

Temporal variations in the relationship between legacies and support: A longitudinal case  
study in Rio 2016 Olympic Games

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### Abstract

The purpose of this research was to describe temporal variations in Rio residents' support for the 2016 Olympic Games (OG) and in the relationship between perceptions of legacies and support for the event. Drawing on social exchange theory, perceptions (expectations and evaluations) of tangible, intangible and environmental legacies should affect support intentions. A longitudinal trend study was designed. Four multistage stratified random samples of Rio residents were surveyed in 2012 (n = 900), 2014 (n = 900), 2016 (n = 723) and 2018 (n = 550). Results showed that perceptions of legacies and support for Rio 2016 OG decreased progressively from 2012 to 2018. In early stages of preparation (2012 and 2014), expectations of intangible and environmental legacies were predictors of support. In the year of the event and two years after the event, perceptions of tangible legacies were predictors of support. Longitudinal findings show that, to gain support, organizers promise unattainable legacies, which then lead to dwindling support as they fail to deliver them. Findings suggest that plans and actions of sport mega-events' organizers must change.

*Keywords:* environmental legacy, intangible legacy, popular support, sport mega-event, tangible legacy

Temporal variations in the relationship between legacies and support: A  
longitudinal case study in Rio 2016 Olympic Games

The International Olympic Committee (IOC) and organizing committees have strived to build popular support for the Olympic Games (OG), because local support has been considered a key element to host successful Games (Deccio & Baloglu, 2002; Gursoy & Kendall, 2006; Preuss & Solberg, 2006; Waitt, 2003). As private funding has proved to be a fallacy for most hosts all around the world (Solberg & Preuss, 2007), residents' support has worked as a seal of approval for public money investment in sport mega-events like the OG. Local residents' support creates legitimacy for government investment in sport mega-events. In a proportion never seen before, lack of popular support has blocked multiple candidacies to host the OG. For example, after residents expressed opposition to bids, Boston and Hamburg withdrew their candidacies to host the 2024 OG. For the same reason, Oslo, Stockholm, Krakow and Munich withdrew their bids for the 2022 Winter OG (Baade & Matheson, 2016). After winning the bid, during preparation and staging, popular support continues to be important, because economic viability, positive festival environment, large pool of volunteers, weakened opposition, and positive publicity, all depend on local residents' support (Gursoy & Kendall, 2006; Prayag, Hosany, Nunkoo, & Alders, 2013; Zhou & Ap, 2009).

Preparation to host the OG takes so many years that attitudes and behaviors toward the Games are very likely to fluctuate over time. Scholars have advocated for longitudinal studies in order to better understand how popular support is built in communities hosting the OG (Mihalik & Simonetta, 1999; Ritchie, Shipway, & Cleeve, 2009; Waitt, 2003). Nevertheless, the vast majority of studies on the OG have applied cross-sectional designs and, then, suggested that future studies should apply longitudinal designs and collect data throughout the whole preparation process (e.g., Deccio & Baloglu, 2002; Gursoy & Kendall,

2006; Zhou & Ap, 2009). The literature has very few longitudinal studies on support for the OG (and other sport mega-events), because this type of design creates many challenges, mainly those related to resources and time. Cross-sectional studies can be valuable to describe popular support at a specific point in time, but they offered little insight about how the levels of such support vary during the long journey from planning and to staging the OG.

To advance theory and practice of the OG organization, longitudinal studies are necessary, because variations in popular support have important consequences for event organizers (Kim, Gursoy, & Lee, 2006; Mihalik & Simonetta, 1999; Waitt, 2003). For example, when low popular support is present, organizers struggle to get public funds, because politicians are reluctant to approve investments for a low-supported event. If organizers know how popular support tend to fluctuate over the preparation period and when moments of low support are more likely to occur, they can act proactively to deal with falls in support. Additionally, organizers should know the causes of support decrease. Tackling such causes could help them to meet some critical popular demands and, consequently, increase support. The current study was designed to fill the gap in the literature, which offers no answers to issues related to temporal variations in support during preparing to stage the OG. Rio 2016 OG was used as a case study to investigate how popular support for the event varied from early stages of preparation (four years before the Games, in 2012) to post-event stages (two years after the Games, in 2018). This leads to the first research question (RQ<sub>1</sub>).

RQ<sub>1</sub>: Does residents' support to host the OG vary over the years – from pre-event to post-event stages?

