SUSTAINABILITY IN TRANSPORTATION BEHAVIOUR IN RELATION TO AN EVENT ORGANIZATION

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Abstract
Purpose – The multiplication of traffic flows during major events in a destination accentuates any potential weaknesses in traffic planning as well as in event planning. The purpose of the paper is to determine if transportation is perceived as an integral part of an event from the perspective of event visitors – both residents and non-residents – and how an event influences human transportation behaviour during its realization.
Methodology – Focusing on one of the Christmas Market events in Europe the paper assesses transportation as part of the event by using the analytical possibilities of the single-case study method. The interview and observation methods are combined in gathering data. Research is carried out by on-site interviews of event visitors, both local population and visitors, on the basis of a structured questionnaire.
Findings – Traffic management during the event changes the mobility patterns of all respondents, regardless of the fact that non-residents are not aware of the change. Unlike indecisive residents, more of the non-residents perceive transportation as a negative element of the event. Both groups would be willing to use more alternative mobility options under certain conditions. Their transportation improvement propositions indicate that more could be done in relation to transportation in order to influence a more positive perception of event and traffic management.
Contribution of the research - Aside from the theoretical contribution to knowledge about actual mobility patterns in urban destinations during hallmark event realization, the contribution of this paper is also practical. It offers an insight to practitioners about the perspective that their targeted audience has about event-related transportation. Availability of such information could provoke changes in event planning and realization, making this paper a tool in achieving social benefits from upgraded and potentially more sustainable transportation options available to the public.
Keywords transportation behaviour, mobility patterns, event organization, hallmark event

INTRODUCTION

Events undoubtedly affect the city in which they take place. By default, organizing a sustainable event should take into account the range of effects that the event may have on the economy, society or the environment of the host community. Theoretical contributions often approach events through assessing individual types of impacts or the trade-off among different event aspects but there is no alternative to assuming event impacts in synergy (Chirieleison, Montrone and Scrucca 2020). Unquestionably, events could have negative impacts (Kim et al. 2015) and be disruptive (Chirieleison, Montrone and Scrucca 2020) for the everyday functioning of a city as a system.

Despite the fact that transportation sustainability is considered one of the key issues of event sustainability, there is only a small number of studies dealing with sustainable transportation as a part of event management, in particular, as a part of hallmark event management (Chirieleison and Scucca 2017). Travel and local transport are two major sources of emissions from events (United Nations Environment Programme 2012), so travel-related CO_2 emissions of event participants/visitors have the highest reduction potential (Defranceschi and Mitrotta n.d., 10).

Hallmark events attract thousands of visitors to a host community. It is therefore extremely important to research specific mobility and transportation problems that occur in the case of lacking dedicated transportation policies related to this kind of event. The majority of available studies focus on the transportation management of mega-events (e.g. Currie, Jones and Woolley 2014; Currie and Shalaby 2012; Liu, Sun and Yao 2011), offering findings hard or impossible to apply to other types of events due to differences in size, duration, and the number of people whose mobility needs to be planned and managed.

The *Advent in Zagreb* event plays a significant role in the tourism and economic development of the city of Zagreb. The event spreads to more venues each year and attracts a growing number of visitors, implying the need to carefully manage all aspects of the event, including traffic. In the last few years, *Advent in Zagreb* has developed into a hallmark event, as evidenced by the annually growing interest of international visitors and the title of the *Best Christmas Market* in Europe for three years in a row.

One of the main objectives of this paper is to determine how an event influences the transportation behaviour of the local population and non-residential event visitors. The research is based on information about the travel and mobility patterns of the interviewed event visitors and acknowledges their perception of traffic management during the event in Zagreb.

The paper is structured in 4 sections, aside from the *Introduction* and *Conclusion*. It starts with the theory behind sustainable (hallmark) events and sustainable transportation during events in the *Theoretical background* section. It then extends to providing details about the conducted research under the title *Research subject, methodology and limitations*, and finishes with presenting research results in *Results and discussion*.

1. THEORETICAL BACKGROUND

Transportation sustainability is considered one of the key issues of event sustainability, but there is a lack of research on the topic, in particular in relation to hallmark events.

1.1. Sustainability of (hallmark) events

A hallmark event is a major attraction in its own, demonstrating a large drawing power and supporting the promotion of tourist destinations by boosting their event tourism portfolios. The term is frequently used in the literature and by practitioners, many times with a faulty understanding of its conceptualization. According to Getz, Svensson et al.

(2012) the concept is based on event quality and branding, focusing on the role that the event has in the host community, rather than its "type, theme, size or ownership" (2012, 52). The function of hallmark events for the host community (attracting tourists, a positive image, image co-branded with the destination, benefits to residents) derives from the event's permanence and periodicity. Hallmark events become a tourist attraction, a tradition, and inextricably linked with the host community and its identity (2012, 52).

Regardless of the amount of research on the topic of event sustainability, there is an obvious lack of a single definition of sustainable events. A sustainable event should be "designed, organized and implemented in a way that minimises negative environmental and social impacts and leaves a positive legacy for the host community" (Defranceschi and Mitrotta n.d.). A lot of studies deal with event sustainability, but most focus on mega-events – e.g. (Hall 2012; Ziakas 2015), especially sports mega-events and their impacts (Collins, Jones and Munday 2009; Fleischer et al. 2013; Revindo et al. 2019; Triantafyllidis, Ries and Kaplanidou 2018), but the existing body of knowledge also recognizes the specifics of cultural events (e.g. Collins and Cooper 2017; Negrusa et al. 2016). Events are frequently (also) studied in the context of tourism (e.g. Andersson and Lundberg 2013; Astawa, Sukawati and Sugiartha 2019; Gregori et al. 2013). Recent research suggests that events will continuously contribute to sustainable development and the well-being of the host community if the focus shifts from measuring individual triple bottom line effects to a more holistic view of sustainable development through "liveability, viability and equity" (Mair 2019).

For those involved in event management, sustainable events have two dimensions – the extent of addressing the triple bottom line through event objectives, and the extent of sustainability issues integration in the activities of all event stakeholders (Henderson 2011). Practitioners often claim event sustainability but in reality it is not the overall event that is sustainable – only a small number of event activities are. A sustainable event should not threaten the biodiversity of a host community, but should benefit the local population, encourage the involvement of local businesses, focus on the use of renewable resources, and show responsibility in the procedures, providing a good example to others (Getz 2013, 177). A sustainable event could be outlined as "the event that is taking measures towards being 'climate neutral', where actions you take reduce the negative environmental, social, and ecological impacts of your event" (Sustainable TedX Event Toolkit 2012, 6).

A number of sustainable event toolkits are available online (Ecologically sustainable events management guide n.d.; Defranceschi and Mitrotta n.d.; VANOC and AISTS n.d.; United Nations Environment Programme 2012), as well as the ISO 20121:2012 Event sustainability management systems standard (ISO 2017), all designed to help manage event-related activities and impacts. Many of the available toolkits acknowledge transportation as one of the sustainable event management axes.

1.2. Sustainable transportation – sustainable mobility in relation to events

Traffic issues of cities today are associated with growing urbanization and the lacking capacity of cities to manage and support sustainable urban development (World Economic Forum 2017; United Nations 2018). Proponents of sustainable (urban) mobility often depict sustainable transportation with a *reverse traffic pyramid* (Bicycle Innovation Lab n.d.), in which cars are at the bottom and walking and cycling are at the top. More recently there is *a new reverse traffic pyramid* (BICYCLE NETWORK n.d.) with "rideables" like electric scooters included. Sustainable transportation prioritises multimodal transport and can be defined as "a form of mobility that is sustainable, energy-efficient and respectful of the environment" (European Commission 2020).

In dealing with urban transportation, *Transportation Demand Management* (TDM) opts to improve the flow and efficiency of traffic (European Commission 2017, 28) and to achieve rational use of traffic infrastructure while reducing the need for travel and the dependence on the use of personal vehicles, by focusing on the user of the transport system, user attitudes and behaviour in choosing the mode of travel, with the aim of achieving a sustainable urban transport system (Brčić, Šimunović and Slavulj 2016, 22). *Mobility management* (MM), another concept of managing transportation demand, aims to achieve a change in mobility and travel patterns by implementing "soft" awareness-raising measures (European Commission 2017, 28) and balancing restrictions on single-occupancy car usage and simultaneous contributions to more sustainable travel options (European Platform on Mobility Management (EPOMM) n.d.). The EU promotes the concept of *Sustainable Urban Mobility Plans* (SUMPs) as a path to improve the overall quality of life of residents by addressing major traffic-related challenges (European Commission 2020).

If there is no sustainable transportation policy, events may multiply traffic problems and have a negative impact on the experience of visitors and the quality of daily life of local people. Event visitor transportation influences all three axes of sustainability (Chirieleison and Scucca 2017). Event organizers focus foremost on economic and social issues and then, in some cases, on transportation issues, even before centring on environmental, cultural and other sustainability issues (ZERO waste guidelines for events and festivals 2015, 31).

In the context of creating a sustainable event, event management needs to consider the extent to which the event influences the visitors' choice of mode of transportation with respect to the existing transportation system, individual preferences or the opportune offering. How event participants arrive to a destination, and move within in it (between venue, accommodation and city centre), often has the biggest impact (Sustainable TedX Event Toolkit 2012, 12). Transportation (both local journeys and international travel) of event visitors accounts for the majority of visitor Footprint (Collins and Cooper 2017) and has the highest CO_2 reduction potential (Defranceschi and Mitrotta n.d., 10).

In line with the above, it is crucial that the main event venues are well connected by PT, event visitors are provided with information that facilitates easy and sustainable travel, and sustainable mobility options are available and supported or subsidized (Defranceschi and Mitrotta n.d., 10-11), but also that the available PT services are effective, low

emission transportation technologies are favoured, and responsible parking services are provided, as well as smart-driving guidance and training (VANOC and AISTS 2010, 12). The accessibility of event locations for the disabled (ZERO waste guidelines for events and festivals 2015, 33) is often overlooked.

Promoting car-free travel (public transportation (PT) and other environmentally-friendly transportation options) and travel carbon emissions offset are considered valid objectives of event travel and transportation strategy (Sustainable TedX Event Toolkit 2012, 12) while poor transportation management and a lack of dedicated transportation policies for hallmark events lead to more negative impacts on the local economy of the host community (Chirieleison, Montrone and Scrucca 2020), aside from the impact of daily traffic (congestion, decrease in quality of life, noise, pollution, etc.).

Creating more sustainable transportation for the duration of the event requires informing transport system users about available mobility options. Properly communicating them to the public is key to implementing sustainable transportation policies during events (Chirieleison and Scucca 2017; Horng et al. 2014). Among the various media, the event website is regarded as the most important communication channel for hallmark events, due to the large share of non-residential event visitors.

2. RESEARCH SUBJECT, METHODOLOGY AND LIMITATIONS

The paper assesses transportation as part of an event by using the analytical possibilities of the single-case study method. The interview is the primary method of gathering data. Research limitations are acknowledged and put into context.

2.1. Case study: Advent in Zagreb event and Zagreb transportation system

Zagreb, the capital of Croatia, is the largest transportation hub in the country. The accessibility of Zagreb lies in road, rail and air traffic. This paper places greater focus on the possibility of moving around the city, i.e. on mobility options. The complexity of traffic issues is increased by the fact that Zagreb is a place of residence for nearly a fifth of all Croatian citizens (Croatian Bureau of Statistics 2018).

Mobility options for residents and visitors to Zagreb include road transport (cars, buses, taxis and bicycles) and rail options (trams, funicular and trains). The traffic infrastructure is different with respect to the city district, but in each of Zagreb's 16 districts, PT (buses and trams) is managed by the company *Zagrebački Električni Tramvaj Limited Liability Company* (ZET). Rail passenger transportation is provided by the company *HŽ Passenger Transport Limited Liability Company* (HŽPP). The ZET fleet includes 438 buses (many of which are fuelled by biodiesel and CNG (ZET 2020)) and 277 trams of which 142 are low-floor trams. Twenty-one vehicles are equipped for transporting disabled people. There are 149 bus day lines operating to/from 28 main transportation nodes. The tram network is serviced by 17 day lines and four night lines. Zagreb also has a public bike scheme.

Although the existing strategic documents - *Strategija prometnog razvoja Republike Hrvatske* 2017. – 2030. (Ministarstvo mora, prometa i infrastrukture Rebublike Hrvatske 2017), *Razvojna strategija Grada Zagreba za razdoblje do 2020* (Gradski ured za strategijsko planiranje i razvoj Grada 2017) and *Strategija razvoja urbane aglomeracije Zagreb do 2020* (Gradski ured za strategijsko planiranje i razvoj Grada 2017) - include specific objectives for improving the transport system in Zagreb, some of which can be linked to create additional (alternative) mobility and travel options, the current situation points to the need for targeted urban mobility management. Interestingly, unlike some much smaller administrative centres, Zagreb still does not have a SUMP (ELTIS 2020).

Given the continuous increase in the number of registered passenger cars from 2014 to 2018 (Statistički ljetopis Grada Zagreba 2019, 238), a sustainable transportation policy needs to be introduced to manage changes in mobility and travel patterns. These changes would be supported and facilitated by the city's traffic system. The current state of Zagreb's alternative transportation options can be outlined as follows:

- the number of bus passengers carried in 2018 decreased compared with the previous year, despite the growing number of city bus lines (Statistički ljetopis Grada Zagreba 2019, 240, 14.7.);
- with the same number of tram lines in 2014-2018, the number of tram passengers continued to grow up to 2017, but then dropped in 2018 (Statistički ljetopis Grada Zagreba 2019, 240, 14.6.)
- the number of rail lines decreased in the same period (2014-2018), but did not negatively affect the number of passengers in the Zagreb area (Statistički ljetopis Grada Zagreba 2019, 241, 14.9.);
- despite the continued increase in passenger numbers on an annual basis (Statistički ljetopis Grada Zagreba 2019, 240, 14.8.), the Zagreb funicular has a limited contribution to mobility due to the characteristics of the vehicle;
- the problem of bicycle transportation lies in the lack of connections (there is no network) of bicycle paths and stagnation of the supply of cycling infrastructure, while bicycle parking facilities recorded an increase in supply (Statistički ljetopis Grada Zagreba 2019, 240, 14.4.-14.5.).

Zagreb has become a year-round destination in recent years. Repeating annual events have become symbols of the City, with *Advent in Zagreb* being at the top. Advent 2018/2019 (when this research was conducted), as well as the two previous event editions, was declared the "Best Christmas Market" according to the *European Best Destinations* organization. During Advent 2018/2019, a total of 140,663 tourists visited Zagreb, amounting to 10% more domestic and 12% more foreign visitors than the year before, and resulting in a 15% increase in overnight stays (Zagrebinfo 2019).

The event's spatial spread is growing from year to year (there is an increase in the number of event venues). Some event venues are distant from the city centre, such as *Advent in Maksimir and the ZOO* which is approx. 7 km away from the city centre. This spatial spread has transportation management implications and makes transportation services part of the event experience for event visitors. The event's latest 2019 edition had 16 venues (four more than in 2018).

All Advent venues are accessible and well-connected by PT. The venues located in the city's Lower Town are served by several tram lines, while venues in the Upper Town can be reached by a bus running from Ban Josip Jelačić Square or by the Zagreb funicular. The *Advent in Maksimir* venue is connected by PT, that is, by tram, with a stop located a few hundred meters from the main entrance to Maksimir Park and the ZOO.

ZET seeks to connect the more isolated Advent venues, supplementing the offering during the event with additional vehicles on the more frequented lines and additional connections such as the bus to Villa Prekrižje. During Advent in Zagreb, the event's organizer, the *Zagreb Tourist Board*, and the ZET transportation company regularly inform the public (event visitors - locals and tourists) about the local travel options during the event. In previous years, PT during the event was free of charge from Friday afternoon to Sunday at midnight and financed from the public administration budget. The latest Advent 2019/2020 novelty is that this option no longer exists. Nevertheless, PT fares are still cheaper than in other European destinations during Christmas market events.

A section of Advent in Zagreb's official website provides the public with some key traffic information (Advent in Zagreb 2019): PT - Bus map in relation to event venues, PT - Info on tram time table modifications during the event, Information and instructions for tourist buses (parking locations, locations for boarding/disembarking passengers), list of car parking locations and parking payment instructions, and mapped locations of platforms covering electrical cables for wheelchair access.

Supporting alternative travel modes among incoming visitors, the event organizers, in cooperation with the HŽPP company, provide a 50% discount on railway tickets from any station in Croatia and Slovenia from Friday to Sunday, and free transportation in suburban Zagreb from Monday to Thursday from 4 p.m. to midnight. The rail transport discount is also linked to a cheaper ticket to the *Ice Park* venue of Advent in Zagreb. The arrival of international visitors is encouraged by cooperation with Turkish Airlines, which gives a 20% discount on transport tickets for flights to/from Zagreb. This travel modality is one of the least sustainable.

2.2. Research settings

The aim of this research was to examine the traffic-related behaviour of visitors to the *Advent in Zagreb* event, as well as their views and opinions about traffic management during the event. The research consists of desk research and field research. The latter included interviewing event visitors using a structured questionnaire and observing traffic flows at most of the event venues. The research was conducted over the course of the Advent in Zagreb event 2018/2019, from December 1, 2018 to January 6, 2019.

The interviews were handled by one of the authors personally, through direct contact with event visitors on a daily basis. The study sample is random (probability sample), as respondents were randomly selected at the Advent in Zagreb venues. A total of 150 people were surveyed, of which just over a third were non-residents of Zagreb, and the rest live in the City. Considering that only Croatian citizens were targeted, the language of the questionnaire and interviews was Croatian.

In addition to gathering data on the respondents, the questionnaire tackled their traffic-related habits and daily mobility patterns, as well as their satisfaction with the elements of traffic during the event. Through open-ended questions, the respondents were given the opportunity to express their opinions and make specific suggestions in line with the research focus. One question was concerned with the motivation for changing individual mobility towards more sustainable patterns, while another sought input from respondents on the possibility of improving traffic and mobility in Zagreb during the Advent in Zagreb event.

The questionnaire consisted of a total of fifteen questions, three of which referred exclusively to event visitors who are not residents of Zagreb. These three questions considered traffic behaviour upon arrival at the destination, duration of stay, and transportation mode(s) used during the stay in the city. The questions sought to identify the difference between average (everyday) and event-related mobility patterns.

Excel was used to analyse the data collected and as a basis for applying descriptive statistics. Based on the gathered data, graphical representations were made and used to display the research results. Because residents and non-residents of Zagreb did not answer the same number of questions, as pointed out, the results of the research, presented in *Results and discussion*, are divided into two parts. Issues common to both sample groups are compared in the *Discussion* section.

2.3. Research limitations

One potential limitation of the research conclusions and implications is the fact that the research was not conducted during the latest edition of the event but during the previous one (2018/2019). The difference is in the cost of PT (during the 2018/2019 event, PT was free of charge during the weekends) and in the event spread (the number of event venues was smaller; +4 venues in 2019/2020). Nevertheless, the concept of the event is almost identical as far as traffic is concerned.

This research intentionally targeted Croatian citizens, due to the observed changes in their transportation behaviour that some previous research had reported (Mrnjavac and Slavić 2018; Slavić and Mrnjavac 2019). Nevertheless, future exploration of this event's (transportation) sustainability would surely benefit from involving international visitors.

Unfortunately, the probability sample, the time of the interviews and the research method resulted in a disproportion of age groups of event visitors willing to participate. The age range of non-residents (aged 19 to 34) limits the contribution of findings to general knowledge of domicile mobility patterns. The age distribution of Zagreb residents (aged 18 to 54) is somewhat better. There is also a lack of other demographic questions that would enable profiling transportation system users. It was a deliberate choice made by authors, in line with the on-site direct communication that needed to be short in order to attain answers to all relevant points.

The questionnaire was structured from 15 questions in total. It was chosen to narrowly focus on some key issues of transportation- and event-related behaviour in line with the method of acquiring data, as described previously. Although research of such scope and

design could serve only as a preliminary study and offer indicative conclusions, it provides a base for more thorough research attempts in the future. Nevertheless, the paper and the presented results contribute to the limited amount of research on event sustainability viewed through the lens of transportation sustainability.

3. RESULTS AND DISCUSSION

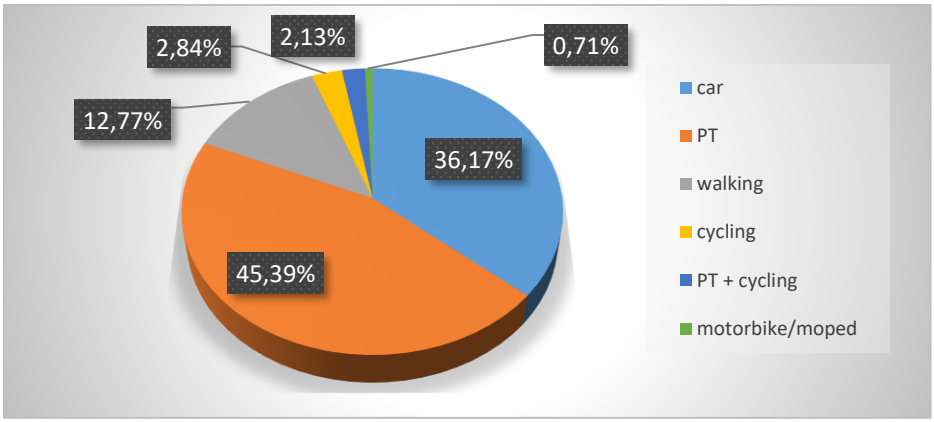
The first subtitle presents the results of the Zagreb residents survey, followed by the results of surveying the non-residents who came to Zagreb to participate in *Advent in Zagreb*. A comparison of the results obtained for the two groups of respondents will show their similarities and differences in mobility patterns, as well as attitudes and perceptions of traffic as part of the Advent in Zagreb event. In addition, the respondents' suggestions for event management and the city transportation system will be summarized in terms of improving transportation services in the city for the duration of the event.

3.1. Transportation behaviour of Zagreb residents during the event Advent in Zagreb

One of the targeted research groups was the local population of Zagreb attending *Advent in Zagreb*. The respondents make up approximately two thirds of the total sample (n = 98). Their age ranges from 18 to 54, and their daily lives and behaviour reflect changes in the surroundings caused by the multi-day hallmark event.

According to the results, the modal split of Zagreb residents is not as unsustainable as could be expected from the fact that a car is the first choice for 51.52% of respondents. The analysis of the three possible answers to the question "*What form of transportation do you choose for local travel on an average day?*" resulted in a modal split dominated by PT, followed by car and walking (chart 1).

Chart 1: **Modal split of residents of Zagreb**



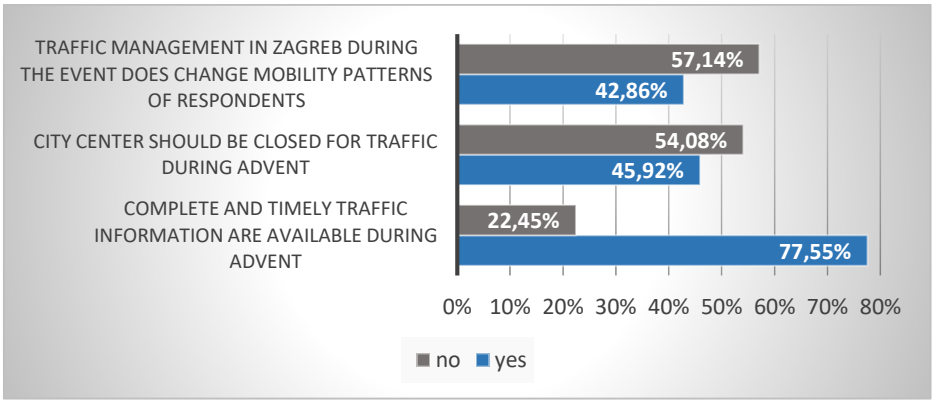
Despite the low share of walking, and an even smaller proportion of cycling, the multiple answers and the resulting modal split revealed a tendency towards multimodality, or choosing different forms of transportation in different situations (most respondents gave more than one answer to this question).

Answers to the question "*What would motivate you to choose alternative modes (cycling, walking, PT) for everyday (functional) local travel?*" could be sorted into several categories. Residents of Zagreb find that *PT upgrades and improvements* (lower fares, higher speed, higher service frequency, fewer delays or deviations from timetables), and *short distance surroundings* (proximity to all amenities and services needed daily, proximity to workplace, proximity to college) are primary incentives. The category *other* includes potential societal incentives - changes in the mobility patterns of friends/family, and the availability of electric cars. In addition, some of the respondents stated that *nothing* would motivate them to change their behaviour (11.22%), while a small proportion stated they were already behaving in an acceptable manner (3.06%).

By agreeing or disagreeing with the statements: 1. *Traffic management in Zagreb during the Advent event changes my mobility pattern*; 2. *The city centre should be closed for traffic during the Advent event*; and 3. *Complete and timely traffic information is available during the Advent event*, respondents living in Zagreb reported the following (chart 2):

- The majority (more than ¾) of respondents think that traffic information is available to everyone,
- More than half of the respondents (57.14%) consider traffic management in Zagreb during the Advent event to be a factor of change to their mobility patterns,
- More than half of the respondents (54.8%) consider closing the city centre for traffic during the event as a valid traffic/mobility management option.

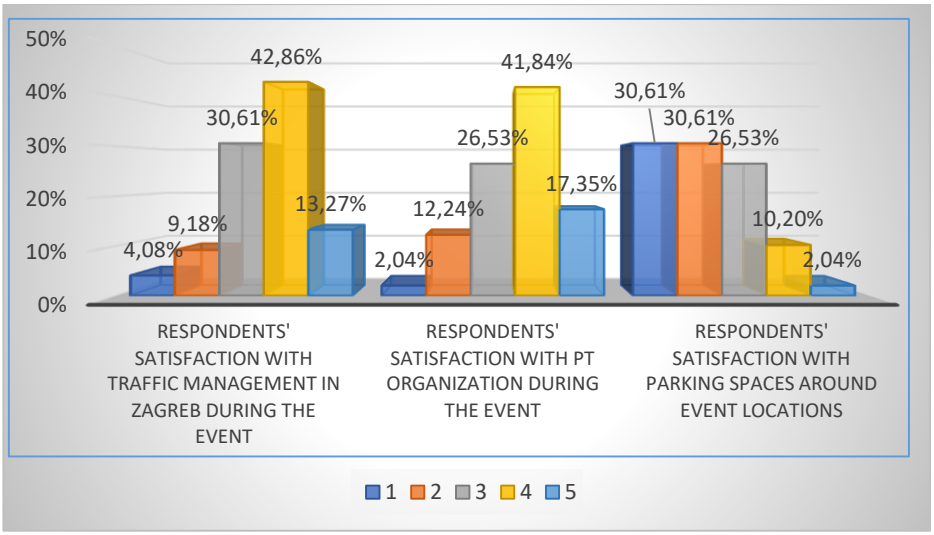
Chart 2: **Respondents' positive/negative perception of traffic management in Zagreb during the Advent in Zagreb event**



Expanding on the topic of traffic management and the elements of mobility management in the destination, the residents of Zagreb (visitors to the Advent event) were asked to assess their level of satisfaction with three points of traffic management: 1. traffic

management in general; 2. public transportation; and 3. parking options (chart 3). The respondents evaluated their level of satisfaction on a scale of 1 ("completely dissatisfied") to 5 ("completely satisfied"). PT issues were addressed individually. The characteristics of PT make it a more sustainable motorized-traffic option in relation to cars. The dominancy of the car for travel among Croatian citizens (TNS Opinion & Social Network 2014; Slavić and Mrnjavac 2019) pushes demand for parking spaces, thus contributing to the multiplication of parking issues as well as making parking a central issue of traffic management.

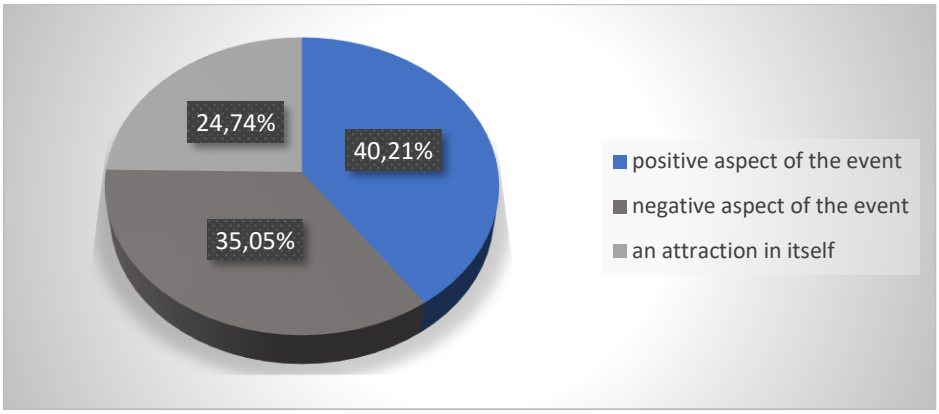
Chart 3: **Respondents' satisfaction with traffic management, in general, and PT and parking issues, in particular**



It should be noted that the majority of respondents are "satisfied" or "completely satisfied" with traffic management - in total, 56.13% of respondents. Only 13.26% of the respondents are "completely dissatisfied" or "dissatisfied" with traffic management in Zagreb during the Advent event. Slightly less than a third of respondents are "neither satisfied nor dissatisfied" with traffic management in general (30.61%). Respondents expressed the highest level of dissatisfaction with parking options close to event venues. Fully 61.22% of respondents are "dissatisfied" or "completely dissatisfied" with parking as an aspect of event participation, while an additional 26.53% are undecided on this issue. Among Zagreb residents, the organization of PT during Advent in Zagreb is perceived as prevailingly satisfactory (a total of 59.19% of respondents are "satisfied" and "completely satisfied").

The question that somewhat divided the respondents was the question referring to traffic being a positive or a negative aspect of the overall event (chart 4).

Chart 4: **Respondents' perception of traffic/transportation being an integrated part of the event**



It is obvious that the difference between the number of event visitors who think traffic is a positive aspect and those who think it is a negative aspect of the event is a few percentage points (a few people in absolute numbers). The positive side prevails, however, because nearly ¼ of the respondents consider traffic during the course of *Advent in Zagreb* to be an attraction in itself. This could partly be attributed to the special holiday forms of the PT offering.

The numerous suggestions that Zagreb residents have for improvements to traffic management for the duration of the event can be categorized (based on content analysis) as follows:

- *PT upgrades and improvements*,
- *improving parking options*,
- *traffic ban and/or restrictions*,
- *alternative mobility options*,
- *other*.

A number of Zagreb residents believe that no traffic improvements are needed (12.24%), while a few think that nothing can be done to improve traffic in Zagreb during the Advent event (3.06%). More detailed overview is in Table 1, in Discussion section.

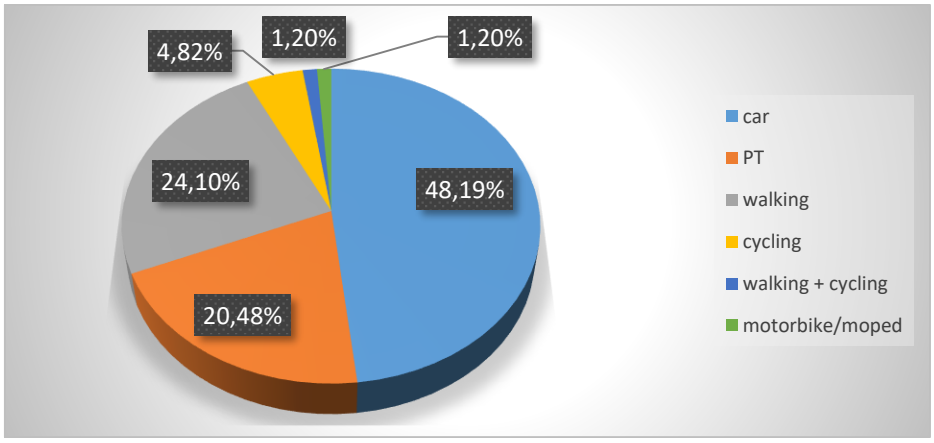
The results show that despite being car-oriented, Zagreb residents base their daily mobility on PT services, and move around on foot to some extent. Of the forms of mobility that are high in the reverse traffic pyramid, cycling options are underutilized. The perception of traffic management is mostly positive and the residents of Zagreb feel well-informed about traffic during the Advent event. Unlike with PT organization, they are the least satisfied with parking options during the event.

3.2. Transportation behaviour of Zagreb non-residents during the Advent in Zagreb event

The respondents who visited *Advent in Zagreb* but came from other parts of Croatia (non-residents) represent just over a third of the total number of respondents (n = 52). In addition to measuring the level of satisfaction and collecting the attitudes of this group on traffic during the event, the questionnaire included three additional questions that sought to identify differences in their mobility patterns while in Zagreb.

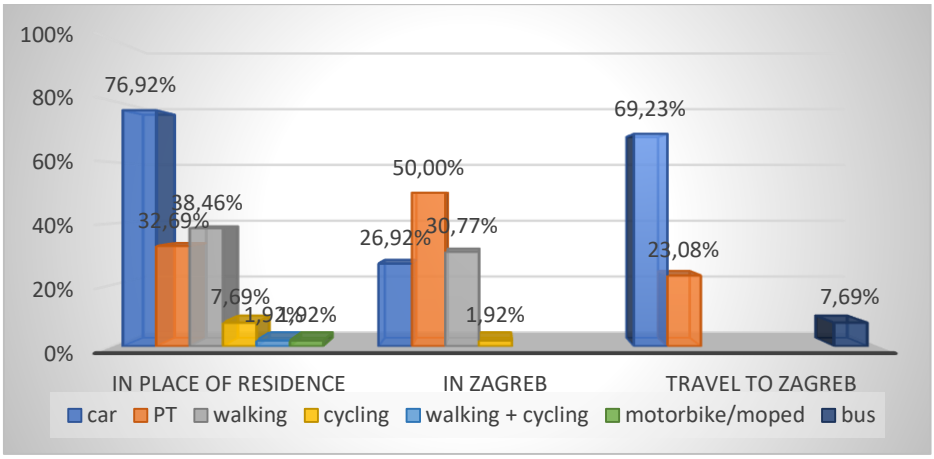
The age of the interviewed Zagreb visitors ranges from 19 to 34. The length of the respondents' stay in Zagreb varies from several hours to several days, which largely depends on the distance of their place of residence to Zagreb. Many respondents stayed in Zagreb for only several hours (day visits). Nevertheless, just over half (51.92%) of those interviewed stayed a minimum of one night. Everyday mobility patterns (in the place of residence) of Advent in Zagreb visitors imply car-dominance in everyday local travel (chart 5).

Chart 5: **Modal split of visitors of Advent in Zagreb in their place of residence**



For almost one in four (24.10%), walking is a valid mobility option, while a little less - about one in five people (20.48%) - choose PT when travelling daily with the city. Travel patterns of Advent visitors to Zagreb (Zagreb non-residents) differ from their average daily behaviour (chart 6).

Chart 6: **Comparison of travel and mobility preferences of visitors to Advent in Zagreb**

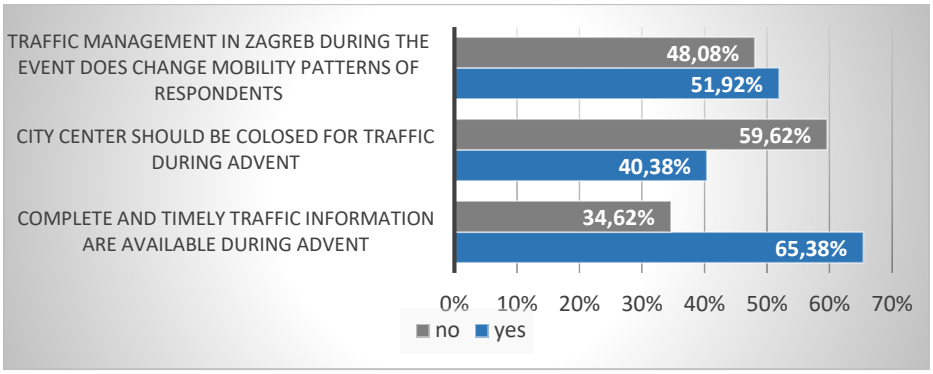


In comparison with everyday mobility, the use of a car is reduced by fifty percentage points when respondents move around Zagreb. However, the sustainability of visitor mobility patterns in Zagreb (during the Advent event) could be debated. Although PT (trams and buses) is used to a greater extent, the share of walking and cycling is reduced, either individually or in combination. However, data on travelling to Zagreb in relation to travelling within Zagreb indicate that a large part of respondents travelled to Zagreb by road (by car and bus) but used PT and walking instead for local travel purposes.

Content analysis enabled grouping the respondents' opinions on "*What would motivate you to choose alternative modes (cycling, walking, PT) for everyday (functional) mobility?"* into several categories. Potential incentives towards a more sustainable transportation behaviour would be: *short distance surroundings* (proximity to work, school and other amenities and services), *walking and cycling upgrades* (new/improved and safe surfaces for cyclists and pedestrians), *PT upgrades and improvements* (cheaper, more frequent and better service), and *other* (social surroundings, lifestyle change). There is a small proportion of respondents whom *nothing* would encourage to change (3.85%), and even fewer are motivated by *environmental considerations* (1.92%).

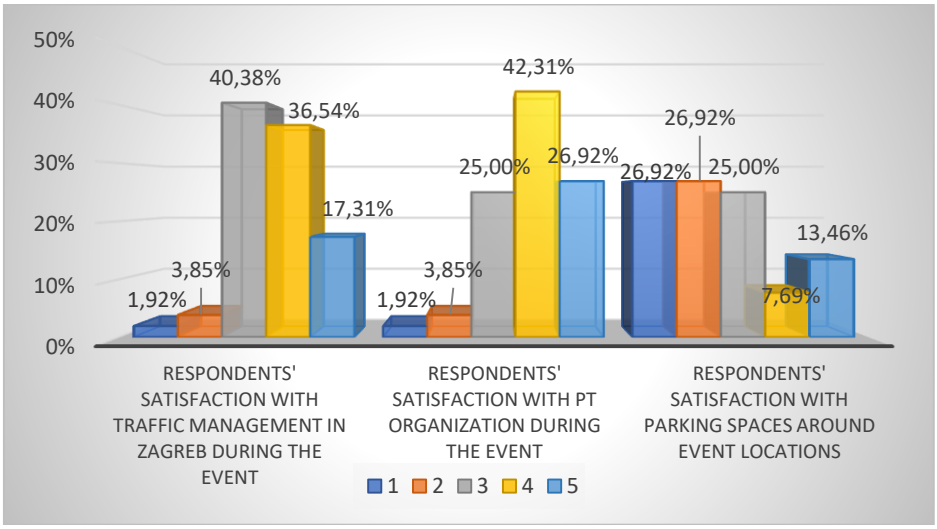
The respondents' perception of traffic management issues during the Advent event (chart 7) is prevailingly positive only in relation to the availability of timely and substantial traffic information. Aside from this, almost 2/3 of respondents (59.62%) do not think the city centre should be closed for traffic during the Advent event, and slightly more than half (51.92%) think that traffic management during the Advent event changes their mobility patterns.

Chart 7: **Respondents' positive/negative perception of traffic management in Zagreb during Advent in Zagreb**



Respondents' satisfaction with traffic management in Zagreb, in general, in relation to PT, and regarding parking issues was expressed on a scale of 1 to 5, with 1 being "completely dissatisfied" and 5, "completely satisfied" (chart 8).

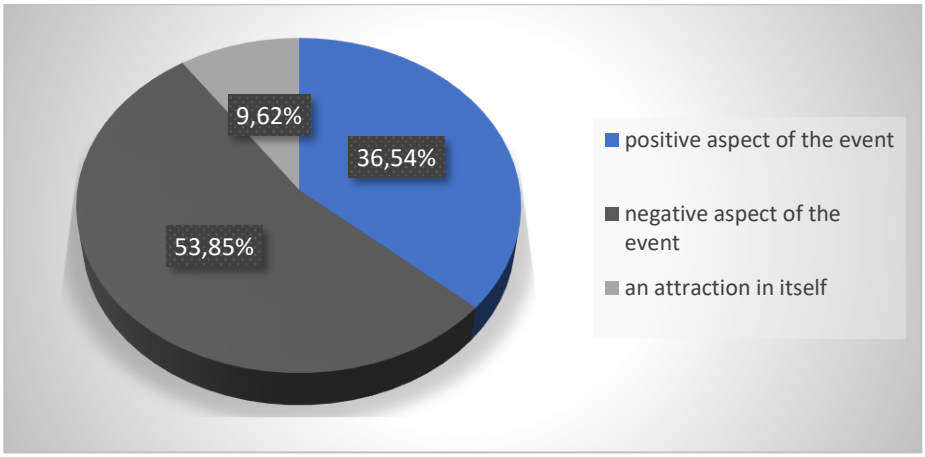
Chart 8: **Respondents' satisfaction with traffic management, in general, and with PT and parking issues, in particular**



Non-residents of Zagreb are mostly indecisive with regard to their satisfaction level with traffic management in general (40.38% is "neither satisfied nor dissatisfied"). However, the perception in general is still positive. The highest proportion of respondents is "satisfied" and "completely satisfied" with PT during the Advent event - in total, 69.23%. The issue of parking is dominated by dissatisfaction (26.92%), or complete dissatisfaction (26.92%), while 25% of respondents are "neither satisfied nor dissatisfied".

The respondents' perception of transportation as an integral part of the event (and a part of both event management and event experience) is prevailingly negative (chart 9). More than half of the respondents (53.85%) consider traffic a negative aspect of the event. Traffic is perceived as a positive event aspect by 36.54%, and an attraction in itself by only 9.62% of the respondents.

Chart 9: **Respondents' perception of traffic/transportation being an integral part of the event**



According to visitors to Zagreb, a *more sustainable/smarter transportation management in Zagreb during the Advent event* could be achieved through several improvement categories. Based on the content analysis, these are (ranked as): *PT upgrades and improvements*, *improving parking options*, *traffic bans and/or restrictions*, *alternative mobility*, and *other* – Table 1, in *Discussion* section.

3.3. Discussion

The growing number of Zagreb visitors in relation to the *Advent in Zagreb* event proves its relevance and attractiveness. The conceptualization of the notion "hallmark event" confirms that *Advent in Zagreb* is one such event. Accordingly, this event should be managed according to its function for the host community (attracting tourists, positive image, image co-branded with the city, benefits to residents) and its permanence and periodicity. Event management should also focus on the transportation management of Zagreb residents and visitors.

Although the research results show that the car is the first choice in both groups of respondents (Zagreb's residents and non-residents), the established modal splits indicate the presence of multimodality. Most respondents show a tendency to choose different modes of transportation in different circumstances/to perform different activities during the day, which is considered positive in the context of mobility management. The transportation behaviour patterns of non-residents of Zagreb visiting the Advent event differ from their average daily behaviour (chart 6) but also from the average mobility

patterns of Croatian citizens as confirmed by research conducted from 2014 to 2018 (Mrnjavac and Slavić 2018; Slavić and Mrnjavac 2019; TNS Opinion & Social Network 2014).

Differences in non-residents' and residents' modal split can be attributed to the fact that Zagreb is the nation's capital and therefore has a more developed traffic system than many other cities in Croatia, resulting in more mobility options. Everyday mobility patterns of non-residents of Zagreb show a larger modal share of cars, as well as a smaller modal share of PT. However, the share of non-resident walking is almost double that of Zagreb residents. Other mobility modes are poorly represented in both respondent groups. Of the forms of mobility that are high in the reverse traffic pyramid, cycling options are underutilized.

The collected data indicate that a large part of the non-residents travelling to the destination by road (by car and tourist buses) transfers to PT and walking for local travel within Zagreb. Of those interviewed, none used the train to travel to Zagreb. Also, only the citizens of Croatia were surveyed. It was therefore not possible to evaluate the respondents' satisfaction with the opportune offerings organized by event management in cooperation with partnering transportation companies (*HŽPP*, *Turkish Airlines*). Although the sample size of non-residents does not allow for generalization, the lack of interest in using the existing rail discounts does suggest that this option needs to be further developed and made more attractive.

The number of registered passenger cars in Croatia is increasing annually (Croatian Bureau of Statistics 2018, 352, 21-12.), and the supply of alternative modes of mobility is also growing, albeit at a slower pace. The traffic behaviour and attitudes of the local population are inevitably related to the quality of the existing traffic system - the same system that is the basis of the tourist (transportation) experience in urban destinations (Slavić and Mrnjavac 2019). Residents of Zagreb would choose alternative modes for everyday local travel (PT, walking or cycling) if Zagreb upgraded its transportation system to more pedestrian and bicycle-friendly surroundings, with improved and cheaper PT. Creating short distance surroundings is also considered important, and from the perspective of non-residents it is of top priority.

Respondents generally perceive traffic management during the Advent event as prevailingly positive only in relation to traffic information availability. Both groups mostly consider traffic management in Zagreb during the Advent event as a change factor for their mobility patterns. The opinions of the two groups differ only in relation to the need to close the city centre for traffic during Advent in Zagreb, with almost 2/3 of non-residents disagreeing and more than half of respondents living in Zagreb thinking the opposite.

The level of respondents' satisfaction with traffic management, in general, and with PT and parking issues, in particular, is only slightly different between the two groups. The respondents of both groups showed the most indecisiveness in grading their level of satisfaction with traffic management in Zagreb during the event in general, although it was graded mostly as satisfactory. The level of satisfaction of both groups is the highest with PT organization during the Advent event, while parking options are considered

highly unsatisfactory. As noted, all Advent venues are connected by PT, either with regular lines with increased frequency of rides, or by introducing additional lines to connect some (new) locations. PT was free of charge during the weekends during the Advent in Zagreb 2018/2019.

Unlike the local population, the highest proportion of Zagreb visitors perceive local mobility options during Advent in Zagreb as being a negative aspect of the event. The availability of specific transportation options (e.g. the Jolly Christmas tram and free tourist trains for children) organized by the city's PT provider certainly contributes to the positive perception of approximately one in four Zagreb residents, but the fact that only one in ten Zagreb visitors considered traffic an attraction in itself could imply the inadequate distribution and availability of information on specific transportation options.

Possible traffic management improvements for the duration of the event could mostly be achieved through: *PT upgrades and improvements, improving parking options, traffic ban and/or restrictions*, followed by *alternative mobility* and *other*. A comparison of those views, summarized in Table 1, could serve as practical implications for event management.

Table 1: **The potential improvements of traffic management in Zagreb, during Advent in Zagreb**

Improvement categories	Zagreb residents	Zagreb non-residents
PT upgrades	better PT organization, increased line frequency/more vehicles, more days of free transportation (outside weekends), more night lines	better PT organization, introduction of more lines to the city outskirts and at night, increasing the number of gas-powered vehicles, better information provided to event visitors about free transportation services
Improving parking options	higher parking capacity, additional parking spaces for the duration of the event, park & ride options, changes in parking rates	higher parking capacity and lower parking rates at Advent-related locations
Traffic ban/restrictions	closing the city centre for all traffic - throughout the event or on weekends only, closing the city centre for road traffic only - including tourist buses	traffic ban in general or for car traffic only - in the city centre and at the event's most frequented venues
Alternative mobility options	expansion of car-free zones in Zagreb, pedestrian zones in event venues, adjusting pedestrian areas of the city to the requirements of blind and disabled people, availability of alternative transportation means (bicycle taxis, electric scooter rental)	availability of alternative mobility modes - bicycle taxi, bicycle rental
Other	signal lights adaptable to traffic situations, regulating traffic with traffic police on site, timely information on current traffic situation	better traffic control

Zagreb residents elaborated their views more broadly, which is understandable, given their daily contact with the traffic situation in Zagreb, while visitors to Advent in Zagreb are exposed to conditions of special traffic regulation up to a maximum of 3-4 days (almost half of those surveyed, up to one day). Nevertheless, key points are commonly recognized by both respondent groups.

Sustainable transportation policies implemented by event organizers could make a difference for the host community that would be more likely to support a hallmark event if it was openly committed to transportation sustainability, including both local travel (to event venue) and travel to a destination/a city (Chirieleison and Scucca 2017). Of the various media, an event's website is regarded as the most important communication channel for hallmark events. The Advent in Zagreb website gives a lot of relevant information to visitors concerning travel to the destination, travel within the destination, or navigating between different Advent in Zagreb venues. Information is provided in six languages, in the form of thematic subpages of the website and with the help of cartographic representations. The emphasis is on the opportune offering.

However, there is a lack of information on PT fares (of tram and city buses) on the Advent in Zagreb website. In the context of changes in tariff policy (PT was free on weekends during the event in 2018/2019, but no longer so in 2019/2020), it is essential to communicate this to potential customers of the PT system. The event's website provides detailed information on more favourable travel to Zagreb (rail and air transportation), as well as on options for local travel – by PT (bus, tram), car or tourist bus. The available information on the locations of platforms covering electrical cables for wheelchair access indicates the recognition of the specific needs of mobility-impaired people.

In addition to the respondents' propositions, practical implications for event management could include proposals summarized from available online guidelines (Defranceschi and Mitrotta n.d., 10; United Nations Environment Programme 2012, 40; VANOC and AISTS n.d., 12; ZERO waste guidelines for events and festivals 2015), as for example:

- reducing the need for lengthy trips – the event venue, city centre, accommodation, and transport nodes should be close together and easily accessible;
- encouraging participants to travel on foot, by bicycle or PT by providing them with maps, timetables, clear instructions, complimentary transport tickets or by synchronising event activities with the timetables of main modes of transport;
- clearly communicating to participants on available PT opportune offerings;
- using low emission transportation;
- compensating/off-setting participant travel emissions or supporting green initiatives by purchasing carbon offsets to balance travel footprints;
- providing responsible parking services that ensure clear water drainage and responsible (snow) clearing;
- providing smart-driving information and incentives for event participants, and smart-driving training and guidelines for event workforce vehicle drivers;
- providing a comprehensive local journey planner in several foreign languages.

In addition to these large-scale event toolkit options, the event management of *Advent in Zagreb* needs to do more to cater to the needs of physically impaired people because providing a map listing locations of platforms covering electrical cables for wheelchair access is but a small step in the right direction. The urban PT provider *ZET* could be encouraged to put some of the vehicles for transporting disabled people in its fleet to service this marginalized group of event visitors. Furthermore, alternative mobility options at the time of the event are rather limited. Event management would benefit from partnership/cooperation with private service providers (public bike scheme, e-scooter rental, bike taxi/rickshaw etc.). Moreover, encouraging international visitors to travel to Zagreb by air travel with reduced fares during Advent in Zagreb should be accompanied by offset arrangements to contribute to event sustainability.

In addition to the experience gained from several previous editions of *Advent in Zagreb*, the event's managers should constantly seek to learn more from available sources and examples. and implement improvements to make the event as sustainable as possible, and this includes making improvements to transportation.

CONCLUSION

The paper has achieved its purpose in determining event participants' (visitors') perceptions of transportation as an integral part of an event and their level of satisfaction with transportation management during the event, establishing the influence of transportation on respondents' "normal" mobility patterns, as well as portraying the respondents' suggestions and improvement ideas. It is possible to determine how residents' and non-residents' perceptions coincide, in general, in most attitudes, opinions and observations. Some of the largest discrepancies in the attitudes of the two groups of event visitors are evident in the respondents' opinions about whether traffic represents a positive or negative part of the overall event.

Drawing on the results of the specific case study, it is evident that event visitors recognise the problems and oversights in traffic planning in the context of event planning. Although this paper has some limitations, it is a preliminary study of transportation issues as part of event management, an interesting topic that is lacking in both theoretical and practical contributions.

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