Event Sustainability And Transportation Policy: A Model-Based Cluster Analysis For A Cross-Comparison Of Hallmark Events

Abstract

Transportation is one of the main topics in the wide-ranging theme of event sustainability. The aim of this article is to make a contribution towards the evaluation of the sustainable transportation policies of hallmark events implemented by the organizers, to establish an accurate and objective methodology for a cross-comparison. The organizers, policy makers and the hosting community are the main stakeholders interested in an evaluation of the degree of sustainability implicit in the mobility policy of an event. Using a sample of periodical Italian hallmark events, a non-hierarchical model-based clustering is performed, and then examined to determine whether there is a difference in the distribution of a selection of auxiliary variables among the clusters. The results show that neither the visitors' number, nor the inhabitants' number in the host city, is associated with the clustering membership. However, the theme of the event appears to be associated with the estimated partition.

Highlights:

- Transportation is one of the main issues involved in event sustainability.
- An evaluation of the sustainable transportation policies of hallmark events is of interests to organizers, policy makers and the hosting community.
- A model-based cluster analysis makes it possible to objectively compare the transportation policies of different events.
- Application to a sample of periodical Italian hallmark events shows that the theme of the event is associated with the estimated clustering, whereas the number of visitors and the number of inhabitants are independent of such a partition.

Keywords: event sustainability; festival; triple bottom line; sustainable transportation; sustainable mobility; model-based clustering; finite mixture model

1. Introduction

In recent years special events and festivals have increasingly come to be seen as an instrument for local development, thanks to their impact on the local economy (Bracalente et al., 2011; Burgan & Mules, 2001; Dwyer, Mellor, Mistilis, & Mules, 2000b; Getz, 2008; Lee & Taylor, 2005; Lee, 2007; O'Sullivan & Jackson, 2002; Tyrrel & Ismail, 2005), as well as their intangible benefits, such as a boost to the image and the reputation of the host city, a sense of pride in the local community, and improved social cohesion (Arnegger & Herz, 2016; Dwyer, Mellor, Mistilis, & Mules, 2000a; Boo & Busser, 2005; De Bres & Davis, 2001; Dwyer et al., 2000a).

Aside from these positive aspects, however, special events can also generate negative consequences (Chen, 2011; Delamere, Wankel, & Hinch, 2001; Fredline & Faulkner, 2000; Hall, 1992; Kim, Jun, Walker, & Drane, 2015). Some of these, such as the degree to which local residents are inconvenienced for the duration of the event, are to a large extent unquantifiable, while others can be quantified, albeit with difficulty, such as the additional explicit – and implicit – costs incurred for local government, and therefore the community as a whole (Andersson & Lundberg, 2013; Chirieleison & Montrone, 2013). An awareness of negative social and environmental impacts has led to increasing attention paid to the issue of event sustainability (Arcodia, Cohen & Dickson, 2012; Dickson & Arcodia, 2010a; Dredge & Whitford, 2010; Getz, 2009; Hall, 2012).

While the theme of sustainability in tourism studies has been present in the literature for a number of years (Buckley, 2012; Clarke, 1997; Hunter & Green, 1995; Hunter, 1997), it has only recently emerged in event studies, and is still at an early stage. However, the extent of research in this field is rapidly growing, in parallel with the interest of practitioners and policy makers (Dickson & Arcodia, 2010; Getz, 2009; Hall, 2011, 2012; Musgrave, 2011; Raj & Musgrave, 2009).

Among event sustainability issues, one of the most relevant is that of transportation and visitor mobility, which significantly affects all three dimensions of sustainability (Dolf & Teehan, 2015; Hall, 2011; Høyer, 2000; Laing & Frost, 2010; Latoski, Dunn Jr, Wagenblast, Randall, & Walker, 2003; Litman & Burwell, 2006; Litman, 1999; Robbins, Dickinson, & Calver, 2007). Firstly, there is the economic impact for the organizers and the public administration, due to the necessity to provide an alternative mode of transport to private cars. Secondly, the social impact on local inhabitants, due to traffic congestion and displacement of residents in the use of public transportation. Thirdly, the environmental impact due to polluting emissions and a deterioration of air quality (Jeon & Amekudzi, 2005; Low, Gleeson, & Whitman, 2002; Zheng, Atkinson-Palombo, McCahill, O'Hara, & Garrick, 2011; Zheng, Garrick, Atkinson-Palombo, McCahill, & Marshall, 2013). As a consequence, choices in terms of visitor mobility can decisively influence the overall level of sustainability of an event (Robbins et al., 2007).

Moreover, while transportation issues can theoretically arise with relation to all special events, the size of the event can be a key factor. In general small events involve the movement of a small number of people, who often come from a local catchment area, and thus do not have a massive effect in terms of transportation sustainability. On the contrary, mega-events (i.e. Olympic Games, World Fair, mega sporting events, etc.), which move huge masses of people from all over the world, can cause enormous sustainable transportation challenges; however, in the recent years organizers and the policy makers, who are becoming progressively more aware of the issue, are increasingly committed to developing specific sustainable transportation management policies in the case of mega-events, with the explicit aim of reducing negative impacts (Currie, Jones, & Woolley, 2013, 2015; Hall & Hodges, 1996; Hall, 2011; Jones, 2014; Li, Lv, & Yan, 2012; Menezes & Souza, 2014; Mol, 2010; Yannis, Golias, Spyropoulou & Rogan, 2009). Indeed, hallmark events (Ritchie, 1984; Getz, Svensson, & Gunnervall, 2012; Hall, 1989, 1992; Ritchie & Beliveau, 1974) risk being stuck in the middle: even if the movement of hundreds of thousands of people can lead to significant mobility and transportation problems, dedicated policies are not necessarily provided for, and such events are sometimes organized by non-professional subjects (i.e. NGOs) that lack the competences to address the issue with adequate attention. Moreover, as these events are often periodical, thanks to their repetitive nature, they are an ideal field in which to develop and improve best practices in sustainable mobility, which are potentially adaptable to the wider field of tourism transport. Thus, such events can be a very interesting subject of study.

While many of the factors influencing visitors' choice of mode of transportation are exogenous with respect the event organizers, i.e. the existing infrastructure or individual preferences (Masiero & Zoltan, 2013; Schneider, 2013), others can be influenced by opportune policies, especially if designed in cooperation with local policy makers and other relevant stakeholders. Nevertheless, undertaking a proper and objective evaluation of such policies is not easy, in particular from the perspective of a comparison between different events. As a result, also due to undeniable methodological difficulties, this issue has yet to be adequately addressed in the literature.

Moreover, it is worth noting that even excellent mobility policies, if not adequately communicated to the audience of an event, risk resulting in failure. Therefore, communication plays a key role and also should be considered. Among the media used to

inform actual and potential visitors about mobility issues, and pull them towards the use of sustainable transportation modes, the event web site is undoubtedly one of the most important (Filo, Funk, & Hornby, 2009; Hoyle, 2002; Shanka & Taylor, 2004; Smith, 2007, 2008; Zarei & Yusof, 2014), in particular for hallmark events, the audience for which often arrives from outside the region, and is therefore not familiar with local transport. Various studies have taken into account online event communication (Devine, Bolan, & Devine, 2009; Filo, Funk, & Hornbt, 2009; Smith, 2008), but none of these specifically focused on sustainable transport issues.

In this framework, the main purpose of this study is to make a contribution towards the evaluation of the sustainable transportation policies of hallmark events, as carried out by the organizers, and communicated through their websites, with the aim of establishing an accurate and objective methodology for a cross-comparison. In particular, this paper proposes the use of a cluster analysis, a widely used method in event studies (i.e. Chen, 2011; Fredline & Faulkner, 2000; Fredline & Faulkner, 2001; Pérez & Nadal, 2005). For the purposes of this analysis, a model-based clustering approach is adopted (McLachlan and Peel, 2000; Everitt, Landau, Leese, & Stahl, 2011). In this methodology, a formal statistical model for the population is postulated, while allowing for the presence of a number of subpopulations that represent the "clusters". This can be expressed through a finite mixture model, in which each cluster corresponds to a component of the mixture with associated mixing weights. The probability distribution for each component is often assumed to be equal across components, but with different parameters that must be estimated from the data. The main advantage of such an approach is that it is explicitly based on the formal statistical model, which allows direct inference. In particular, the determination of the number of clusters can be pursued by model selection criteria. Furthermore, the final clustering partition can be accompanied with posterior probabilities of cluster membership for each observation.

The proposed model-based clustering will be applied to a sample of twenty events in Italy, chosen from among the most visited periodical hallmark events in the country. After ordering the clusters based on their sustainability, a descriptive analysis of auxiliary variables is performed in order to search for any association with the estimated partition. Particular attention is devoted to the study of the characteristics of events assigned to the most sustainable cluster.

The paper is organized as follows.

The second section features a brief summary of the literature, focusing firstly on event sustainability issues, and secondly on the linkage between transportation and events sustainability.

The third section, following the identification of key issues related to transportation sustainability, proposes a method for a cross-comparison between events, in terms of sustainable transport policies.

The fourth section applies the methodology to a sample of twenty periodical hallmark Italian events and discusses the results.

Finally, some conclusions are drawn in the closing section, which highlight the policy implications, the limits of the analysis, and indications for further research.

2. Literature review

2.1. From the positive impact of events to events sustainability issues

Special events and festivals have increasingly been studied in literature, giving rise to a huge number of theoretical and empirical studies (Getz, Andersson, & Carlsen, 2010; Getz & Page,

2014; Getz, 2005, 2008; Wilson & Arshed, 2016), also due to the awareness that they confer significant benefits on the hosting region.

Firstly, events can be seen as a powerful tool for attracting tourists, thanks to their appeal, which can completely or partially motivate travel, thus increasing the number of visitors to a region (Chirieleison, Montrone, & Scrucca, 2013; Dwyer et al., 2000a; Felsenstein & Fleischer, 2003). Events can also help to develop a more profitable distribution of tourist flows, by enhancing the average length of stay, deseasonalizing arrivals, and balancing the typical seasonal drop in tourism demand off-peak season (Connell, Page, & Meyer, 2015; Getz, 2005; Ritchie & Beliveau, 1974). As a consequence, special events can (directly or indirectly) generate a significant economic impact in the territory, thanks to visitor demand for goods and services at a local level in various sectors, such as hospitality, dining, retail, arts and crafts, transport, etc. This demand leads to an increase in employment, and wealth creation and distribution, thus generating a positive multiplicative effect for the local economy, and dozens of studies in the literature are devoted to its measurement and evaluation (Arnegger & Herz, 2016; Bracalente et al., 2011; Ritchie, 1984; Dwyer, Forsyth, & Spurr, 2006a, 2006b; Dwyer et al., 2000b; Lee & Taylor, 2005; Lee, 2007; O'Sullivan & Jackson, 2002; Tyrrel & Ismail, 2005).

Secondly, from a less material perspective, events can contribute to improving the visibility and distinctiveness of the host town, thus enhancing its attractiveness and competitiveness as a tourist destination (Arnegger & Herz, 2016; Jago, Chalip, Brown, Mules, & Ali, 2003; Simeon & Buonincontri, 2011). Indeed, events emerge as a key feature to differentiate a destination on the national and international scene in the context of growing competition (Getz & Page, 2014). These positive effects can be seen not only during the days when the event takes place, but also in the long term, and indeed also in structural terms (Arnegger & Herz, 2016; Boo & Busser, 2005; Jago et al., 2003; McCartney, 2005).

Thirdly, beyond tourism, the organization of events, particularly hallmark and mega-events, can sometimes accelerate urban requalification processes, stimulate improvements in infrastructure, and represent an opportunity for extraordinary intervention, in terms of cultural heritage and the landscape, which is also to the benefit of local inhabitants (Burbank, Andranovich, & Heying, 2002; Chen & Spaans, 2009; Gold & Gold, 2015; Hall, 2004; O'Halloran, 2014; Preuss, 2007; Wu, Li, & Lin, 2016).

Finally, from a social point of view, some special events are the visible evidence of the immaterial heritage of a community, and thus act as a celebration that reinforces traditions, civic pride and cohesion, with a positive impact on shared intangible values (De Bres & Davis, 2001; Derrett, 2003; Dwyer et al., 2000a; Kim et al., 2015; Richards, 2007; Small, 2007).

Alongside this, thanks to the wide spread of the Triple Bottom Line approach (Elkington, 1997), the literature and practitioners are becoming increasingly aware that events give rise to significant sustainability issues, due to possible social and environmental negative impacts (Dickson & Arcodia, 2010; Gaffney, 2013; Getz, 2009; Hall, 2012; Hede, 2007; Heitmann & Dávid, 2010; Jones, 2014; Musgrave, 2011; Raj & Musgrave, 2009; Stettler, 2011; Whitson & Horne, 2006; Yuan, 2013).

With respect to social impact, various recent studies in the literature have highlighted the criticalities raised by special events, and major events in particular, for the hosting community (Chen, 2011; Hall & Hodges, 1996; Taks, 2013; Waitt, 2003; Whitson & Horne, 2006). The relevance of this issue is attested to by the numerous attempts made in the literature to evaluate this social impact, in both qualitative and quantitative terms (Andersson & Lundberg, 2013; Delamere, 1997; Fredline, Raybould, Jago, & Deery, 2005; Kim et al., 2015; Rollins & Delamere, 2007; Small, 2007; Waitt, 2003). Among the main disadvantages that can be cited at a local level are traffic congestion, pressure on services and infrastructure, with a consequent decreased in use by residents, and a reduced quality of life for local people during

the days when the event takes place (Hall & Hodges, 1996; Small, Edwards, & Sheridan, 2005). Moreover, the organization of an event can also generate direct costs for the community. On the one hand, events – and cultural events in particular – often benefit directly from local public funding, raising opportunity cost questions (Felsenstein & Fleischer, 2003; Mules & Dwyer, 2005; Whitson & Horne, 2006) and, on the other, some costs related to event organization are typically indirectly supported by the Municipality, in order to guarantee that the event runs smoothly, such as extra wages for policing, rubbish collection and cleaning costs, assistance and aid (Chirieleison & Montrone, 2013). Finally, undesirable socio-cultural impacts can emerge, as in the case where the "touristification" of an event reduces its authenticity (Jansen-Verbeke, 2009; Thompson & Matheson, 2008; Xie, 2004) and compromises its long-term legitimacy, as the event becomes out of step with local residents. In particular, when historical commemorations, religious and folkloristic events become a mass product, they can lose their authentic relationship with the community, and even their reason to exist (De Bres & Davis, 2001; Derrett, 2003; McCartney & Osti, 2007; Richards, 2007).

With respect to environmental impacts, special events can determine an intensive use of energy and natural resources, and generate atmospheric and water pollution, not to mention an increase in waste and noise (Adema & Roehl, 2010; Collins, Jones, & Munday, 2009; Hottle, Bilec, Brown, & Landis, 2015; Kulshrestha, Nageswara Rao, Azhaguvel, & Kulshrestha, 2004; Kuo, Lee, & Lai, 2006; Laing & Frost, 2010; Wang, Zhuang, Xu, & An, 2007). Mega-events have also recently been accused of being co-responsible for contributing to climate change (Collins et al., 2009; Dolles & Söderman, 2010). Various methodologies have been proposed in the literature to evaluate and measure the environmental impact of event organization, such as its ecological footprint (Collins & Flynn, 2008; Dolf & Teehan, 2015; Gössling, Hansson, Hörstmeier, & Saggel, 2002; Wackernagel & Rees, 1998), environmental impact assessment (Ahmed & Pretorius, 2010; Hunter & Green, 1995; Tang, Lo, Cheung, & Lo, 2009), carrying capacity concept (Lee & Graefe, 2003; Lindberg, McCool, & Stankey, 1997; O'Reilly, 1986), and environmental input output tables (Collins, Flynn, Munday, & Roberts, 2007; Collins et al., 2009).

Following this growing attention, studies devoted to event sustainability are spreading rapidly, progressively moving the attention of organizers and policy makers towards responsible event management (Adema & Roehl, 2010; Arcodia et al., 2012; Dredge & Whitford, 2010; Gaffney, 2013; Okech, 2011), which is also pulled by visitor awareness and behavioral implications (Horng & Hu, 2014; Kim, Borges, & Chon, 2006; Laing & Frost, 2010; Song, Lee, Kang, & Boo, 2012; Wong, Wan, & Qi, 2015).

2.2. Events sustainability and transportation

In this framework, the limited existing literature, and the results of a range of empirical research, demonstrate that – while little studied – transportation is one of the main topics in the wide theme of tourism and event sustainability, from all the perspectives of the triple bottom line: the social, environmental, and economic (Becken, Frampton, & Simmons, 2002; Black, 1996; Dolf & Teehan, 2015; Gössling et al., 2002; Gronau & Kagermeier, 2007; Høyer, 2000; Laing & Frost, 2010; Robbins et al., 2007).

From the social perspective, the transportation choices made by the event's visitors significantly influences the degree of nuisance for local inhabitants (Robbins et al., 2007). Particularly in case of events with hundreds of thousands of visitors, the impact on urban traffic can be disrupting (Andranovich, Burbank, & Heying, 2001; Currie & Shalaby, 2012; Gaffney, 2013; Menezes & Souza, 2014; Müller, 2015; Yannis, Golias, Spyropoulou & Rogan, 2009).

From the environmental perspective, the use of unsustainable modes of transport, and private cars in particular, to reach the event can generate significant pollution outcomes, bringing the level of fine particles and other air pollutants over the allowed limit, with a related threat to the public health (Banister, 2008; Horng & Hu, 2014; Jeon & Amekudzi, 2005; Low et al., 2002; Richardson, 2005; Zheng et al., 2011, 2013).

From the economic perspective, on the one hand poor transportation management can discourage potential visitors from taking part in the event, with an evident effect on the direct income of the organizers and the economic impact on the territory, while on the other public costs are be to be incurred, in order to limit and manage congestion, i.e. extra-wages for city police (Chirieleison & Montrone, 2013; Menezes & Souza, 2014). Moreover, some recent studies appear to show a positive correlation between events sustainability and the attitudes and behavior of visitors, i.e. in terms of overall satisfaction or revisit intentions (Cole & Chancellor, 2009; Dickson & Arcodia, 2010b; Kim et al., 2006; Laing & Frost, 2010; Mair & Laing, 2012; Mol, 2010; Song et al., 2012).

Therefore, the growing attention to topics of sustainability – which represent one of the major challenges for the future development of event management – highlights the importance of the transportation issue, which may have a strong linkage with the event's success, its legitimacy and public and community support (Prayag, Hosany, Nunkoo, & Alders, 2013). A core problem is that of how to induce a change in the transportation mode away from private cars (Høyer, 2000). Indeed, while the definition of a sustainable transportation system varies in the literature, there is a wide consensus that private cars are at the bottom of the pyramid (Black, 2010; Jeon & Amekudzi, 2005). However, sustainable transport policies and studies focus primarily on the reduction of the use of individual motorized transport with regard to daily traffic, providing an attractive public transport offer, and improving the infrastructure for non-motorized traffic, while the attention paid to leisure induced mobility still remains quite low (Gronau & Kagermeier, 2007; Kagermeier & Gronau, 2015; Robbins et al., 2007). Various approaches are available to event organizers to face this relevant issue (Currie & Shalaby, 2012).

Firstly, even if one of the objectives of organizers is typically to attract the highest number of visitors, they could try to spread this out over the entire duration of the event, reducing the peak of the demand, which is in general concentrated during the weekend. This strategy requires appropriate event planning (i.e. different ticket prices, promotions, special venues, accommodation packages, etc.), but its effectiveness is strongly linked to the characteristics of the single event, in term of duration (i.e. number of days), theme (i.e. repeated shows or unique occurrences) and main audience (i.e. adults vs. retired or young people), as well as the incentives and the ability of the organizers themselves.

Secondly, to move the audience to a more sustainable mode of transport, event organizers could promote the non-use of private cars, i.e. encouraging primarily the choice of public transportation, but also car-pooling and bike sharing, or pedestrian mobility (Laing & Frost, 2010; Pratiwi, Zhao, & Mi, 2015), and also offering incentives for those that accept giving up their private car (i.e. discounts on production of a train ticket). In any case, it is worth noting that, particularly in the case of hallmark events that attract hundreds of thousands of visitors, the ordinary system of public transportation might collapse and, to offer an effective alternative to private cars, it may be necessary to enhance the offer, which requires the cooperation of local government authorities. However, any improvement of the public transportation offer beyond a certain threshold is hard to realize (Li et al., 2012; Menezes & Souza, 2014; Sinha, 2003), as when faced with a peak in demand in the case of special events, the public mobility offer tends to be constant and rather rigid, due to the contracts of transport employees and the capacity of the available vehicles. Moreover, additional services imply

costs that are typically directly or indirectly borne by the public administration, and thus again fall back on the local community (Zheng et al., 2011).

Thirdly, the organizers could establish a special alternative mobility offer. Indeed, many hallmark events, often incentivized by local municipalities, provide extra buses, shuttle bus connections with public transport, and so on. This additional service could be paid for by the event visitors themselves, or by the organizers, and be free of charge for the users, to incentive them to use it.

Finally, the organizers could choose to ignore mobility issues, regardless of the effects on the event's sustainability, but this might put its legitimacy at risk, due to a growing awareness among public opinion, the public authorities, and the visitors themselves.

From the perspective of visitors, the choice of transportation mode to an event is the result of a complex process, which is affected by a multiplicity of factors (Asensio, 2002; Böcker, Dijst, Faber, & Helbich, 2015; Collins & Chambers, 2005; Kagermeier & Gronau, 2015; Masiero & Zoltan, 2013; Schneider, 2013; Vos et al., 2015). Some of these are structural, and cannot easily be changed in the short term (i.e. infrastructure and accessibility of the location, availability and cost of public transportation, weather conditions, etc.), while others depend on the individual conditions of the visitors (number of persons travelling together, age, health condition, income, culture, etc.). In any case, it can be assumed that the policies of event organizers also have an influence, encouraging the use of sustainable transportation and promoting effective alternatives to mobility based on private cars (Kagermeier & Gronau, 2015; Kassens-Noor & Kayal, 2016).

However, any transportation policy risks having very little effect if not adequately communicated to visitors (Horng & Hu, 2014). Thus the degree to which the organizers clearly publicize the transportation alternatives, emphasizing and promoting the more sustainable options, could be decisive in their choice. Even those visitors theoretically willing to use sustainable modes of transport might give up, due to the lack of easily obtainable information on how to reach the event venue without their car. Various media can be used: newspapers, television, social media, newsletters, etc. (Kozak & Kozak, 2008). Among these, a fundamental role is played by the event website, which is often the first source of information for visitors in planning a journey (Devine et al., 2009; Filo et al., 2009; Kozak & Kozak, 2008; Moise & Cruceru, 2014; Shanka & Taylor, 2004; Smith, 2007, 2008; Zarei & Yusof, 2014). Moreover, the relevance of the event web site is even more important for hallmark events, whose audience is to a large extent composed of non-local inhabitants. Therefore, to implement sustainable transportation policies without properly communicating them on the event web site would be akin to not implementing such policies in the first place.

In general, few empirical studies have been conducted on the issue of sustainable transportation in the context of event organization. Furthermore, much of this research relates to mega-events, such as the summer or winter Olympic Games, or the World's Fair, the scale of which is far from typical. As a result the methodologies and results are not automatically applicable to smaller periodical events. Other studies that focus on a single event, while offering interesting indications on the linkage between transport and sustainability, do not allow for a comparison between different contexts (Asensio, 2002; Böcker et al., 2015; Currie & Shalaby, 2011; Frantzeskakis & Frantzeskakis, 2006; Gaffney, 2013; Latoski et al., 2003; Li et al., 2012; Menezes & Souza, 2014; Mol, 2010; Robbins et al., 2007; Shahin, Hüseyin, & Kemal, 2014; Xinhua, 2011; Yannis, Golias, Spyropoulou & Rogan, 2009).

In this framework the present article focuses on the sustainable transport policies implemented by event organizers, as communicated in their web sites, proposing a method that allows for an objective comparison of a number of periodical hallmark events.

While a comparison of the sustainable transportation policies of different events is not an easy task in methodological terms, it would be useful for organizers, for a pre- and post-event self-

assessment, in terms of effectiveness and as an instrument for benchmarking analysis (Adema & Roehl, 2010; O'Brien & Gardiner, 2006); for policy makers, whose role is to support the organizers in ensuring the smooth running of the event, maximizing positive and minimizing negative impacts (Dredge & Whitford, 2010; Getz, 2009); for the hosting community, which suffers inconvenience due to unsustainable mobility, and would be more likely to support a hallmark event if there was a commitment towards transportation sustainability (Prayag et al., 2013; Yu, Chancellor, & Cole, 2009).

3. Methodology

The main purpose is to group hallmark events based on their similarity in terms of the organizers' sustainable transportation policy, resulting from the presence or absence on their web sites of key issues related to sustainable mobility. Following this a cluster analysis, a statistical methodology widely used in event literature (see for instance Chen, 2011; Fredline & Faulkner, 2001; Fredline & Faulkner, 2000; Pérez & Nadal, 2005), is carried out. Unlike most other studies, in this case a model-based clustering approach was adopted (McLachlan and Peel, 2000) to estimate a finite mixture model which allows to make inference on the number of clusters, assign a probability of cluster membership to each event, and compute the corresponding uncertainty associated with this classification. Once the clusters have been estimated, these can be ordered based on a positive response to the selected features. Identified clusters of events are then compared in terms of sustainable transportation policies. Further analysis is performed by investigating whether events belonging to different clusters present distinguishing features, with particular attention to those classified in the cluster presenting a prevalence of commitment towards sustainable transportation.

3.1. Key issues related to the sustainable transportation policy of events

Firstly the main issues related to the sustainable transport policies implemented by the organizers were identified, and the research hypotheses were established.

An analysis of the literature (Banister, 2008; Høyer, 2000; Jeon & Amekudzi, 2005; Low et al., 2002; Menezes & Souza, 2014; Robbins et al., 2007; Zheng et al., 2011, 2013) identified the existence of five main key issues worthy of investigation related to the sustainable transportation policy of events:

a) the provision of information about alternative sustainable transportation modes to reach the event venue (i.e. by train, bus, metro, bicycle, etc.);
b) the organization of ad-hoc sustainable transportation at a local level from the arrival point (regardless of the transportation mode up to that point) to the event location (i.e. parking + shuttle; parking + bus; train + shuttle);
c) the organization of additional extra-local sustainable transportation (i.e. special buses; special trains);
d) the promotion of the use of sustainable mobility (i.e. providing links to car sharing, bike sharing, bus or train timetables);
e) incentivizing sustainable mobility, offering advantages for visitors choosing alternatives modes to private cars (i.e. ticket discounts or promotions on production of train or bus ticket).

For each of these five key issues a set of binary patterns to be searched for on event web sites were identified, labeled as follows:

1. "Inform": the web site offers information on how to reach the event location using a transportation mode other than by private car;
2. "Loc-Organize": organized sustainable transportation is provided from the arrival point to the event location;

3. "Ext-Organize": special extra-local sustainable transportation is arranged;
4. "Promote": the web site promotes the use of sustainable transportation and raises the awareness of visitors;
5. "Incentive": an incentive is provided for the use of sustainable transportation.

The assumption is that the more key issues are addressed on the event web site, the more the event can be considered committed to a sustainable transportation policy.

Finally, to verify whether those events more committed to sustainable transportation present similar characteristics, a search was conducted for auxiliary variables associated with the clusters assignment. Even if theoretically all hallmarks events raise issues linked to transportation sustainability, some circumstances could increase the commitment of organizers to dedicated policies.

Firstly, the higher the number of visitors, the more relevant transportation inconvenience could be (Preuss, 2007, 2011). Therefore, the hypothetical relationship is proposed as follows:

H1. The cluster assignment is associated with a higher number of visitors.

Secondly, in general the larger the hosting city, the harder it is to manage the mobility of thousands of visitors in addition to normal city traffic (Gold & Gold, 2015; Muñoz, 2006). Therefore, the hypothetical relationship is proposed as follows:

H2. The cluster assignment is associated with a higher number of inhabitants of the hosting city.

Finally, regarding the push factors, the organizers themselves might have a particular sensitivity towards sustainability, which could act as a pulling factor towards sustainable transportation policies. Since various studies show that the theme of the event is linked with the attitudes and values of the organizers, highlighting a relationship with sustainability (Kim et al., 2006; McKercher, Mei, & Tse, 2008), the hypothetical relationship is proposed as follows:

H3. The cluster assignment is associated with the theme of the event.

3.2. Statistical methods

Cluster analysis is a broad area of statistical methods which aims to discover groups of similar observations (Everitt et al., 2011). Classical methods assign a measure of dissimilarity among the observations, and then a hierarchical procedure is used for merging (agglomerative bottom-up methods) or dividing (divisive top-bottom methods) the observations into groups. Another popular approach is the K-means algorithm, which, for fixed number of clusters K, seeks the optimal partition of objects around K centroids. A different approach is pursued in *model-based clustering*, where it is assumed that the data are an i.i.d. sample from a population described by a probability density function. This density function is expressed as a finite mixture of parametric component density functions, each component modeling one of the clusters.

Model-based clustering for binary data, also known as *Latent Class Analysis*, assumes the following mixture model with K components:

$$p(\mathbf{x}) = \sum_{k=1}^{K} \pi_k \, f_k(\mathbf{x}; \mathbf{p}_k).$$

Under the local independence assumption, the component density function can be written as

$$f_k(\mathbf{x};\mathbf{p}_k) = \prod_{j=1}^{p} p_{kj}^{x_{kj}} (1-p_{kj})^{1-x_{kj}},$$

where $x_{kj} = 1$ if an attribute is present in the jth feature or variable for the kth component and 0 otherwise, and p_{kj} the associated probability of success.

Celeux & Govaert (1991) proposed a re-parameterization of the above model, which allows a rich set of models to be fitted. This is implemented in the `Rmixmod` package (Lebret et al., 2015) for the R statistical software environment (R Core Team, 2016), which returns parameters estimated by the method of maximum likelihood (McLachlan & Peel, 2000).

A crucial advantage of model-based clustering, compared to other methods such as hierarchical algorithms, is the sounded formal probability formulation, which allows for the evaluation and selection of the model that best approximates the data distribution. In particular, model selection involves both the model parameterization (among the ten available) and the number of mixture components or clusters. A popular model selection criterion is the *BIC* (Bayesian Information Criterion) (Schwarz, 1978), which is computed as

$$\text{BIC} = 2\ln\hat{\text{L}} - \nu\ln(n),$$

where $\ln\hat{\text{L}}$ is the maximized value of the log-likelihood function, ν is the number of free parameters to be estimated, and n is the sample size. This criterion penalizes the log-likelihood by model complexity, so the chosen model is the one maximizing the BIC criterion.

Having selected a final model, the probability of a data point $\mathbf{x}_i$ belonging to a given cluster can be easily computed as

$$\hat{\text{z}}_{ik} = \frac{\hat{\pi}_k f_k(\mathbf{x}_i;\hat{\mathbf{p}}_k)}{\sum_{g=1}^{K}\hat{\pi}_g f_g\left(\mathbf{x}_i;\hat{\mathbf{p}}_g\right)},$$

and then assigned to the cluster $\hat{\text{k}}$ according to the *MAP* (maximum-a-posteriori) principle, i.e. $\hat{\text{k}} = \arg_k\max \hat{\text{z}}_{ik}$. The *uncertainty* associated with the classification of one data point can be expressed as $u_i = 1 - \max\ \hat{\text{z}}_{ik}$ for $i = 1, \ldots, n$.

Finally, *entropy* can be used as a measure of overall uncertainty:

$$\text{Entropy} = -\sum_{k=1}^{K}\sum_{i=1}^{n} \hat{\text{z}}_{ik}\ln(\hat{\text{z}}_{ik}) \geq 0.$$

An optimal classification has minimum entropy equal to 0 when $\hat{\text{z}}_{ik} = 1$ for classification of the ith observation to cluster k and 0 elsewhere. Larger values of Entropy indicate higher clustering uncertainty.

The final clustering partition obtained is then used to assess whether the distribution of some selected auxiliary variables is different among the clusters. For categorical variables the chi-square test of independence (Agresti, 2007) is used with statistical significance (i.e. *p-value*) obtained by simulations as, due to the small sample size, most of the cells have frequencies of less than five. For numerical variables, the one-way ANOVA (Montgomery, 2013) is carried out to test the significance of cluster means, followed by the Tukey honest significant differences (HSD) test (Tukey, 1949), which allows to take into account issues arising from multiple comparisons. In all cases the significant level is set to the usual 5%. Failing to reject at the specified significance level implies that the distribution of an auxiliary variable is not statistically different among the clusters.

3.3.The selection of the sample

As previously discussed, hallmark events risk generating significant negative impacts both on the environment and the local hosting community, due to the unsustainable mobility choices of their visitors, who often arrive from outside the local district. For this reason it was decided to adopt a sample of major Italian periodical events. Unfortunately, as in many other countries, a reliable database of the periodic special events organized yearly across the national territory is not available.

Consequently, a database of the main Italian hallmark events staged in 2015 was created by conducting a web search, using four of the main international search engines (Google, Yahoo, Msn, Bing) and two of the main Italian search engines (Virgilio.it and Arianna.it). The use of a multiplicity of search engines reduced the possibility of overlooking key hallmark events. The resulting information was integrated with that retrieved from the main thematic portals (i.e. Eventreport.it; Italia-eventi.com; Italiafestival.it; etc.).

Given the aim of the analysis, only events that simultaneously present the following features were considered suitable:

1. repetitiveness: regular events cause periodical mobility problems that affect the hosting community, which attracts the attention of local government authorities; on the contrary, in the case of one-off special events, the organizers may be less interested in sustainable transportation issues, or be unable to produce ad-hoc policies. Thus, only events held annually at least have been taken into account;
2. duration longer than one day: it was considered that single day special events, in general, have a lower impact on urban traffic, and even serious inconvenience may be tolerable for such a limited period of time;
3. medium-sized or larger events: it is difficult to compare the scale of different events, because various criteria could be used (i.e. visitor numbers, length, cost for the organizers, income, etc.). As suggested by the prevailing literature (Getz et al., 2012; Hall, 1989; Jago & Shaw, 1998), visitor numbers were considered, and a threshold of at least 100,000 visitors to the most recent edition (as declared on the event web site) was established. While aware that the organizer estimates of visitors number are sometimes not completely reliable (Chirieleison et al., 2013; Davies et al., 2010; Raybould, Mules, Fredline, & Tomljenovic, 2000; Tyrrel & Ismail, 2005), they were accepted as being a good indication, and considered prudently, particularly in the case of free of charge events. In these cases, to verify visitor numbers, focused research was conducted on the local and national press review and, in the case of inconsistent results, the lowest data was considered.

Among the corresponding events, the first 20 by visitor numbers were considered in the sample. It was decided not to extend the sample size further, as the aim was to establish quality through in-depth analysis of the data. Table 1 shows the visitor numbers for each event in the sample, along with the location and number of inhabitants of the hosting municipality (in the case of multiple locations, the sum has been considered), the theme (adapted from Getz & Page, 2014 and Getz, 2005), the duration, and whether a ticket is required for access or entrance is free of charge.

Table 1. The events in the sample

Events	Visitors	Location		Inhabitants	Theme	Duration	Access
Notte Rosa (Pink Night)	2,000,000	Rimini, Forli, Cesena, Ravenna,	5 Cities	655,140	Entertainment	3 days	free

		Ferrara					
Carnival of Venice	860,000	Venice	City	263,736	Celebration (carnival)	20 days	free
Eurochocolate	800,000	Perugia	City	166,273	Entertainment (food festival)	10 days	free
Buskers Ferrara	800,000	Ferrara	City	133,398	Entertainment (music)	10 days	free
Umbria Jazz	450,000	Perugia	City	166,273	Entertainment (music)	10 days	free and ticket
Pizza Village	380,000	Naples	Metropolis	971,623	Entertainment (food festival)	6 days	free
Turin International Book Fair	340,000	Turin	Metropolis	890,133	Culture	5 days	ticket
Notte della Taranta (Taranta Night)	320,000	Melpignano	Village	2,237	Entertainment (music)	18 days	free and ticket
Motor Show	300,000	Bologna	City	384,202	Sport (recreational)	10 days	ticket
Summer Jamboree	300,000	Senigallia	Town	45,027	Entertainment (music)	8 days	free and ticket
Tocatì Festival	300,000	Verona	City	258,765	Culture (traditional culture)	4 days	free
International food and taste fair	220,000	Turin	Metropolis	890,133	Entertainment (food festival)	5 days	ticket
Philosophy Festival	207,000	Modena	City	184,973	Culture	3 days	free
Science Festival	180,000	Genoa	City	586,987	Culture	11 days	ticket
Italian Tennis International BNL	175,978	Rom	Metropolis	2,867,143	Sport (competition)	7 days	ticket
Lucca Comics & Games	150,000	Lucca	Town	89,196	Entertainment	4 days	ticket
Viareggio Carnival	150,000	Viareggio	Town	62,598	Celebration (carnival)	5 days	ticket
Cheese Festival	150,000	Bra	Town	30,224	Entertainment (food festival)	4 days	free and ticket
Literature Festival	119,000	Mantua	Town	48,690	Culture	5 days	free and ticket
MITO	115,000	Milan, Turin	2 Metropolis	2,235,039	Entertainment (music)	3 weeks	free and ticket

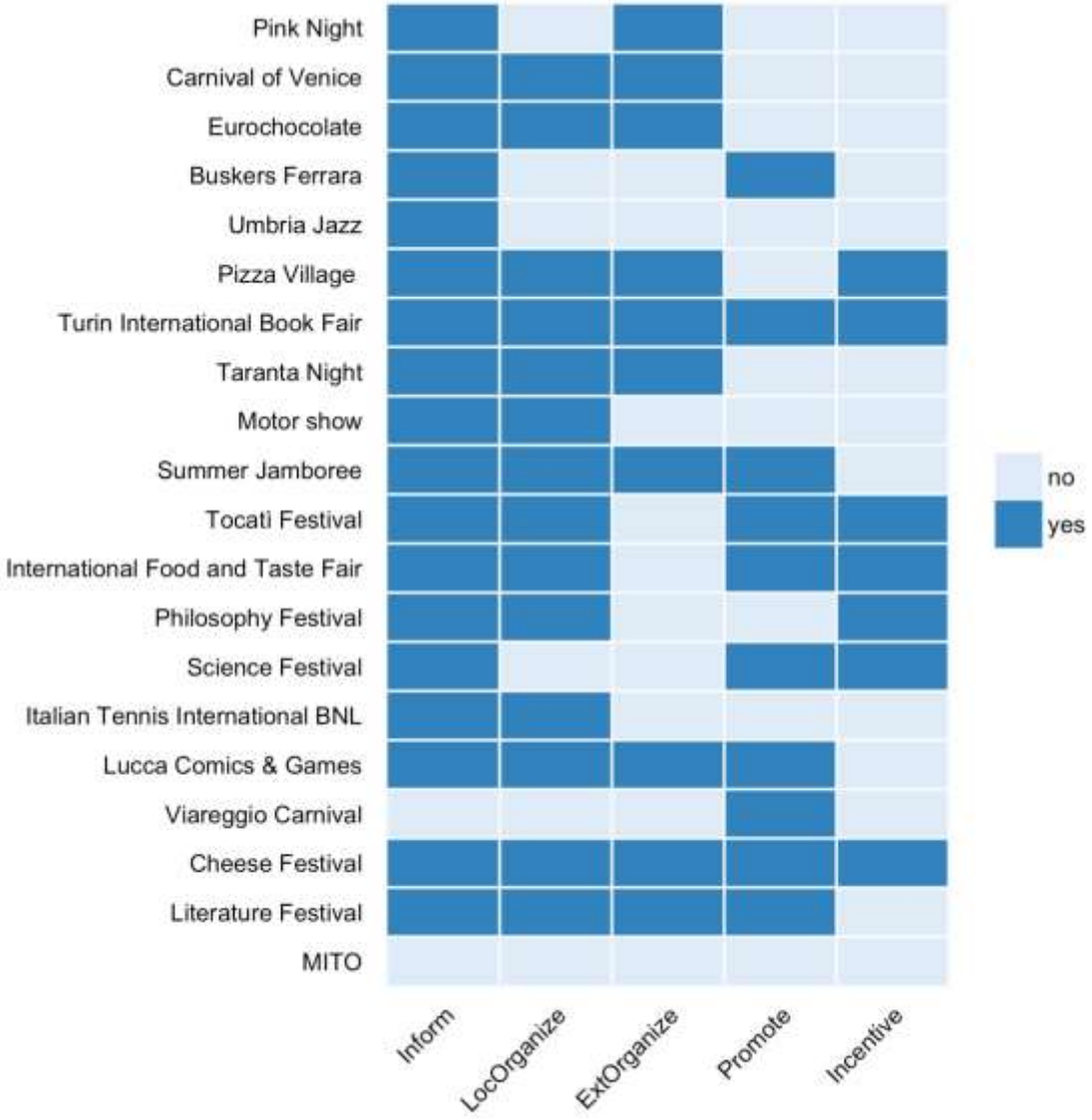
4. Results and analysis

4.1. Data collection

According to the main aim of the paper, data gathering was conducted on the official event web sites, typically the first interface for a visitor in search of information on how to reach an event's location, particularly if they are non-local. The analysis was conducted with reference to the 2015 editions of events.

A graphical representation of the collected data is reported in Figure 1. In this plot rows correspond to events (ordered by number of visitors), and columns to observed features. The presence (yes) or absence (no) of each key feature is indicated in different colors.

Figure 1. Collected and analyzed event data features

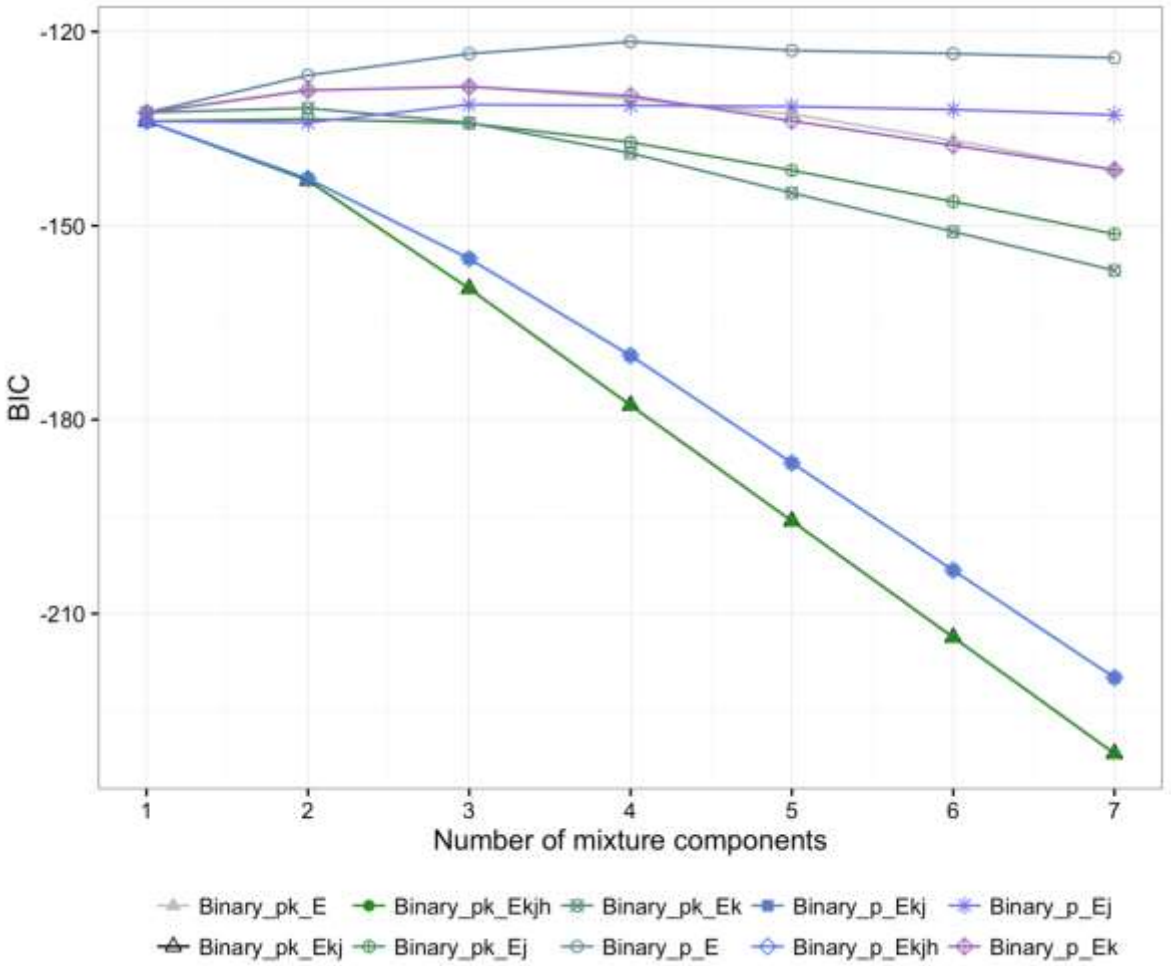


A very mixed situation becomes apparent from inspection of the observed data, with a number of events that are strongly committed to sustainable transportation complying with each of the key issues, while some other events appear not to be committed at all, even lacking any information on how to reach the venue with a sustainable mode of transportation.

4.2. Data analysis and discussion

The model-based clustering analysis for binary data, as discussed in Section 3.2, began by considering all the available model decompositions and the number of mixture components or clusters ranging from 1 to 7. Figure 2 shows the corresponding BIC values

Figure 2. BIC values to be used for selecting the clustering model for binary data



The model with the highest BIC value is the model with equal mixing proportion and complete independence, with respect to both the features and the components (`Binary_p_E`), and 4 components. However, models with 3, 5, and 6, components have BIC differences of less than 2 from the best model, so they also appear to be well supported by the data, according to the usual interpretation of BIC differences (Kass and Raftery, 1995). To decide which final model to adopt, the entropy of the classification (see Section 3.2) may be considered. As shown in Table 2, the model with 3 mixture components has the lowest overall uncertainty, and for this reason was the final model selected.

Table 2. Summary statistics for the models with the largest support from the data

Model	K	log-likelihood	BIC	BIC difference	Entropy
`Binary_p_E`	3	-60.22	-123.41	-1.86	13.12
`Binary_p_E`	4	-59.28	-121.55	0.00	18.52
`Binary_p_E`	5	-59.96	-122.91	-1.36	24.59
`Binary_p_E`	6	-60.20	-123.40	-1.85	27.30

Figure 3 shows the classification uncertainty for events grouped by cluster membership.

Figure 3. Clustering uncertainty of events grouped by cluster membership

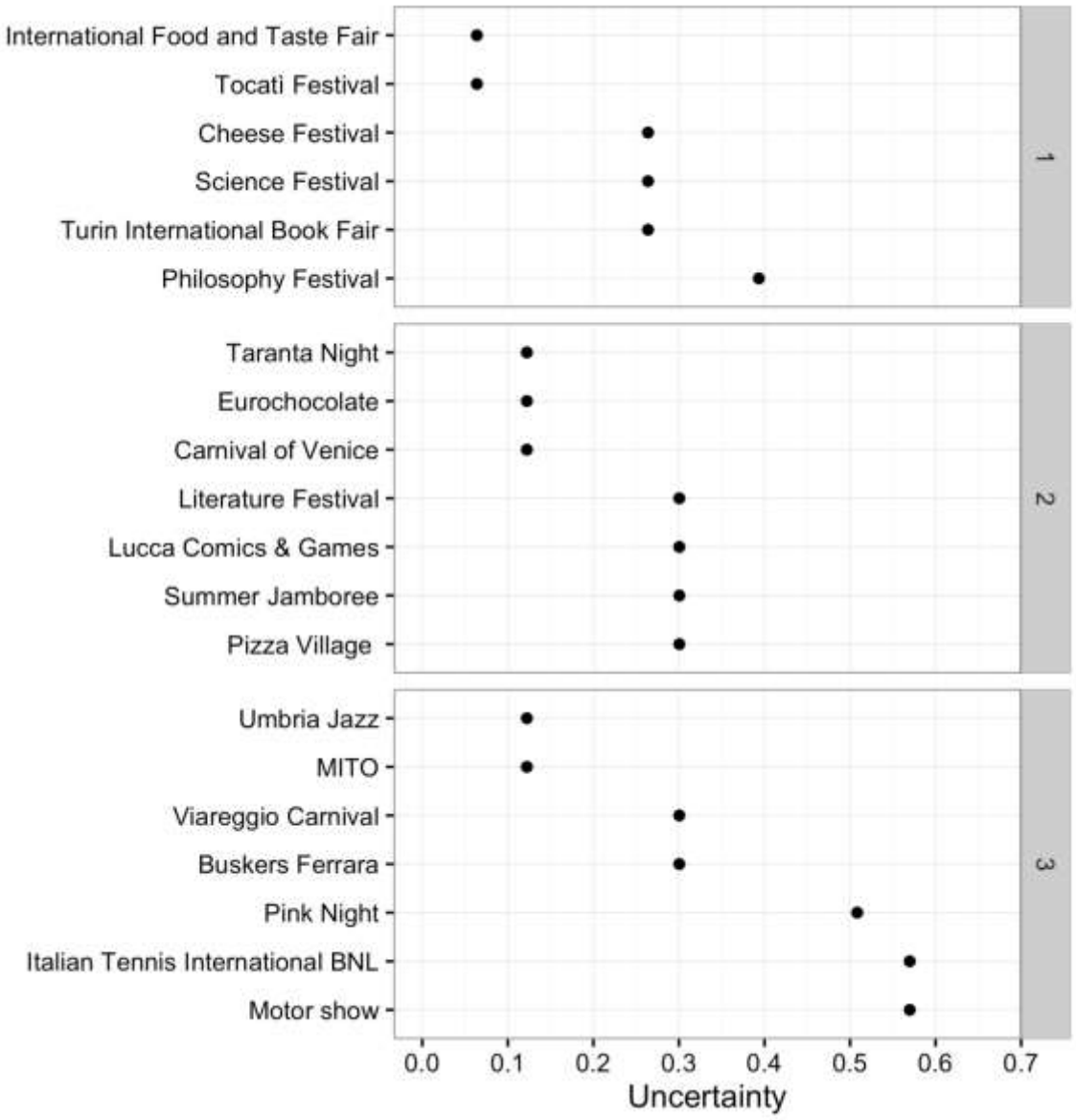
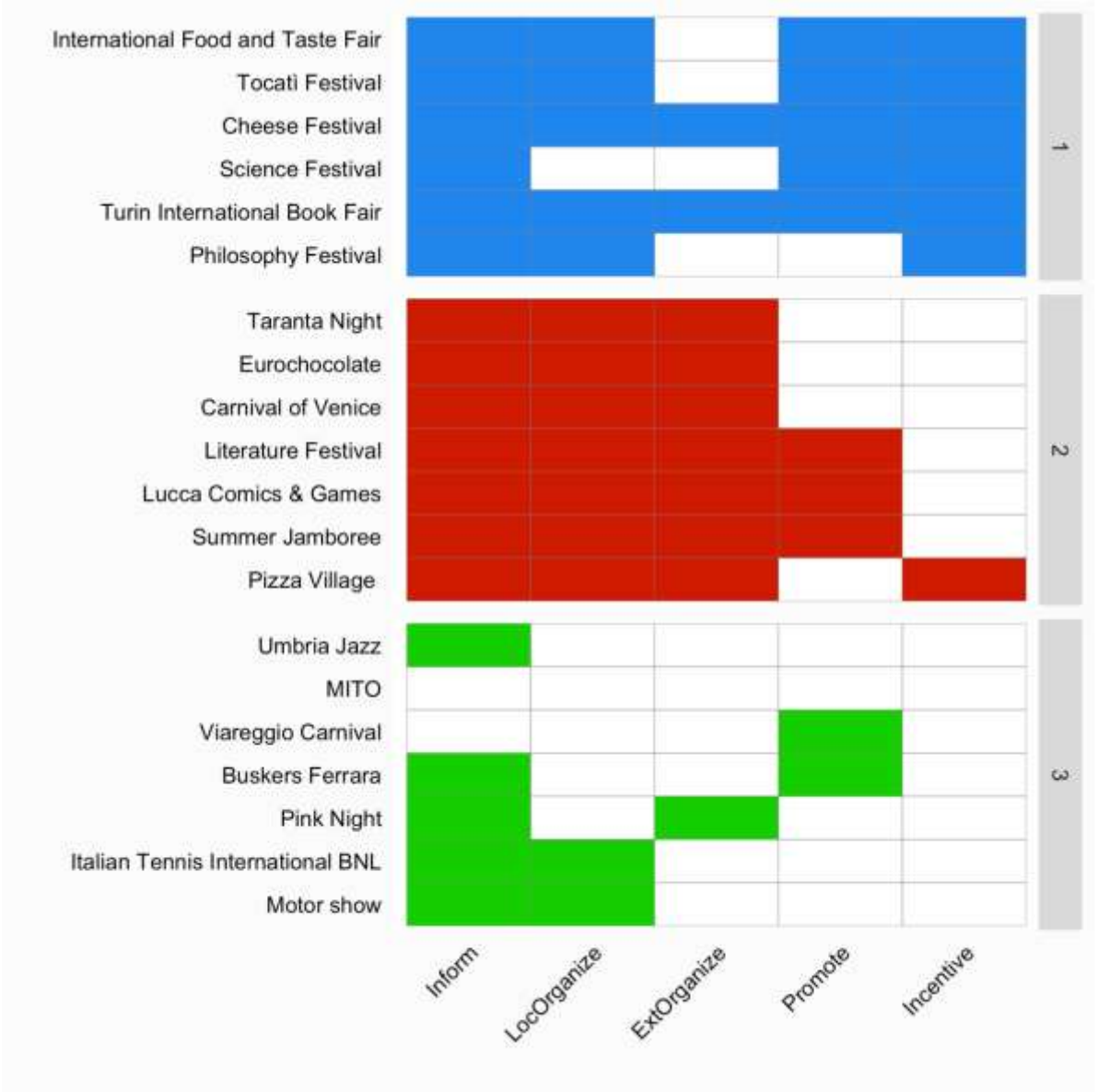


Figure 4 presents the estimated clusters of events, ordered by decreasing uncertainty within each cluster, and the corresponding feature values.

Figure 4. Graphical representation of collected data with events grouped by cluster membership and ordered by decreasing uncertainty within each cluster



It can be easily seen from this graph that the first cluster presents most of the features, whereas the last cluster is missing most of them. The situation for the second cluster is somewhat between the other two clusters. Note that clusters have been ordered based on the number of positive answers to the selected features. There is no loss in generality by applying this step, since any clustering model is identifiable up to a permutation of the group labels. In this case, the first cluster is the most sustainable, while the third is the least.

Following the analysis, it can be observed that cluster n. 1 is also the less numerous one, with only 6 events: the International Food and Taste Fair, The Tocatì Festival, the Cheese Festival, the Science Festival, The Turin International Book Fair, and the Philosophy Festival. It is worth noting that many of the events in this cluster are committed not only to informing visitors on how to reach the venue without private cars, and organizing local and/or extra-local sustainable modes of transportation (as those in cluster n. 2 do also), but they also actively promote and encourage sustainable mobility.

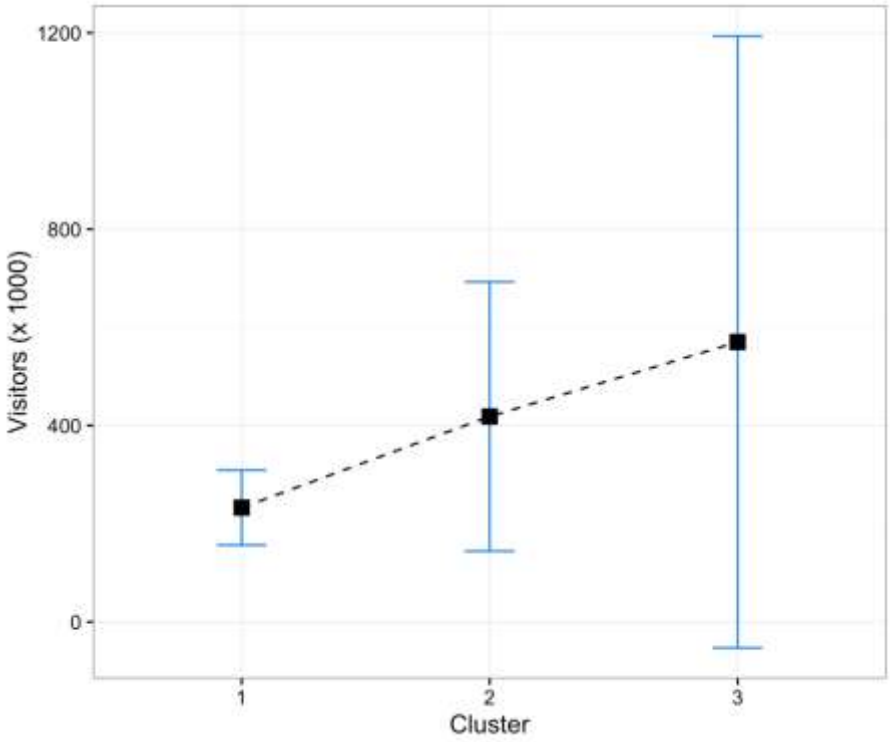
On the contrary, cluster n. 3 evidently groups events with poor sustainable transportation policies, which lack a significant commitment towards these issues.

Regarding the second research question, this investigates whether the average number of visitors is significantly different among clusters. As shown in Table 3, the ANOVA analysis indicates that the means are not statistically different (*p-value* 0.405). The graph in Figure 5 shows the average number of visitors in each cluster with the corresponding 95% confidence intervals. As can be seen, there is a large overlap of intervals, and a Tukey HSD test confirms that the means are not statistically different. Thus, the first hypothesis (**H1**) is not verified, as the presence in the best cluster is not associated with a higher number of visitors.

Table 3. ANOVA table for testing the significance of the mean differences for the number of visitors in each cluster

Effect	df	Sum Squares	Mean Squares	F value	*p-value*
Cluster	2	367654.36	183827.18	0.95	0.405
Residuals	17	3277742.75	192808.40		

Figure 5. Plot of the average number of visitors in each cluster with 95% confidence intervals



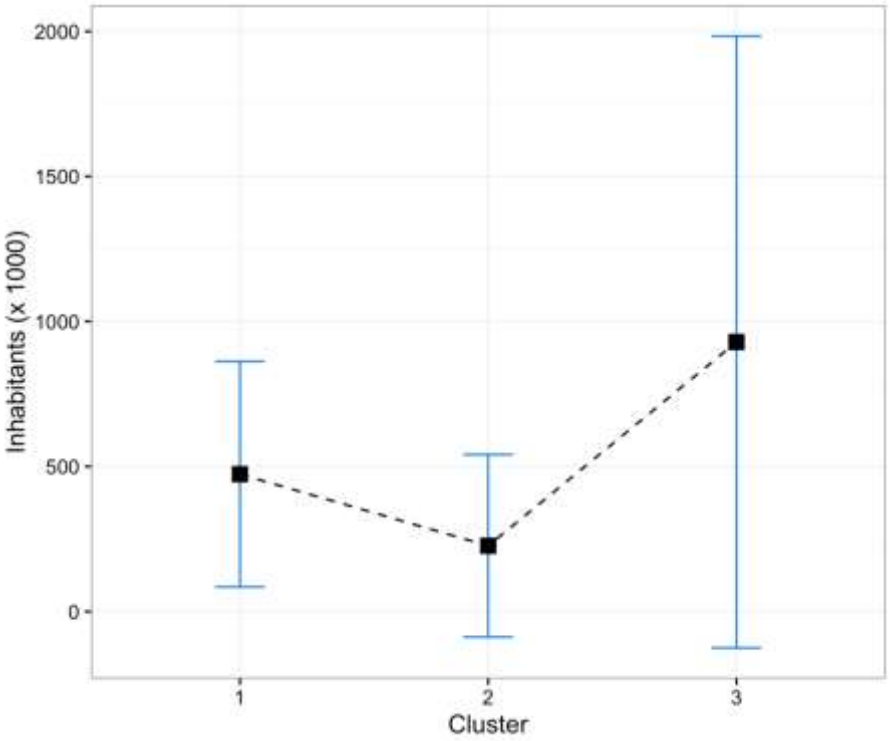
The same analysis was also conducted for the number of inhabitants (Table 4), and again there was no significant difference in the means within clusters (*p-value* 0.223). The plot in Figure 6 shows the average number of inhabitants in each cluster with the corresponding 95% confidence intervals. As in the previous case, both the graph and Tukey HSD test confirm that the means are not statistically different. Thus the second hypothesis (**H2**) is not verified, as the presence in the best cluster is not associated with a significantly different number of inhabitants in the hosting city.

Table 4. ANOVA table for testing the significance of the mean difference of the number of inhabitants in each cluster

Effect	df	Sum Squares	Mean Squares	F value	*p-value*
Cluster	2	1772672.70	886336.35	1.64	0.223

Residuals	17	9179142.63	539949.57

Figure 6. Plot of the average number of inhabitants in each cluster with 95% confidence intervals



Finally, the possibility of an association between the theme of the event and the estimated cluster membership was investigated. The corresponding cross-tabulated data are shown in Table 4, and a chi-squared test of independence indicates a marginally significant result (X^2 = 11.671, *p-value* = 0.0412; due to sparseness in the contingency table the *p-value* was simulated using 10000 resamples).

Table 5. Two-way contingency table of cluster membership and the theme of the event. The table reports the absolute frequencies and percentages by rows

Cluster	Theme				Sum
	Celebration	Culture	Entertainment	Sport	
1	0 (0.00%)	4 (66.67%)	2 (33.33%)	0 (0.00%)	6 (100%)
2	1 (14.29%)	1 (14.29%)	5 (71.43%)	0 (0.00%)	7 (100%)
3	1 (14.29%)	0 (0.00%)	4 (57.14%)	2 (28.57%)	7 (100%)

Therefore, the third hypothesis (**H3**) is verified, as a presence in the best cluster is associated with the theme of the events, and in particular cluster n. 1 is shown to include the most cultural events in the sample.
Furthermore, while the sample size necessitates caution in generalizing the conclusions, it does appear that pulling factors are more influential than pushing factors in moving event organizers towards sustainable transportation policies.

5. Conclusions

The organization of special events can lead to significant advantages for the hosting community, with regard to both economic and social impacts (Arnegger & Herz, 2016; Dwyer et al., 2000a). Nevertheless, they can also raise significant sustainability issues, and policy makers are increasingly interested in a triple bottom line assessment of special events (Andersson & Lundberg, 2013; Dredge & Whitford, 2010; Getz, 2009; Hall, 2012). As a consequence, sustainability will probably become one of the main challenges for event management in the next few years, also due to visitor awareness and behavioral implications (Horng & Hu, 2014; Kim, Borges, & Chon, 2006; Laing & Frost, 2010; Song, Lee, Kang, & Boo, 2012; Wong, Wan, & Qi, 2015).

As many authors have indicated, the choices of transportation mode made by the public are one of the main determinants of the overall impact of the event, in terms of sustainability (Kagermeier & Gronau, 2015; Laing & Frost, 2010; Low et al., 2002; Robbins et al., 2007). Visitors' mobility decisions are influenced by numerous factors (Hu & Schneider, 2015; Schneider, 2013). Besides structural factors, i.e. the infrastructure assets of the hosting region, and individual factors, i.e. age and health conditions of the visitors, the existence of specific policies introduced by the organizers to encourage the audience to use sustainable transportation also play a significant role. Moreover, as the event's web site is often the first (and sometimes the only) source of information used by visitors to obtain details (Devine et al., 2009; Moise & Cruceru, 2014; Smith, 2008) about how to reach the event venue, the presence or absence of key information that aims to encourage sustainable mobility can be a determinant in the decision made.

In this framework, the main purpose of the research was to propose a method which allows for an objective comparison of various events, in terms of sustainable transportation policies, through their website communications, and offer two sets of conclusions: general conclusions, regarding methodology, and specific conclusions, regarding the results obtained applying the method to a sample of Italian hallmark events.

With reference to the methodological approach taken, this research offers a useful contribution towards the development of an objective methodology for comparative analyses between different events with regard to the organizers' support for transportation sustainability. The statistical investigation proposed is a model-based clustering approach, where a formal statistical model is adopted to describe the clusters. This has the main advantage of readily available statistical inferential tools, both for the estimation of parameters, and the determination of the number of clusters.

Such a model does not require expensive research, while at the same time offering a useful yardstick for the evaluation of the key issues related to the sustainable mobility of events.

Moreover, integration with a successive analysis of association between event features that are conditional on the estimated clusters makes it possible to easily individuate the existence of any factors related to a greater commitment on behalf of the organizer to sustainable mobility policies. Both organizers and policy makers can benefit from the result of this study, as it provides insight into sustainable transportation policies, which received limited attention from academics and the practitioners in the past. The proposed method should also be of interest to local stakeholders and the hosting community, which suffer the weight of the inconveniences resulting from the unsustainable mobility choices of the event visitors (Currie et al., 2015; Müller, 2015). It should therefore be helpful in the debate about hosting and supporting the organization of an event (Delamere et al., 2001; Hede, 2007; Laing & Frost, 2010; Prayag et al., 2013). Moreover, as it allows for a clear comparison among different events, the method could be adopted for easy benchmarking analyses, encouraging a virtuous

circle towards sustainable events governance, to the benefit of the event's legitimacy and the growth of positive net impacts for the local community.

With reference to the specific case study, the method was tested with a sample of 20 Italian periodical hallmark events. The results confirm that hallmarks events – despite the fact that moving thousands of visitors can generate significant sustainability issues – often fail to provide adequate transportation policies, as a significant number of events were assigned to the worst cluster. Moreover, all the events in the best cluster are committed not only to informing visitors on how to reach the venue without using private car, and organizing local and extra-local sustainable transport, but also to actively promoting and encouraging the choice of sustainable transportation modes through their web sites.

Finally, while the number of visitors to an event and the number of inhabitants of the host city do not appear to have a significant relationship with the estimated cluster membership, the theme of the event does. Even if the sample size suggests caution in the generalization of the findings, the results appear to be coherent with previous studies, confirming that the organizers' vision can act as a key sustainability performance driver, following endogenous pull factors, more than push factors related to exogenous features (Mair & Laing, 2012, 2013).

However, it is worth highlighting some limits of the research.

Firstly, the host community typically tends to suffer the brunt of the negative effects of unsustainable local mobility, which causes crowding, traffic collapse and air pollution in urban areas (Gaffney, 2013; Preuss, 2011; Taks, 2013), while there is a tendency to underestimate the consequences of extra-local unsustainable mobility. However, the proposed method weights both aspects equally, considering the commitment towards sustainable transport up to the hosting city (pattern "Ext-Organize") and the commitment towards sustainable transport from the arrival point to the events venue (pattern "Loc-Organize") on the same level.

Secondly, in the analysis of the relationship between auxiliary variables and estimated cluster membership, the number of visitors was considered as in table 1, but it worth noting that, in particular for free access festivals, the data cannot be considered completely reliable, as it is often the result of an optimistic estimate on behalf of the organizers rather than objective measurement.

Drawing on the specific case study, useful suggestions can be made for further research. Firstly, although the sample was adequate for the statistical analysis, a larger sample size would yield more generalizable results about the auxiliary variables. Thus, regardless of event size, a wider sample could be used to test the hypothesis that endogenous factors (other than the theme of the event) related to the organizers propensity, rather than exogenous factors (such as the visitors or the inhabitants of the host city), play a strong role in determining the commitment towards sustainable mobility policies, and consequently the cluster membership.

Secondly, it would be interesting to apply the proposed method to a sample of hallmark events in different countries, to allow an international comparison of the results on sustainable transportation policy. In particular, an eventual association between the Country hosting an event and its estimated cluster membership could highlight the weight of different national sustainability frameworks.

Finally, probably the most interesting development of the present research would be to investigate whether, and to what extent, the effective choices of visitors are affected by the event's sustainable transportation policies. Indeed, while the assumption that an enhancement of sustainable mobility policies has a positive effect on visitor awareness, and thus their propensity to use greener means of transport, is highly convincing, and endorsed by some recent studies (Banister, 2008; Black, 2010; Kagermeier & Gronau, 2015; Litman & Burwell, 2006; Richardson, 2005), the theme merits further investigation.

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