The current study goes beyond testing temporal variation in support and tests some causes of this variation. Residents' support may vary based on changes in macro-environmental factors. For instance, the event portrayal in the media (Ritchie, Shipway, & Chien, 2010), local economic crisis (Ritchie, Molinar, & Frechtling, 2010), and popular riots

(Neilson, 2002), all have been reported as macro-environmental factors that affect people's attitudes toward the OG. However, organizers rarely have some control over macro-environmental factors. Organizers should create mechanisms to keep popular support during the whole process of preparation, disregarding macro-environmental changes.

In recent history, to build support, the IOC and different organizing committees have strongly relied on the concept of legacy. Legacy is any tangible or intangible structure that is created as a consequence of hosting the OG (Preuss, 2007). Legacies are not necessarily positive, although the IOC and organizers tend to assume that negative legacies do not exist when they want to garner local support (Cashman, 2006; Lenskyj, 2016). The IOC and organizers of the OG have worked on and promoted the idea that the event is worthy of supporting, because it will bring positive legacies for local residents. Positive legacies can vary from economic benefits to social, environmental, and infrastructural improvements in local communities. This strategy can be analyzed under the lenses of the social exchange theory, which posits that people weigh benefits and risks (trying to improve the former and reduce the latter), before choosing how to behave (Blau & Scott, 1962). In promoting positive legacies, organizers try to give residents a reason to believe that benefits will be much larger than risks when a city hosts the OG. Drawing on the tenets of this theory, people will support the event because it should bring benefits to the city and to the residents themselves.

Previous studies have not assumed that all legacies are positive, but they have found that perceptions (expectations and evaluations) of positive legacies lead to popular support for OG (Deccio & Baloglu, 2002; Rocha, Barbanti, & Chelladurai, 2017; Zhou & Ap, 2009). The current study follows the same direction and does not make assumptions about the direction (positive or negative) of legacy perceptions. The major problem with those previous studies resides in the fact that they have relied on cross-sectional data. Considering the long-term nature of the preparation phase, the information on a positive relationship in one

moment is not enough to inform the organizers whether the strategy of promoting legacies works along the whole process. The relationship may be positive in early stages of preparation, when people have limited information to assess potential for actual legacies. It may grow weaker, as the event approaches, the organizers fail to deliver some of the promises, and people get more informed. The opposite may also occur. The relationship may start weak and grow stronger, as the event approaches and people collect some benefits from transformations in the city, economic growth and social opportunities. An additional problem with cross-sectional studies is that scholars have mainly focused in pre-event and ignored the post-event stages of the OG. Post-event investigations are very important because they can portrait the most realistic picture of the relationship between legacies and support. In the post-event stage, people do not need to rely on expectations of legacies anymore; rather, they can use actual evaluations about what has stayed as legacy. For example, two years after the OG, people can certainly evaluate whether the public transportation system was improved. Therefore, this study proposes a longitudinal study with pre- and post-event data collections, to test the relationship between legacies and support intentions for the 2016 OG. This leads to the second research question (RQ<sub>2</sub>).

RQ<sub>2</sub>: Does the relationship between legacies and support to host the OG vary over the years – from pre- to post-event stages?

The purpose of this research was to describe temporal variations in Rio residents' support for the 2016 Olympic Games (OG) and in the relationship between perceptions of legacies and support for the event.

### **The Context: Rio 2016 OG**

Rio won the bid to host of the XXXI Olympiad against Tokyo, Madrid, and Chicago in 2009. Despite of economic uncertainties, which seem to be present in developing countries, during the bid competition (2007-2009), the international economic scenario was

favorable to Brazil. In 2008, the most recent global economic crisis erupted, hitting harder in the USA and Europe. A group of developing countries – the BRICs (Brazil, Russian, India, and China) – passed that crisis quite smoothly (Flanders, 2011). In 2011, Brazil overtook Great Britain as the world’s sixth-largest economy and the “country risk” (the cost of protecting the country’s debt against non-payment) fell below of that of the United States (Romero, 2012). Considering the commercial emphasis placed on the Olympic sport nowadays, economic stability and a large home market may have influenced the IOC members when they voted for Rio to be the host of the 2016 OG. However, beyond economic factors, social and human living conditions have been quite low in the country. For example, in 2011, the human development index of Brazil was 0.730, which placed the country at the 85th position among 187 countries ranked by the United Nations (UNDP, 2013). Despite a moment of economic growth, the country still had much to do in terms of social equity. This did not hinder the Rio’s bid, reinforcing the current focus on economic factors to choose a host.

To make things more complicated, some years after winning the bid, the economy of the country started to collapse. Brazil’s gross domestic product (GDP) fell by 3.8% and 3.6% in 2015 and 2016, respectively (IBGE, 2018). The unemployment rate rose steadily from 2014 to 2016, when it reached its peak at 12% or 12.3 million people (Reuters, 2016). Rio de Janeiro suffered harder the effects of the national crisis. In 2016, two months before the OG, Rio’s governor declared a state of financial emergency and begged for federal intervention to avoid the collapse in public security, health, education, and transport (Watts, 2016). Moreover, Rio has had long-term problems with housing. In 2016, 24% or about 1.5 million residents of Rio city lived in favelas, which count with rudimentary infrastructure at best and shelter the vast majority of drug cartels (Ortiz, 2016). The economic crisis came in tandem with a political crisis, which resulted in the impeachment of the then president Ms. Rousseff.



Considering the macro socioeconomic scenario, the preparation process for hosting the 2016 OG can be divided in three periods. In the first period, from 2009 to 2012, despite the favorable economic moment in the country, very little was done to prepare Rio to host the OG. During this period, some infrastructural transformations started, such as the expansion of the international airport and the construction of the bus rapid transportation (BRT) system. These transformations started in that period because they targeted the 2014 FIFA World Cup. Specific transformations to host the OG were not made until the end of this first period. For example, the construction of the Barra Olympic Park – the main location of the Olympic venues – started only in mid-2012 (Magalhaes, 2012). The second period, from 2012 to 2014, started with the end of London 2012 OG. The Rio organizing committee started to work. Most of the planning for the 2016 OG happened in this period. However, not much was put into practice. Although some Olympic-specific constructions started before 2014, they progressed very slowly. In the third period, from 2014 to 2016, the organizing committee and local government built most of the necessary infrastructure to host the 2016 OG. For instance, the construction of the Deodoro Olympic Park – the second largest cluster of sport venues – started on July 2014. In this last period, all arenas, the Olympic village and the media center got ready. Additionally, the organizing committee recruited, selected and trained all the volunteers (Oliver, 2014), and began to work on the legacy projects (Santos, 2018). Table 1 summarizes the most important macro and micro socioeconomic facts surrounding Rio 2016.

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Insert Table 1 about here  
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The case of Rio 2016 is very important because the turbulent socioeconomic context in that host city/country has happened more often than never before. For example, controversies related to environmental and social issues gave the tone to the narratives of the Beijing 2008 OG. While the “green Olympics” never actually happened, the Chinese

government confiscated land and evicted about 300,000 residents to build the Olympic park, in the name of “public interest” (Broudehoux, 2007; Jin, Zhang, Ma, & Connaughton, 2011). Preparation and hosting of Sochi 2014 Winter OG were marked by human rights controversies, mainly discussed in the light of anti-gay legislation approved months before the Games (Van Rheenen, 2014). Human rights violations and corruption accusations have also been constantly associated with the Qatar 2022 FIFA World Cup preparation (Brannagan & Rookwood, 2016). Rio 2016 OG context was turbulent but not unique. Along with results from previous events, findings of the current study should add to the literature and inform future hosts about residents’ attitudes toward hosting sport mega-event.

### **Literature Review**

#### **Support based on Expected Benefits**

The origins of using social exchange theory (Blau & Scott, 1962) to explain residents’ support for sport mega-events are in studies of support for tourism development in specific areas. Scholars have proposed that residents would support the development of tourism in their regions if they perceived potential gains for the local community (Ap, 1992; Jurowski, Uysal, & Williams, 1997; Perdue, Long, & Allen, 1990). Ap (1992) summarized this idea by saying that “it is assumed that host resident actors seek tourism development for their community in order to satisfy their economic, social, and psychological needs and to improve the community’s well-being” (p. 669). According to Ap, the primary force for engaging in social exchanges from the local residents’ point of view was to improve the local social and economic well-being. Jurowsky et al. (1997) empirically tested this assumption and found that potential for economic gain and attachment to the community are significant predictors of tourism development support from residents of national recreational areas in the United States. In another empirical study, Yoon et al. (2001) found that perceived cultural and economic impacts positively affected local residents’ support for tourism development in an

area with theme parks and beaches. They concluded that social exchange theory is a suitable theoretical framework to explain exchanges between residents and local authorities in the tourism context, because residents support tourism development if they perceive benefits of tourism exceed the costs.

Previous investigations about popular support for sport mega-events have also drawn on the social exchange theory (Deccio & Baloglu, 2002; Kim et al., 2006; Rocha et al., 2017). These studies have proposed that social exchanges occur between local residents and organizers of sport mega-events. When locals perceive that benefits will stay for the local community because of hosting, they tend to support the event. This is consistent with the basis of the social exchange theory, which holds that human relationships are based on potential exchanges – acts of giving something to receive another thing with important value in return (Blau & Scott, 1962). Building on Jurowski et al.'s (1997) model, Deccio and Baloglu (2002) asserted that residents are usually willing to engage in exchanges with other parties (e.g., the organizers of a sport event) if they perceive they will have some individual or collective benefits derived from such exchanges. Gursoy and Kendall (2006) tested the hypothesis of social exchange by investigating the popular support for the 2002 Salt Lake City Olympic Games. They found that residents exchange support for perceived benefits (positive impacts). They did not find a negative significant relationship between negative impacts (which they called “costs”) and support.

Cropanzano and Mitchell (2005) informed that one of the most basic tenets of social exchange theory is that relationships may change over time. Investigating temporal changes in attitudes toward the Sydney 2000 Olympic Games, Waitt (2003) noted that “[...] exchange relations are not temporally static. Residents constantly re-evaluate the perceived consequences of the exchange transaction within a dynamic social setting” (p. 196). Based on this argument, previous cross-sectional investigations on support for sport mega-events have

advocated for the use of longitudinal studies (Ritchie et al., 2009; Zhou & Ap, 2009). Ritchie et al. (2009) affirmed that residents' attitudes (e.g., support) could vary over time, probably as a function of the variation in perceptions of benefits and costs associated with the event. Therefore, they strongly recommended longitudinal research designs, which should offer better results in terms of describing popular support for sport mega-events. Knowing change patterns in popular support should be very helpful to assist sport mega-event organizers and local authorities to make decisions and to strategically plan the event (Ritchie et al., 2009).

### **Variation in Support over Time**

Although information about how support change over time has been considered fundamental to guide the work of sport mega-event organizers (Ritchie & Smith, 1991; Waitt, 2003), few longitudinal studies have been conducted in this context. Most longitudinal studies on sport mega-events have adopted a trend design. Trend and panel studies are both longitudinal designs. While in panel designs the same individuals are followed over time, in trend designs, different individuals are randomly drawn from the same population at different moments (Ary, Jacobs, Irvine, & Walker, 2018). An important advantage of trend longitudinal designed studies is avoiding finishing the study with a very small sample size, without losing representativeness (Ary et al., 2018). In a trend study, Mihalik and Simonetta (1999) investigated support and other attitudes of Georgia residents toward the 1996 Atlanta OG, over a period of four years before the Games. They found small decreases in residents' support and intentions to attend the Games over time. For example, in 1992, almost 70% of the state residents had intentions to attend the Games; but in 1995, only 48% expressed the same intentions. Mihalik and Simonetta also described the variations in perceived benefits over time. Results were inconclusive because while perceptions of some benefits (e.g., tourism benefits) increased, perceptions of others (e.g., international recognition of Georgia) decreased over time. These authors did not consider that social exchanges might explain

variation in residents' attitudes and, thus, they did not test possible relationships between perceived benefits and attitudes.

In another trend study, Kim et al. (2006) investigated changes in Koreans attitudes toward the 2002 FIFA World Cup, three months before and three months after the event. They found that Koreans held significantly higher perceptions before than after the event of both benefits (e.g., economic gains, cultural exchange, and conservation of natural resources) and costs (e.g., social problems such as crime and prostitution) of the event. On the one hand, the authors concluded that the event failed to meet people's expectations of positive impacts (benefits) for the country; on the other hand, they reported that negative impacts (costs) associated with hosting the event were underestimated. Considering that some of the legacies can only be felt years after a sport mega-event (Ritchie, 2000), an evaluation conducted three months after the event has its limitations. Additionally, in this study, the authors did not test any antecedents or consequences of perceptions of impacts.

Karadakis and Kaplanidou (2012) conducted a longitudinal panel study to investigate how perceptions about the importance of legacies change over time – six months before, during, and six months after the 2010 Vancouver Winter OG. The importance of almost all types of legacies (e.g. economic, tourism, social-cultural) remains unchanged during that period (the exception was the importance of social-cultural legacies that dropped from pre-event to during and after the event). This study illustrates the challenges associated with longitudinal panel designs (same subjects investigated over time). Results of this study were based on small (due to sample attrition), non-probabilistic samples of residents of the host city, Vancouver (n = 41), and a non-host city, Ottawa (n = 43). Respondents expressed how important each legacy was for their overall quality of life. Still regarding the Vancouver 2010 OG, Hiller and Wanner (2011) conducted a trend study, where Vancouverites' feelings and attitudes toward the Games were collected immediately before, during, and immediately after

the Games. Their results showed that feelings and attitudes toward the Games became more favorable during and after the event. Additionally, they reported that supporting the Liberal party was one of the most important predictors of positive attitudes toward the Vancouver 2010. Considering that they conducted the investigation immediately after the Games, it informs little about actual legacies, which demand years to be realized (Chappelet, 2012).

Waitt (2003) conducted a panel study and investigated changes in residents' attitudes toward the Sydney 2000 OG. He reported that enthusiasm toward the event increased over time, between 1998 and 2000, reaching what he called a "state of euphoria" in the month of the opening ceremony. Support for the Games was one of the dimensions of enthusiasm. That increase in enthusiasm and support did not vary based on socioeconomic variables (education, income, occupation). However, Waitt reported an increase in the level of skepticism over economic impacts, whose positive expectations dropped from 71% (1998) to 33% (2000). Repeating the data analysis strategy employed by Mihalik and Simonetta (1999) and Kim et al. (2006), Waitt did not test influences of perceptions of legacies on the attitudes of residents. The current study on Rio 2016 OG fills this void in the literature by investigating the relationships between perceived legacies and local residents' support for the Games. Informed by social exchange theory, this study also tests how the relationships among these variables vary over time.

### **Legacies**

Benefits and costs of sport mega-events have been summarized in the concept of legacy (Dickson, Benson, & Blackman, 2011; Preuss, 2007). Some authors have preferred to use the term "impact" and avoided the term "legacy" (Hiller & Wanner, 2011; Jones, 2001). However, many others have used the terms impact and legacy as synonyms (Dickson et al., 2011; Preuss, 2007). Defining legacy is not an easy task. Scholars have agreed that legacy has two basic characteristics: it represents a consequence of hosting an event and it stays longer

than the event itself (Cashman, 2006; Dickson et al., 2011). Preuss (2007) summarized this idea and proposed three dichotomous characteristics for a sport mega-event legacy: planned-unplanned, positive-negative, and tangible-intangible. (p. 211).

The literature has not reported any study that separates planned from unplanned legacies. In fact, investigations have assumed that all legacies are planned. This assumption can have multiple causes, such as difficulties in predicting and measuring unplanned legacies and IOC requirements of a legacy plan from the host cities (Toohey & Veal, 2007). In terms of tangibility, the literature presents investigations focusing on either tangible (Solberg & Preuss, 2007) or intangible legacies (e.g. Macrae, 2017; Taks, Littlejohn, Snelgrove, & Wood, 2016). Economic, tourism, and structural legacies are commonly referred as tangible or hard legacies, as they can be palpable or concretely felt and supported by numbers (e.g. number of international arrivals) or physical structures (e.g. new sport venues) (Essex & Chalkley, 2004; Fourie & Santana-Gallego, 2011; Preuss, 2007). Since the literature and non-academic reports have failed to show unequivocal tangible legacies for hosts (Kesenne, 2012), scholars have changed their focus from these legacies to intangible or soft legacies (Chalip, Green, Taks, & Misener, 2017). Different intangible legacies have been discussed in the literature, such as cultural, psychological, and sporting legacies (Macrae, 2017; Misener & Schulenkorf, 2016; Taks et al., 2016).

The current investigation considered the dichotomy proposed in the literature and divided legacies into two groups: tangible (economic, tourism, structural legacies) and intangible (sporting, cultural, psychological legacies). Environmental legacy has not clearly fit in either the tangible or the intangible category. Studies on environmental legacy have considered it as an independent category of legacy, with specific characteristics, which can be either tangible (e.g. CO<sup>2</sup> footprints) or intangible (e.g. reduce in electrical energy usage) (Collins, Jones, & Munday, 2009; Jin et al., 2011). Accordingly, the model of the current

study considered the influences of tangible, intangible and environmental legacies on intentions of support for the 2016 Rio OG.

For the last dichotomy, previous investigations have explored residents' perceptions of both positive and negative impacts of sport mega-events (Deccio & Baloglu, 2002; Essex & Chalkley, 2004; Gursoy & Kendall, 2006). However, when they tried to establish a connection between perceptions of legacies and residents' attitudes, they have found significant relationships between expected benefits and attitudes (e.g., support), but have not found significant (negative) relationships between expected costs and attitudes (e.g., Deccio & Baloglu, 2002; Gursoy & Kendall, 2006). Gursoy and Kendall (2006) proposed that support should rely on perceived benefits, supporting the use of social exchange theory. Although support may be connected to expected positive legacies, negative legacies should not be ignored. In the current research, the local residents judged about the positive or the negative valence of a legacy. Legacies are in the eye of the beholder. Consider, for example, the legacy of building sport venues useful to the population. If residents evaluate this as something that has happened as a hosting consequence, then a positive structural legacy is inferred. On the contrary, if they evaluate this as something that has not happened, then a negative structural legacy is present (because this should have actually happened). Other scholars have used similar strategies to assess the valence of the legacies (Deccio & Baloglu, 2002; Hritz & Ross, 2010; Zhou & Ap, 2009).

Scholars have reported that legacies usually cross the borders of the host city and reach other regions in the host country (Deccio & Baloglu, 2002; Ritchie et al., 2009). Legacies of Rio 2016 have been expected to reach the whole country (Rocha et al., 2017). Most of the public investment for the event came from the federal government, which had political and diplomatic ambitions associated to the Games (Rocha, 2017). Although with different motivations, a similar situation happened in Sydney, when the Games were used to



boost tourism and economy not only of the host city, but also of the whole country (Chalip, 2002). Chalip (2002) described how Australia (not only Sydney) benefited from a specific strategy to leverage legacies, varying from using Western gates for visitors coming from Europe to investments in international media to promote country. These strategies apparently produce benefits for the whole country. Despite the lack of comparable leveraging strategies, the geopolitical position of Rio and Brazil has made the 2016 OG the Games of a country and a continent (Darnell, 2012).

## **Method**

### **Participants and Procedures**

An important advantage of the current investigation over former trend studies on attitudes toward mega-events was the use of random samples, drawn using the same criteria of selection, in four distinct times. The most recent census in Brazil (2010) indicated that the city of Rio de Janeiro had a population of 6.323.037 inhabitants. Considering the initial budget for this research, in 2012, I opted for having a random sample with a margin of error of 3.3% at a confidence level of 95%. To get a sample with these characteristics, 900 Rio adult residents were randomly selected to respond a questionnaire. The same sample size was used in 2014. In 2016, due to a budget cut, the sample was reduced to 723, with a margin of error of 3.6%, keeping the 95% confidence level. In 2018, after a new budget cut, the sample size was reduced to 550 respondents, increasing the margin of error to 4.2%, but keeping the confidence level of 95%. Despite the budget cuts, all samples had a margin of error below 5% at a confidence level of 95%. A replacement of those residents who did not agree to participate happened based on the city population quotas of age, gender, education, and household income. The sampling strategy used a multistage (neighborhoods, residences, residents) stratified random technique. Data collection happened in May of each year and was

conducted by the same market research company every time. Responses were collected via face-to-face interviews in the houses of the selected respondents.

The characteristics of each sample are described in Table 2. Demographics characteristics (age, gender, education, and household income) were used as control variables in the inferential statistical analysis. Age (years) is a continuous numerical variable. Gender (male = 0; female = 1) and education (no college degree = 0; college degree = 1) were represented by dummy variables. Two other dummy variables were created to represent medium (low = 0; medium = 1; high = 0) and high (low = 0; medium = 0; high = 1) income, with low income being the reference group. A one-way ANOVA showed that the age of the respondents did not differ across moments of data collection ( $F = .215$ ;  $p = .886$ ). Chi-square tests for the nominal variables showed that there is no differences between gender ( $\chi^2 = 0.228$ ;  $p = .973$ ), education ( $\chi^2 = 1.371$ ;  $p = .712$ ) and income ( $\chi^2 = 6.238$ ;  $p = .397$ ) across moments.

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### **Scales**

Scales used in the study were originally constructed in English. To assess the content validity of the scales, all items and subscales were submitted to a panel of six experts, native English speakers with doctorate degrees in sport management. Scales were refined after experts' suggestions. Back translation indicated no major differences between the first and the final English versions of the questionnaire, indicating that the integrity of all items was maintained during the translation process to Portuguese.

*Tangible legacies* and *intangible legacies* are second-order latent variables represented respectively by (a) economic, tourism and structural legacies, and (b) sporting, cultural and psychological legacies. *Environmental legacy* is a first-order latent variable. Four items indicated each of the seven first-order latent variables (dimensions of legacy)—

economic, tourism, structural, environmental, sporting, cultural, and psychological legacy.

The stem for these items read, “Hosting the Rio 2016 Olympic Games will help [for the 2012, 2014 and 2016 versions] *or* helped [for the 2018 version] the country to”.

Five items indicated local residents’ *support for the Rio 2016 OG*, a first-order latent variable. The stem for the items read, “Considering that Rio will host [for the 2012, 2014 and 2016 versions] *or* hosted [for the 2018 version] the 2016 Olympic Games, please, express your level of agreement with the following statements”. Items were jumbled within each section. The response format for all items was a 7-point anchored scale ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*). Table 5 presents all item wordings.

### **Data Analysis**

First, data were analyzed by descriptive statistics. Then a MANOVA was conducted to examine possible differences between perceptions of legacies and support in different moments of the hosting process. In this analysis, the seven dimensions of legacy and support were the dependent variables, the moment (2012 x 2014 x 2016 x 2018) was the independent variable, and the demographic variables (age, gender, education, and household income) were control variables (covariates).

In the sequence, a covariance-based structural equation modelling (SEM) analysis was conducted for each moment, following the two step-approach (Anderson & Gerbing, 1988). In the first step, the measurement model was tested using confirmatory factor analysis (CFA) technique. In the second step, the structural model, using SEM. Three indices were used to assess the model fit: RMSEA, CFI and TLI (Hair, Black, Babin, & Anderson, 2009; Hu & Bentler, 1998). Using the measurement model, the constructs’ reliability (internal consistency) were indicated by the measures of Cronbach’s alpha ( $\alpha$ ) and by composite reliability ( $\rho$ ) (Bagozzi & Yi, 1988; Nunnally & Bernstein, 1994). Average variance extracted (AVE) was used as an indicator of convergent validity (Fornell & Larcker, 1981). The Wald

chi-square test for parameter equalities was applied to test correlations between pairs of constructs, an indicator of discriminant validity (Bagozzi, Yi, & Phillips, 1991; Guo, Aveyard, Fielding, & Sutton, 2008).

In the structural model, perceptions of tangible legacies, intangible legacies and environmental legacy affect intentions of support directly. Demographic variables were entered in the model, affecting support directly, to control for spurious relationships, due to differences in respondents' personal characteristics rather than their perceptions of legacies.

### Results

Expectations and evaluations of legacies and support for Rio 2016 OG decreased progressively from 2012 to 2018 (Figure 1). Skewness and kurtosis measures indicated no concerns in terms of symmetry and normal distribution of the data. Results of the MANOVA showed that there was a significant decrease for all dimensions of legacy and support (Table 3). Post hoc Tukey tests indicated that all variables differ in all pairs of moments, excepted for tourism legacy, cultural legacy, psychological legacy, and support between 2016 and 2018.

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Insert Figure 1 about here  
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Insert Table 3 about here  
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Analyzing each legacy individually, Figure 1 shows that the decreasing trend is very similar to all of them. The same is true for support, excepted for the last two measures (2016 and 2018), when support stayed consistently low (below 4, in a 7-point Likert scale). Residents did not support the Games in the year of the event and still did not support it two years later. Comparing legacies, Figure 1 and Table 3 show that Rio residents had higher perceptions of tourism legacies and lower perceptions of environmental legacies.

Based on the results of CFA, the measurement model fit the data reasonably well, in all moments (Anderson & Gerbing, 1988) (Table 4). The significant results of the Wald chi-square test for parameter equalities for all samples indicated that none of correlations between pairs of constructs was equal to one, supporting discriminant validity (Guo et al., 2008) (Table 4).

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Analyzing each sample individually, constructs showed good internal consistency and composite reliability estimates (alpha and rho in Table 5). Average variance extracted (AVE) of all scales (but two in the 2012 sample) were equal to or larger than .50, which is an indicative of convergent validity (Fornell & Larcker, 1981). In the 2012 sample, AVE of the environmental legacy and the structural legacy scales were slightly below .50, indicating that some items did not load sufficiently high in the assigned construct. Instead of deleting such items to increase AVE and attain the minimum criterion for convergent validity, I decided to rely on the other samples and keep the integrity of the original scales. All items have a substantive importance for the scale.

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Insert Table 5 about here  
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Results of SEM showed that the structural model fit the data closely in all moments (Table 4). Figure 2 shows that different types of legacy affected intentions of support in different moments of the Rio 2016 OG. In stages of preparation, in 2012 and 2014, perceptions of intangible and environmental legacies were predictors of intentions to support. In the year of the event and two years after the event, perceptions of tangible legacies were predictors of support.

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Insert Figure 2 about here  
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### Discussion

The purpose of this research was to describe temporal variations in Rio residents' support for the 2016 OG and in the relationship between perceptions of legacies and support for the event. The investigation was designed to answer two research questions. The RQ<sub>1</sub> asked, "Does residents' support to host the OG vary over the years – from pre-event to post-event stages?" Results showed that local residents' support for the Rio 2016 OG consistently decreased over the years. From 2012 to 2018, Rio residents' support for the OG dropped 1.64 point, from 5.45 to 3.81 (in a 7-point scale). The initial findings did not confirm Waitt's (2003) results, which reported a pattern of increase in positive attitudes over time toward the Sydney 2000 OG. Waitt reported that enthusiasm (a dimension of support in his study) increased over time between 1998 and 2000, reaching a "state of euphoria" in the month of the opening ceremony. Results for Rio 2016 showed a contrary trend: Rio residents' support and perceptions of legacies decreased as the Games approached. Waitt's study did not investigate what happened after the Games. Nevertheless, post-Games reports showed that residents might be not so positive about benefits some years after Sydney 2000 (see Cashman, 2006, as an example).

Rio 2016 and Sydney 2000 happened in different socioeconomic contexts. At the time of the Sydney 2000, Australia was considered a developed country, with stable economy. At the time of the Rio 2016, Brazil, a developing country, was facing a terrible political and economic crisis. Approaching sport mega-events, Baade and Matheson (2004) noted that the opportunity cost of capital is particularly higher in developing nations. They added that costs of hosting sport mega-events should not be represented by the amount of money spent, for example, in the construction of sport arenas or in the gentrification of the city. Rather, costs of hosting should be calculated based on the value to society from the same amount of capital, which could have been spent on the next best public benefit (e.g. new public schools,

better hospitals). Considering the next best options to spend scarce public resources, opportunity costs to host Rio 2016 OG were much higher than those to host Sydney 2000. In Rio, many years before the event, opportunity cost was unlikely to be an issue. As the event got closer, Rio residents collected more information about how much (opportunity costs) had been invested in the event. Although most of them might not have elaborated on the concept of opportunity cost, they understood the concept in practice. The original promises were far from being delivered, while the city kept suffering from lack of popular housing, public schools and hospitals (Oliver, 2014; Rocha et al., 2017). Therefore, not surprisingly, Rio never got the state of euphoria experienced in Sydney.

No longitudinal studies were found in the literature in the context of the 2004, the 2008, or the 2012 Olympic Games. Between that longitudinal study in Sydney 2000 (Waitt, 2003) and this investigation in Rio 2016, there is a gap of 16 years. During this period, the world changed, literature advanced, and criticisms about sport mega-events increased substantially. Articles have reported negative aspects of hosting sport mega-events, such as displacement of people (Watt, 2013), damages to the environment (Zemel, 2011), economic loss (Baade & Matheson, 2004), and sex trafficking (Matheson & Finkel, 2012). Meanwhile, the media have published reports and stories showing that hosting the OG have rarely produced positive outcomes to the host communities (Beard, 2008; Bulman, 2007; Watts, 2014). In this sense, an increased amount of information might have created more critical residents, who are now less willing to believe in positive legacies and, consequently, to support sport mega-events in their communities. It is noteworthy that, even in Sydney, Waitt (2003) found an increased level of skepticism over expected economic impacts, whose positive evaluations dropped from 71% in 1998 to 33% in 2000. