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The social impact of the 2016 Rio Olympic Games: comparison of residents' pre- and post-event perceptions

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The social impact of the 2016 Rio Olympic Games: comparison of residents' pre- and post-event perceptions

Purpose: Despite the recognition that citizens' perceptions of mega sport events' social impact is critical for the sustainable development of these events and host cities, most previous studies have not taken into consideration how these perceptions may change over time. This study examines citizens' social impact perceptions of the 2016 Rio Olympic Games before and after the event.

Design/methodology: Data were collected among local residents of Rio de Janeiro pre- and post-event (n = 256). A confirmatory factor analysis (CFA) analysed the psychometric properties of the proposed social impact constructs. Subsequently, a multi-group analysis and latent mean comparisons were conducted to test social impact perceptions pre- and post-event.

Findings: The multi-group CFA showed factorial stability of the social impact model in both periods, while the latent mean comparisons revealed significant differences in the dimensions of social experiences, city image and community pride enhancement, public infrastructures and social conflicts. Results indicate that the perception of positive impacts tends to increase, while perceived negative impacts decrease from pre- to post-event.

Implications: The social effects of hosting sport mega-events result in a short-term change in attitudes towards the local community, leading to a better comprehension on how communities perceive the event's impact on their lives.

Originality/value: In a highly complex mega-event such as the Olympic Games, any change may influence residents' perceptions. The findings of this study demonstrate the importance of residents to determining support or opposition in hosting the event allowing a better understanding the exchange effects.

Keywords: Social Impact; Mega-events; Olympic Games; Host cities; Local Communities.

Introduction

Mega-events such as the Olympic Games are one-time and short-term obtrusive events that can generate profound positive and negative impacts on host communities (Gürsoy *et al.*, 2017). These impacts are typically haphazard and unplanned (Taks *et al.*, 2015), occur immediately before, during, and after the mega-event (Preuss and Solberg, 2006) and with immediate effect on the quality of life of local (Balduck *et al.*, 2011). Many cities that apply for such events seem to be taking for granted that they automatically will generate short-term benefits for the host region. However, the recent emergence of anti-bid groups (e.g., “No Boston 2024”; “Native Anti-2010 Resistance”; “No Olympics LA”) has highlighted local perceptions of negative impacts (e.g., high costs, maintenance backlogs, and ineffectiveness of public transport system; Kassens-Noor, 2019). Thus, the International Olympic Committee (IOC) has been forced to set out a reform agenda (Olympic Agenda 2020’s New Norm) to reimagine how the Olympic Games are delivered, from candidature through to legacy, in close cooperation with the bidding cities (MacAloon, 2016).

In contrast, a number of studies continue to suggest that hosting sport mega-events is socially and economically beneficial for the host regions (e.g., Lee *et al.* 2013; McGillivray *et al.*, 2019). These suggested benefits are often related to the attraction of tourists, advertisement of local products to a global audience, increased business in exports and investment, enhancement of event management knowledge, and development of the tourist industry both locally and internationally (Pappalepore and Duignan 2016). For example, Rose and Spiegel (2011) detail how an Olympic bid can act as a signal to induce international trade, and thus boost a nation’s economy. Nevertheless, most studies about mega-events are focused on the so-called developed and democratic countries (Lee *et al.*, 2013; Giulianotti *et al.*, 2015; Duignan *et al.*, 2019). In addition, previous studies suggest little knowledge of other influential factors (Ma *et al.*, 2013) such as public infrastructure (Liu, 2016), and have been

cross-sectional (e.g., Mao and Huang, 2016), whereas perceptions of event features may vary over time (Ribeiro *et al.* 2018). Thus, understanding how residents of the host cities perceive the social impact of sport mega-events is important for a number of reasons. First, the social effects of hosting sport mega-events may result in a change in attitudes towards the local community (e.g. awareness of various local resources; Tomiyama, 2018) leading to increased attention of understanding the exchange effects (Japan Sports Agency, 2016). Second, the evaluation of host residents' reactions to sport events can result in more effective stakeholder management (Chen and Tian, 2015) leading to better planning, implementation and to leveraging the event outcomes (Ritchie *et al.*, 2009). Third, residents' perceptions of costs and benefits of mega-events are crucial for determining support or opposition in hosting (Müller, 2017a) allowing a better understanding of winners and losers (Ma *et al.*, 2013).

Identifying host city residents' perceptions is vital for the sustainable development of sport events and cities (Ma *et al.*, 2011; Ma *et al.*, 2013). Notwithstanding, with the exception of one recent publication (Rocha, 2020), previous studies on Rio 2016 Olympic Games have focused on short-term social consequences for the local community. From a theoretical point a view, understanding citizens' perceptions of the event throughout time is important to help clarify social exchanges. Therefore, the purpose of this study is to compare local residents' social impact perceptions of the 2016 Rio Olympic Games pre- and post-event. From a practical standpoint, this study aims to contribute to a community-based planning approach for future events through deepening bonds in the local community and increasing the attachment of individuals to the host city.

Theoretical background

Olympic Games

The Olympic Games reflect the global mobility of capital, people and information, the extension of economic and social relations into various spheres of life (Müller, 2017a; Hiller

and Whannel, 2016). As noted by VanWynsberghe, Derom and Maurer (2012, p. 188), “the Olympic Games might be unique among mega-events because they also represent a catalyst for positive social change in the host region and around the world, supplying additional symbols and images with which to attract capital”. Also, the Olympic Games are a well-utilized cause that proponents use as part of a city or region growth agenda, given that it generally requires major infrastructure projects and often promotes urban development as part of regeneration strategies of the host city (Müller, 2017b). This was evident in London 2012 (e.g., East London industrial area), Beijing 2008 (e.g., several environmental projects implemented in the city), and Barcelona 1992 (e.g., new service facilities and recreational areas) (Preuss, 2015). In Rio de Janeiro, the Olympic Games were part of strategy to advance urban transport and upgrade neighbourhoods (Gaffney and Robertson, 2018).

As countries prepare bids to host sport mega-events such as the Olympic and Paralympic Games, one of the justifications communicated to local communities is associated with the legacy or benefits that will be left for them (Gold and Gold, 2017; Thomson *et al.*, 2018). Nowadays, the IOC promotes the sustainability of the event by focusing on aspects such as social and housing issues, and the infrastructures for developing the Games (Giulianotti *et al.*, 2015). Also, the “The New Norm” represents an attempt to address challenges associated with bidding for and hosting the Olympic Games, while encouraging the development of a sustainability strategy (Ribeiro *et al.*, in press). One of the main interests is to generate a positive impact (IOC, 2014), but there is still the social problem of how to engage and develop the civic pride in local communities for the event. For example, after the 2012 London Olympic Games, residents took advantage of the new sports infrastructure and improved neighbourhoods that were left (Horne and Manzenreiter, 2006). On the contrary, before the 1998 Seoul Olympic Games it was estimated that 700,000 people were evicted, while around 300,000 were forced to move from their houses ahead of the 2008 Beijing

Olympic Games (Ribeiro *et al.*, in press). In essence, events such as the Olympic Games can bring substantial positive and negative impacts to host areas.

A consequence of these events is the increasing need to justify whether such a strategy is desirable or beneficial for the local communities (Ma *et al.*, 2013). A sport mega-event is not only about promoting the host cities for prospect visitors, but also for giving visibility to the local communities (especially in the case of cities with social challenges such as traffic congestion, difficulties in law enforcement and increased crime; Duignan and McGillivray, 2019). A number of developing countries have hosted sport mega-events (e.g., India 2011 Cricket World Cup or South Africa 2010 FIFA World Cup), and the positive and negative impacts of such events have to be considered when discussing opportunity costs of the resources committed to hosting events in these countries (Gratton and Preuss, 2008). This is the case of Brazil where numerous sport events were hosted (e.g., 2016 Rio Olympic Games, 2014 FIFA World Cup, 2007 Pan-American Games) in recent years as part of a strategy to demonstrate the country's vitality (Santos *et al.*, 2016). Although some studies have examined the social impact of sport mega-events in single moments in time (i.e. cross-sectional studies; Kim and Walker, 2012; Liu, 2016), a longitudinal examination of the social value of these events is warranted to further understand the continued impacts on the host communities.

Positive impacts of hosting the Olympic Games

The hosting of sport mega-events provides an unparalleled opportunity to make a statement on the world stage or to put the host "on the map" through the associated international media coverage (Parent and Chappelet, 2015). In the case of the Olympic Games, the event provides opportunities for increased publicity and enhanced awareness for host cities and nations (Grix and Houlihan, 2014), attraction of potential investment in new facilities that locals and tourists alike can enjoy (Hiller, 2006), increased tax revenues, employment opportunities and new sources of income before, during and after hosting the event (Mao and Huang, 2016). For

instance, Deccio and Baloglu (2002) analysed the 2002 Winter Olympic Games and noted that the local residents were positively affected by expected social interaction opportunities, economic gain and resource use.

Local governments seek to host these sport mega-events not only to provide an economic stimulus, but also to promote positive social and cultural impacts to residents (Kim and Walker, 2012). Benefits such as residents' increased attitudes toward event hosting or improved quality of life have been indicated as relevant indicators for a host community's prosperity (Kaplanidou, 2012; Al-Emadi *et al.*, 2017). Positive social impacts such as increased community pride, strengthening of cultural values and traditions, and increases in national identity (Heere *et al.*, 2013; Inoue and Havard, 2014) have been often suggested in prior studies, and may translate into a sustainable legacy for the host societies in the form of social capital (i.e., community connectedness). To this respect, Gibson *et al.* (2014) noted that feelings of event-related pride/euphoria and social cohesion increased from pre to post-event. These suggested positive impacts are part of the rationale for some cities that bid to host sport mega-events by claiming opportunities to unite its citizens, whether on a national scale, or within local communities (Bason and Grix, 2018). Furthermore, hosting sport mega-events often provides the opportunity for Governments who seek to attract tourism and foreign investment besides being part of a state's wider soft power strategies (Grix and Houlihan, 2014). Brazil has been suggested as an example of a country using these events to project a positive external image. That is, the 2007 Pan American Games has been suggested to have been a precursor to winning the right to host both the 2014 World Cup and the 2016 Olympic Games, justifying a number of positive signals of inclusion and acceptance in the international system (Grix *et al.*, 2015). Table 1 provides an overview of the suggested positive and negative impacts of sport mega-events on host communities.

[Insert Table 1 around here]

Negative impacts of hosting the Olympic Games

It has been widely discussed that the Olympic Games can also provide negative social impacts on the host cities and their local communities (e.g., Mao and Huang, 2016). Cities and countries often see mega-events as opportunities to boost or reshape their image (e.g., Germany used the 2006 World Cup to alter a tarnished image; Grix *et al.*, 2015). However, there are numerous instances where inadequate planning, poor design of the facilities, withdrawal of sponsors, political boycotts, heavy infrastructure cost overruns, and forced eviction of residents living in surrounding areas may lead to a legacy that tarnishes, rather than enhance the reputation of the host city (Preuss, 2019; Parent and Chappelet, 2015). Also, some studies have suggested that hosting the sport mega-events may create other negative effects in host cities such as prostitution and displacement of residents (Kim and Petrick, 2005). For example, the urban renewal of East London in advance of the 2012 London Olympic Games contributed to the gentrification of the area (Preuss, 2019).

A number of studies have suggested that residents tend to show concern with the economic costs of the Olympic Games, such as price inflation, increased taxes, boosts in the price of lands and housing, inappropriate use of public funds (Deccio and Baloglu, 2002; Pillay and Bass, 2008), and waste of taxpayers' money (Lorde *et al.*, 2011). Kim, Gürsoy and Lee (2006) noted that residents tend to judge social problems and price increases related to the hosting of mega-events throughout time. Other studies have suggested that residents are likely to perceive problems such as traffic congestion, law enforcement strain, and increased crime (Kim and Petrick, 2005). Furthermore, sport mega-events have also been associated to some social conflicts between the host community and visitors due to different standards of living, economic welfare, and purchasing power gaps (Tosun, 2002). In the same vein, some researchers have claimed that mega-events may generate physical and natural environmental

costs, including destruction of natural resources, pollution, and deterioration of cultural and/or historical resources (Gürsoy *et al.*, 2011; Lorde *et al.*, 2011).

Recent studies (Mao and Huang, 2016; Liu, 2016) have captured e both positive and negative social perceptions of sport mega-events based on intrinsic and extrinsic dimensions. These dimensions refer to variables that affect resident reactions at the macro and micro level (Fredline and Faulkner, 2000) (see Table 1). Overall, there is a body of literature suggesting that the impacts of sport mega-events may lead to negative or positive perceptions and how impacts evolve over time (Ma and Rotherham, 2015; Le *et al.*, 2013).

Mega-event host: Understanding the rationale

Following Balduck, Maes, and Buelens (2011) and Taks (2013), social impact in the current study refers to changes in the collective and individual value systems, lifestyle and quality of life of local residents in a sustainable way. The theoretical foundations for studying social impacts of mega-events can be linked to social exchange theory (SET; Ap, 1992), social representation theory (SRT; Pearce *et al.*, 1996), and prospect theory (PT; Kahneman and Tversky, 1979). The SET postulates that reward-seeking is a key ingredient in the decision to enter into an exchange (Cropanzano and Mitchell, 2005). In the context of the Olympic Games, the relationships between hosts and local residents are evaluated positively or negatively based on perceived benefits and costs associated with hosting the mega-event (Waitt, 2003). Based on the SET, the residents of the host community tend to form their perceptions through the expected value of the exchange before the actual exchange occurs (Lee *et al.*, 2013).

The SRT has been used as an alternative framework of preconception systems, images and values about certain phenomena (Kim *et al.*, 2006). Applied to the Olympic Games, when local residents analyse new experiences, knowledge and values (Fredline and Faulkner, 2000; Waitt, 2003), these sources of information tend to influence their mental representations of

the event (Fredline, 2005). It means that social phenomena occurs as a dynamic process of social interaction and communication (Lee *et al.*, 2013). Therefore, before a mega-event, information from various sources, such as media, will be influenced by factors that include residents' values and experience of similar events. This shapes residents' initial perceptions of the event becoming a 'reference point' for the next event.

According to the PT, the initial perceptions before the event serve as a mental 'reference point' for any later re-evaluation of the effects (i.e. value function; Kahneman and Tversky, 1979). This theory describes decision processes as occurring in two stages: editing and evaluation (Lee *et al.*, 2013). In the editing stage, a heuristic method is followed to reach the decision. For example, a resident decides which outcomes are similar and then sets a reference point. Lower outcomes are considered to be losses and larger outcomes are gains. In the evaluation phase, a resident acts as if she/he would compute a value, based on possible or probable results. Expectations lower than the reference point are seen as losses, leading to negative perceptions and disappointment. If expectations are higher than the reference point, they are seen as gains, resulting in positive perceptions. The PT directly addresses how these choices are framed and evaluated in the decision-making process (McDermott, 2000). This re-evaluation helps residents to establish a new reference point and decide whether they will support future events.

Understanding how to measure social impact is important for organisers and local governments because not all residents attribute the same value to the mega-event, and bridging SET with SRT and PT may help clarify the social value residents impute to hosting the Olympic Games. Following Mao and Huang (2016) and Liu (2016), in this study, we conceptualise the social impact with regards to perceived positive and negative aspects associated with hosting the mega-event, and then examine the differences in each proposed dimension for both time-periods. Considering the exchange effects with the Olympic Games

and given the positive results in the post event stage in previous studies (Balduck *et al.*, 2011; Karadakis and Kaplanidou, 2012; Gibson *et al.*, 2014), it is expected a short-term change in perceived social impacts between pre- and post-event.

Method

Research setting

Brazil hosted the Olympic Games in Rio de Janeiro in August 2016 being the first city in South America to receive this event (Cole, 2016). A total of 11,238 athletes representing 207 countries participated in the event. Following the example of the 1992 Barcelona Olympic Games, Rio de Janeiro embarked on a journey of image management through urban development (Vainer, 2009). The 2016 Rio Olympic Games were seen as a way to showcase the vitality of a city, a coming-out party aiming to consolidate the city's brand and leave a lasting impression on the world as a place worth investing (Grix *et al.*, 2015). At the same time, anecdotal evidence suggest that Brazilians enjoyed the Games since the opening ceremony, showing the broader aspirations for the long-term future of the city at becoming an even greater global city (Stevens, 2016). However, the hosting of the event was also fraught with difficulties. Many deprived communities (e.g., Autodromo Village and Metro-Mangureira communities) were targeted as locations for Olympic infrastructure or new roadways leading to the major stadiums (Rio Popular Committee, 2015). The evictions that were carried out have been deemed against the law as residents were not given proper compensation or notice. This was noted in a letter to the IOC by the International Amnesty stating the violations of human rights and asking the international body to publicly condemn the Brazilian government (Powell, 2016). Also, the costs surpassed the initial estimations in \$1.6 billion, and Rio's State government turned its pockets inside out looking for money to pay salaries and to keep hospitals open (Price, 2016). Similarly, cost overrun and associated debt from the 2016 Rio de Janeiro Olympic Games contributed to weaken the local organizing committee (LOC) and the

emergence of the Rio state of emergency (Flyvbjerg *et al.*, 2016). All these controversies may have had the potential to influence perceptions of the social impact of the event.

Data collection and sample

An online survey was used to collect data among residents of Rio de Janeiro. The questionnaires were carried out during two-time periods. The first data set was collected one month prior to the start of the event (between 1st and 30th July), and a second wave of data collection was carried out three months after the main event (between 1st and 31st December), given that these social impacts must be considered as part of a longer term process (Clark *et al.*, 2016). The online questionnaire was shared on forty-four Facebook groups of residents of Rio de Janeiro and a local volunteer's database provided by the Rio Organizing Committee (LOC). This allowed to collect data from a large group of residents who live in different neighbourhoods of the city, mainly class A and B, in the south zone of the city (n=123); and class C and D in the north zone of Rio de Janeiro (n=133). This measure is based on the Gertúlio Vargas Foundation (FGV) and its concept of class stratification divides the population into five classes: A (high level), B, C, D and E (lower-income) (Ponte and Campos 2018). A banner with the questionnaire link and an explanation of the purpose of the study was activated on these platforms inviting city residents to participate in the study. In each moment of data collection, the IP addresses of participants were recorded and further access from these IP addresses was denied after the survey submission to avoid repeat participants. Email addresses of the participants were requested (not mandatory) to align responses from both waves of data collection. The survey was available online for one month in each wave of data collection (pre- and post-event) with a total of 612 visitors accessing the survey link in both moments.

Then, the data collected in each moment (pre- and post-event) were crossed by identification of the e-mail addresses provided by participants. Only individuals who

participate in both pre- and post-event questionnaires were included in the final database. Subsequently, the data were examined and responses from individuals less than 18 years-old, surveys not fully completed or from respondents that were not residents of the Rio de Janeiro State, and those containing 10 or more consecutive answers on the same scale number were excluded from further analysis (Ribeiro *et al.*, 2018). After these data screening procedures, a total of 256 surveys were deemed usable for data analysis, considering the same respondents who participated in the pre-event questionnaire (n=513) and post-event questionnaire (n=256). The reduced number of participants from pre- to post event is consistent with previous studies indicating that attrition (i.e. the loss of study participants) is one of the challenges associated with longitudinal studies (Ma and Rotherham, 2016; Young et al., 2006). More than half of the respondents were female (57%). The mean age was 34 years old (SD=10.53), with ages ranging from 18 to 65, predominantly in the 18-29 age bracket (46.1%). Most of the respondents were Brazilian (94.9%), with 5.1% from other nationalities but fluent in the Portuguese language. Almost 25% of the respondents had a secondary school degree, and more than half (69.3%) had completed an undergraduate degree. Table 2 provides the demographic characteristics of the sample, as well as the overall Rio de Janeiro and Brazilian population.

[Insert Table 2 around here]

Measures

The survey was based on previous literature and included two sections. The first section was designed to measure the perceptions of social impact of the 2016 Rio Olympic Games, and included two initial filter questions related to respondents being (or not) residents of Rio de Janeiro, and if they could express their opinion on the Rio Olympics. Section two captured sociodemographic characteristics of the respondents (see Table 2). Following previous literature on overall social impact (e.g., Mao and Huang, 2016; Liu, 2016) mega-events in

Brazil (Ribeiro *et al.*, 2018), the impact was measured through the social dimensions of ‘city image and community pride enhancement’, ‘social experiences’ and ‘public infrastructures’ (positive impact), ‘social conflicts’ and ‘costs’ (negative impact). Perceptions of ‘city image and community pride enhancement’ were measured using a 3-item scale based on Mao and Huang (2016) to capture image, community pride and international recognition of Rio de Janeiro. The construct of ‘social experiences’ was measured using a 4-item scale related to social cohesion and new leisure opportunities that was adapted from Mao and Huang (2016) and Ma *et al.* (2013). ‘Public Infrastructures’ were assessed using the 3-item scale proposed by Liu (2016) with the items capturing perceptions of public transportation, sport facilities and general infrastructure. On the other hand, the ‘social conflicts’ construct included 5 items adapted from Mao and Huang (2016) and Balduck, Maes, and Buelens (2011) focused on perceptions of community social pressure, disorder and congestion derived from the event. Finally, perceptions of ‘costs’ were captured with 2 items proposed by Deccio and Baloglu (2002) and Pillay and Bass (2008) related to the fair use of government financial resources and increases in price levels derived from the event.

All items were translated into Portuguese and back-translated into English to ensure accuracy between the original scales and the translated versions (Banville *et al.*, 2000). This process was conducted by a total of 5 scholars who are fluent in both languages and with experience in sport event-related research. Next, a native Brazilian researcher conducted a content analysis of the items in terms of their clarity for the Brazilian population, and suggestions for changing the wording in 6 items were provided and subsequently accepted. Respondents were asked to evaluate all the items on a 5-point Likert-type scale (1=“Strongly Disagree”, to 5=“Strongly Agree”).

Data analysis

Data were analysed using AMOS 21.0. A confirmatory factor analysis (CFA) was conducted to verify the proposed structure of the social impact model in each time-period (i.e., pre- and post-event). The use of CFA allows to assess the fit between observed data and an a priori conceptualised, theoretically grounded model (Schreiber *et al.*, 2006), as well as the psychometric properties of the measured constructs. The appropriateness of the measurement model to the data was examined using the ratio of chi-square (χ^2) to its degrees of freedom, Tucker-Lewis Index (TLI), comparative-of-fit-index (CFI), goodness-of-fit index (GFI), and root mean square error of approximation (RMSEA). Internal consistency of the constructs was measured through composite reliability (Hair *et al.*, 2009). Convergent validity was evaluated through the average variance extracted (AVE), while discriminant validity was established when AVE for each construct exceeded the squared correlations between that construct and any other (Fornell and Larcker, 1981). Next, a multi-group CFA was conducted to test the invariance of the model across the pre- and post-event moments of data collection. This step allows to compare residents' perceptions of the social impact before and after the event. The model's invariance was tested by comparing the unconstrained model with the constrained model (Loehlin, 2003). The changes in CFI were considered to capture measurement invariance (Biscaia *et al.*, 2016; Cheung and Rensvold, 2002). Then, latent mean comparisons were investigated with Cohen's (1988) d statistic being calculated to obtain the effect sizes.

Results

Assessment of pre- and post-event social impact measures

In order to assess the psychometric properties of the measures, the measurement model was first examined separately for each time period. The results for pre-event [$\chi^2(80) = 108.32$ ($p < .019$), $\chi^2/df = 1.35$, CFI = .98, GFI = .94, TLI = .98, RMSEA = .03] and post-event [$\chi^2(80) = 161.27$ ($p < 0,001$), $\chi^2/df = 2.01$, CFI = .95, GFI = .92, TLI = .93, RMSEA = .06] showed an

acceptable fit of the model to the data. Even though the χ^2 value was significant in both periods, its ratio to the degrees of freedom was below the threshold of 3.0 (Kline, 1998). The GFI, TLI and CFI values were all greater than .90 for both time periods. Also, the RMSEA value was equal to or less than .06 suggesting good fit (Hair *et al.*, 2009) in both time periods.

As shown in Table 3, all factor loadings were above the cut-off point of .60 (Hair *et al.* 2009) ranging from .68 to .87 (pre-event), and .69 to .87 (post-event), thus providing evidence that each item appropriately captured their respective factor. The composite reliability values ranged from .73 to .89 for pre-event and from .68 to .86 for post-event, indicating the constructs were internally consistent. Evidence of convergent validity was accepted in both time periods given that the AVE values for pre-event and post-event ranged from .58 to .69 and from .52 to .68, respectively (see Table 3). Additionally, all constructs were considered to exhibit discriminant validity given that all AVE values exceeded the squared correlations between each pair of constructs in the two models (Fornell and Larcker, 1981). Detailed information about the survey items is available in the appendix 1. Based on these results, the multi-group CFA analysis was then conducted for testing the invariance of the measurement model across pre- and post-event.

[Insert Table 3 around here]

When examining the factorial invariance of the social impact model across pre- and post-event, both the unconstrained model [$\chi^2(160) = 269.59$ ($p < .001$), $\chi^2/df = 1.68$, CFI = .96, GFI = .93, TLI = .96, RMSEA = .03] and the model constraining measurement weights [$\chi^2(175) = 322.54$ ($p < .001$), $\chi^2/df = 1.84$, CFI = .95, GFI = .92, TLI = .95, RMSEA = .04] showed an acceptable fit to the data. Although the χ^2 statistic may suggest that measurement invariance was not achieved [$\Delta\chi^2(15) = 52.95$, $p < .01$], the literature suggests that partial measurement invariance can be assessed when measures are invariant across some but not all the groups (Castillo *et al.* 2010). The change in CFI was lower than .01 ($\Delta CFI = .001$), which can be

considered negligible (Castillo *et al.*, 2010; Cheung and Rensvold, 2002). Thus, based on the Δ CFI comparison, the models' invariance between pre- and post-event can be partially assumed latent mean comparisons can be examined.

Social impact comparison between pre- and post-event

Figure 1 shows the results of the latent mean comparison between the two time periods. The post-event period was chosen to serve as a reference group and pre-event as a comparison group. The mean was set to 0 in the reference group (i.e., post-event), and to vary freely in the comparison group (i.e., pre-event). With the exception of 'costs' (Δ LM = -0.19 , $Z = -1.91$, $p > .05$), significant differences were observed in all social impact dimensions. The latent mean (LM) differences for the social impact dimensions of 'city image and community pride enhancement' (Δ LM = -0.40 , $Z = -3.89$, $p < .01$), 'social experiences' (Δ LM = -0.30 , $Z = -3.16$, $p < .05$), 'public infrastructures' (Δ LM = -0.23 , $Z = -2.41$, $p < .05$), 'social conflicts' (Δ LM = 0.61 , $Z = 26.29$, $p < .01$), were significantly different when compared to post-event.

The Z values indicate that the comparison group (pre-event) has lower latent mean values than the reference group (post-event). In addition, Cohen's (1988) d statistic for the social impact dimensions where significant differences were observed revealed the following effect sizes: 'City image and community pride enhancement' ($d = .37$; average effect), 'social experiences' ($d = .32$; average effect), 'public infrastructures' ($d = .23$; low effect), 'social conflicts' ($d = .62$; high effect).

[Insert Figure 1 around here]

Discussion and managerial implications

Given the importance of assessing the perceptions of local residents toward hosting sport mega-events, the contribution of the current study is threefold: the provision of 1) insights to event organizers on how to enhance social benefits to local communities in future events; 2) evidence of the importance of strategic planning by anticipating social differences in local

support; and 3) evidence that residents' perceptions about the social impact may change throughout time. These results offer a series of theoretical and managerial implications.

Theoretical implications

The first theoretical contribution is that the study reinforces the importance of SET for studying social impacts of sport mega-events (Ap, 1992) by providing empirical evidence that host residents' perception changed over time and showed improvements. Similar to Gürsoy *et al.* (2017) in Brazil and Ma and Rotherham (2015) in Taiwan, the host residents evaluated the positive social impacts above their initial expectations. In comparison to events hosted in the Global South, Gibson *et al.* (2014) found an increase of psychic income (event-related pride/community spirit) among residents in South Africa, while Gürsoy *et al.* (2011) noted increases in cultural identity of host community as a result of the 2008 Beijing Olympic Games two months later. This means that benefits or positive impacts on the local community represent a fundamental condition which may satisfy the residents' expectations and influence their support the hosting of sport mega-event. In this sense, the SET offers a suitable theoretical framework to explain why organisers can expected their residents' support. Positive perceptions may be related to aspects such as the cultural diversity and opportunities to meet new people provided by countries' hospitality houses or Olympic education programmes (Ribeiro *et al.*, 2018) , thus promoting a social exchange relationship among citizens. In addition, the new sport facilities (e.g., Deodoro Radical Park) and upgraded public transportation (VLT or BRT) are examples of investments in Rio de Janeiro metropolitan area that may have contributed to positive social exchanges. These structural changes into Olympic clusters may have acted more over some citizens than others. For example, Deodoro cluster was a priority for the city's social reform, while in the wealthy neighbourhood of Copacabana any urbanistic or mobility actions were noted as part of the Olympic legacy (Santos Neto *et al.*, 2018). In this sense, it is recommended that local governments plan the

mega-events considering the needs of different Olympic clusters, social cohesion and needs of the locals to leverage social impacts and have residents' support to the future events (i.e. social exchange).

Second, the results indicate that residents were positively impacted with the international recognition and image of Rio de Janeiro after the Olympic Games. These results are in line with Gürsoy *et al.* (2011) and Kim and Petrick (2005) who considered “image enhancement and consolidation” to be the most positive impact to China and South Korea communities. As noted by Rocha and Fink (2017), Brazil built a positive international image in association with the Olympic brand to promote tourism, while in the Sochi case, the event did not manage to improve the host image as tourism destination (Müller, 2017b). Searching for strategies to build a positive international image, some developing countries (e.g., Brazil and South Africa) have sought the hosting rights of the Olympic Games, given that these events are a unique opportunity to get global media coverage (Bason and Grix, 2018). Although other large events are hosted in Rio de Janeiro (Carnival or Rock in Rio), the Olympic Games represent an opportunity to promote Brazil as a whole and not just a city (Gibson *et al.*, 2014). This suggests that the “showcase effect” by media coverage (Horne and Manzenreiter, 2006) may have contributed to resident's support to the event. That is, the information shared by media about the improvements of Rio de Janeiro’s global image (Rocha and Fink, 2017) and the international recognition of host city (Ribeiro *et al.*, 2018) may also have aided to shape residents' perceptions of the event, which is aligned with the representation theory.

Third, this study provided evidence that residents' expectations are higher than the reference point, and thus they are seen as gains (i.e. positive perceptions). This re-evaluation is important to help residents establish a new reference point and decide whether they will support future events (Gürsoy *et al.*, 2017). The current results are consistent with Ma and

Rotherham's (2015) study in which Taiwan residents' overall perceived benefits, the level of event interest and attendance played a role of their support to the event. In the current study, the residents' perceptions of the event's positive impact improved, while perceptions of negative impact (e.g., social conflicts) decreased when compared to the first moment of data collection (one month before the beginning of the event). It suggests that residents thought that the Rio Olympic Games would result in a substantial lower benefit to the community and formed their reference point using those initial perceptions. This is consistent with issues raised in previous studies about perceived lack of security (Biscaia et al, 2017), corruption and anti-Olympic protests before the beginning of the event (Ribeiro *et al.*, *in press*) that may have influenced public opinion. However, after the Olympic Games, residents realized that the benefits generated were significantly higher than they had expected (i.e. above their reference point) justifying the relevance of the prospect theory in hosting sport mega-events.

Managerial implications

This study also offers useful insights for event organisers, local governments and the IOC. First, by considering both positive and negative impacts for residents in the host city, this study contributes to help event managers in the planning of the Olympic Games. For instance, forming strategic alliances with local community subgroups (e.g., positivists, mixed positive, mixed negative and negativists) might be useful for addressing the hosting benefits to the communities by engaging in positive word-of-mouth communication for the event (Ma *et al.*, 2013). The knowledge about positive impacts is also a way for the Brazilian government to gain power, promote its international image and show diplomatic importance, which in turn bring a geopolitical balance between the North and the South within the context politic and international relations (Cornelissen, 2010; Gursoy *et al.*, 2017). As a result, one may argue that soft power strategies of Brazil have been attuned to leverage and promote mega-event development, despite the country's poor economic situation.

Second, the findings suggest implications regarding the application of positive impact dimensions. The enhanced community attachment, emotional experiences and opportunities to interact with other community members during the event were appreciated by the residents and should be taken into account in the planning of future events (Inoue and Havard, 2014). That is, a social engagement plan needs to be considered during the planning process of the Olympic Games (e.g., Olympic exhibitions, cultural and music festivals; Olympic education programmes; Ribeiro *et al.*, 2018) so that valuable experiences and a good atmosphere can be offered. In a similar vein, organisers and policymakers should involve local populations to a greater extent in host city planning and for urban changes (Weimar and Rocha, 2016). For example, they may be create public committees prior to submitting bids and include them in most decisions regarding the urban regeneration and changes of public facilities. Moreover, it is important for the event's organisers and the city of Rio Janeiro to develop the city's image in future endeavours as one of the main tourism destination, and turn the area into a year-round event destination.

Third, significant differences were observed in the dimensions of social conflicts between pre- and post-event. Our findings may have been related to the strong investment made by the country and the organising committee in providing high levels of security during the event (Charner *et al.*, 2016). This was evident, for example, by the army's presence in the city streets and the police pacification program in the host city, which has been suggested as a type of measure that often takes place in the Global South in 'emerging nations' with geopolitical goals of controlling territory, people, and resources (Rekow, 2016). Nevertheless, it is also important to note that these social impacts must be seen as short-term consequences (Baldock *et al.*, 2011), resulting from the host city's urbanization and development agenda. Governments and event managers can develop internal communication strategies to help change residents' opinion, invest in listening the various stakeholder concerns and work with

the community members to soften conflicts. If managed effectively, these collaborations may alleviate potential social conflicts and risks, and use the degree of security as a “barometer” of an event’s social impact.

On the other hand, the high prices and use of public investment were critical aspects, evidenced by the fact that residents’ perception did not change significantly from pre- to post-event. These issues seem to be consistent with other developing countries that have hosted large scale events (e.g., India: Commonwealth Games; South Africa: FIFA World Cup Games) leading some researchers to criticise the benefits accrued to societal elites and perpetuation of economic inequalities and higher costs (Gursoy *et al.*, 2017). Also, possible negative effects in the pre- and post-event may be evidenced through general frustration by residents related to corruption, high prices, or disappointment with policy makers (Weimar and Rocha, 2016). To this respect, the state government of Rio de Janeiro even declared a financial “state of emergency”, evidencing a realistic picture of costs and budget overruns before it staged Olympic Games. In this sense, it is recommended that local governments and event organizers take steps to manage the costs such as signing a Host City Contract (HCC) that confirms the share of costs and revenues borne by each partner as well as involving the host communities in making decisions. Furthermore, the LOC's may subsidise tickets prices for local’s residents rather than subsidising the whole event.

Limitations and future research

There are limitations in this study that may have influenced the study’s results and should be considered for future research. First, although items are derived from different scales applied in developed countries and cities, this research focuses on the first South American city to stage the Olympic Games. Considering the different social context in Rio de Janeiro, future studies could improve the scale with a complementary qualitative approach (e.g., interviews, focus group) and include new social factors to aid improving the fit with the context. In

addition, given that various large scale events hosted in Brazil and its potential long-term impacts, future studies could endeavour to validate social impact instruments for Brazil with the collaboration of Brazilian experts.

Second, participants' perceptions of the negative impacts in the post-event may have been influenced by the emotionally appealing atmosphere that was felt when the event took place (Ribeiro *et al.*, 2018) and the continued levels of security due the subsequent Paralympic Games (Charner *et al.*, 2016). Future studies could include external variables (e.g., media following on the Games, type of spectators, number of events attended, attitudes towards the event) and consider intrinsic variables (e.g. residential proximity and respondents' ZIP codes) to better understand the social impacts for the local communities living in the surroundings of the event site. In addition, this study did not consider outcome variables for the social impact model tested. Future studies should consider the use of outcome variables (e.g. quality of life; Ma and Kaplanidou, 2017; intentions to follow other events in the city; Kharouf *et al.*, in press) to further develop knowledge about social impacts derived from mega-events.

A third limitation and research opportunity may be related to sample composition and participant attrition rates. The online questionnaire strategy that was used may have limited the sample composition, given that there are still some groups of residents of the host region without easy access computers and the Internet (Corrêa and Ribeiro, 2018). Although Brazilian elderly have been referred to use Facebook often (equivalent to 7.4 million; Costa, 2018), future studies should collect larger samples, representing participants from different regions and demographic status (Santos *et al.*, 2016). In addition, the examination of different stakeholders' perceptions of the social impact in Olympic Games (e.g., volunteers, domestic sponsors, organisers) may be of paramount importance to better plan and manage these events. Furthermore, despite previous studies with more than one wave of data collection tend

to show participant attrition (e.g., Rocha, 2020; Lee et al., 2013), it is important that in future studies to maintain contact after the first data collection and provide positive survey experiences (e.g., acknowledgment messages, information about the progress of the study) to increase participant retention rates.

Fourth, despite the results of the current study suggest an increase of perceived positive social impact and a decrease of social conflicts in the short-term, anecdotal evidence seems to indicate critical long-term negative impacts such as the lack of maintenance and devastation of many sport facilities (e.g., Maracanã Stadium and Aquatic Stadium) (Charner and Darlington, 2017). Some projects linked to the legacy plan (e.g., the reform of rail stations, the *Maracanãzinho arena* and the *BRT Transbrasil*) are still awaiting developments (Gold and Gold, 2017). Thus, future research should complement citizens' perceptions with the collection of actual evidence of social impact (e.g., transport systems changes, carbon footprint reduction and engagement Rio's people) after the mega-events to better understand whether or not social impacts are maintained over time. An in-depth qualitative approach to citizens and other stakeholders may also contribute to better understand other benefits and costs that may not have been captured in the current study.

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