Information Technologies*, 4(6), 717–719.
- Koenigstorfer, J., Yang, Y., Bocarro, J. N., Brittain, I., Lundberg, E., McGillivray, D., Misener, L., Chalip, L., & Duignan, M. B. (2023). The state of play between managing major sports events and human rights: A scoping review. *Event Management*, 27, 823–849. [CrossRef]

- Kolmogorov, A. (1933). Sulla determinazione empirica di una legge di distribuzione. *Giornale dell'Istituto Italiano degli Attuari*, 4, 83–91.
- Konstantaki, M., & Wickens, E. (2010). Residents' perception of environmental and security issues at the 2012 London Olympic Games. *Journal of Sport and Tourism*, 15, 337–357. [\[CrossRef\]](#)
- Leiber, S., & Alton, D. (1983). Visitor expenditures and the economic impact of public recreation facilities in Illinois. In S. Leiber, & D. Fesenmeier (Eds.), *Recreation planning and management*. Venture Publishing.
- Liberato, D., Costa, E., Ferraz, A., Liberato, P., & Ribeiro, J. (2023). WRC Vodafone Rally de Portugal fostering tourism development. In *Advances in Tourism, Technology and Systems: Selected Papers from ICOTTS 2022, Volume 1* (pp. 13–32). Springer Nature Singapore. [\[CrossRef\]](#)
- Lloyd, S. (1982). Least squares quantization in PCM. *IEEE Transactions on Information Theory*, 28(2), 129–137. [\[CrossRef\]](#)
- MacKellar, J. (2013). World Rally Championship 2009: Assessing the community impacts on a rural town in Australia. *Sport in Society*, 16(9), 1149–1163. [\[CrossRef\]](#)
- 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. (2023). Social impacts of mega-events: A systematic narrative review and research agenda. *Journal of Sustainable Tourism*, 31(2), 538–560. [\[CrossRef\]](#)
- Marsh, H. W., Wen, Z., & Hau, K.-T. (2004). Structural equation models of latent interactions: Evaluation of alternative estimation strategies and indicator construction. *Psychological Methods*, 9(3), 275–300. [\[CrossRef\]](#)
- Matsuoka, H., Kang, T., Oshimi, D., & Hahm, J. (2024). What motivates residents' approval of hosting another winter mega-sporting events? *Current Issues in Tourism*. [\[CrossRef\]](#)
- Matthews, J. J. K., & Pike, E. C. J. (2016). What on Earth are they doing in a racing car? Towards an understanding of women in motorsport. *The International Journal of the History of Sport*, 33(13), 1532–1550. [\[CrossRef\]](#)
- McGillivray, D., Edwards, M. B., Brittain, I., Bocarro, J., & Koenigstorfer, J. (2019). A conceptual model and research agenda for bidding, planning, and delivering major sport events that lever human rights. *Leisure Studies*, 38(1), 175–190. [\[CrossRef\]](#)
- 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. [\[CrossRef\]](#)
- Mollah, M. R. A., Cuskelly, G., & Hill, B. (2021). Sport tourism collaboration: A systematic quantitative literature review. *Journal of Sport and 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.
- Naess, H. E. (2014). *A sociology of the world rally championship: History, identity, memories and place*. Springer. [\[CrossRef\]](#)
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Oshimi, D., Yamaguchi, S., Fukuhara, T., & Taks, M. (2024). Role of risk perception on trust, event impact experiences, and event support in the Tokyo 2020 Olympics during COVID-19 outbreak. *Sport Management Review*, 1–22. [\[CrossRef\]](#)
- Parent, M., & Chappelet, J. L. (Eds.). (2015). *Routledge handbook of sports event management*. Routledge. [\[CrossRef\]](#)
- Patterson, I., & Balderas-Cejudo, A. (2022). Tourism towards healthy lives and well-being for older adults and senior citizens: Tourism Agenda 2030. *Tourism Review*, 78(2), 427–442. [\[CrossRef\]](#)
- Pearce, P., Moscardo, G., & Ross, G. (1996). *Tourism community relationships*. Pergamon.
- Peric, M., & Vitezic, 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. [\[CrossRef\]](#)
- Pflugfelder, E. H. (2009). Something less than a driver: Toward an understanding of gendered bodies in motorsport. *Journal of Sport and Social Issues*, 33(4), 411–426. [\[CrossRef\]](#)
- Piggott, L. V., Hovden, J., & Knoppers, A. (2024). Gender exclusion and inclusion in sport organizations. In *Sociological thinking in contemporary organizational scholarship*. Emerald Publishing. [\[CrossRef\]](#)
- Prayag, G., & Savalli, M. (2021). Residents' perceptions of event impacts and support for the 2012 formula one grand prix in Monaco. In D. Gursoy, R. Nunkoo, & M. Yolal (Eds.), *Festival and event tourism impacts* (pp. 139–153). Routledge.
- Ramos-Ruiz, J. E., Solano-Sánchez, M. Á., Castaño-Prieto, L., & Aguilar-Rivero, M. (2024). Gender bias in residents' perceptions and support of Rally Event Tourism: The Sierra Morena Rally of Cordoba, Spain. *Administrative Sciences*, 14(11), 289. [\[CrossRef\]](#)
- 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. [\[CrossRef\]](#)
- Riley, B., Rimmer, J. H., Wang, E., & Schiller, W. J. (2008). A conceptual framework for improving the accessibility of fitness and recreation environments for people with disabilities. *Disability and Health Journal*, 1(1), 49–56. [\[CrossRef\]](#)

- Ritchie, B. W., Shipway, R., & Cleeve, B. (2009). Resident perceptions of mega-sporting events: A non-host city perspective of the 2012 London Olympic Games. *Journal of Sport and Tourism*, 14, 143–167. [[CrossRef](#)]
- Rousseeuw, P. J. (1987). Silhouettes: A graphical aid to the interpretation and validation of cluster analysis. *Journal of Computational and Applied Mathematics*, 20, 53–65. [[CrossRef](#)]
- Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting Structural Equation Modeling and Confirmatory Factor Analysis Results: A Review. *The Journal of Educational Research*, 99(6), 323–338. [[CrossRef](#)]
- Singh, R. P., Chowdarhy, N., & Gursoy, D. (Eds.). (2021). *An SPSS guide for tourism hospitality and events researchers*. Routledge. ISBN 978-0-367-23657-1.
- Smirnov, N. (1948). Table for estimating the goodness of fit of empirical distributions. *The Annals of Mathematical Statistics*, 19(2), 279–281. [[CrossRef](#)]
- Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25(2), 173–180. [[CrossRef](#)]
- Stončkaitė, I. (2022). Baby-boomers hitting the road: The paradoxes of the senior leisure tourism. *Journal of Tourism and Cultural Change*, 20(3), 335–347. [[CrossRef](#)]
- Tan, P. N., Steinbach, M., & Kumar, V. (2019). *Introduction to data mining* (2nd ed.). Pearson. ISBN 978-0-273-77532-4.
- Vaaranen, H. (2004). The emotional experience of class: Interpreting working-class kids' street racing in Helsinki. *The Annals of the American Academy*, 595(1), 91–107. [[CrossRef](#)]
- Wang, X., Qiao, G., & Lu, Y. (2024). Sustainable development of non-nega international sports events in a small town: Social impacts, residents' attitudes, and leveraging role of local government. *International Journal of Tourism Research*, 26(4), e2699. [[CrossRef](#)]
- Weed, M. (2003). Why the two won't Tango! Explaining the lack of integrated policies for sport and tourism in the UK. *Journal of Sport Management*, 17(3), 258–283. [[CrossRef](#)]
- Weed, M. (2006). Sports tourism research 2000–2004: A systematic review of knowledge and a metaevaluation of methods. *Journal of Sport & Tourism*, 11(1), 5–30. [[CrossRef](#)]
- Weed, M. (2009). Progress in sports tourism research? A meta-review and exploration of futures. *Tourism Management*, 30(5), 615–628. [[CrossRef](#)]
- Weed, M. (2014). After 20 years, what are the big questions for sports tourism research? *Journal of Sport & Tourism*, 19(1), 1–4. [[CrossRef](#)]
- Yamashita, R., & Hallmann, K. (2024). Residents' trust, perceived benefits and support for mega-sporting events: Insights from the Tokyo Olympic and Paralympic Games. *International Journal of Event and Festival Management*, 15(4), 575–589. [[CrossRef](#)]

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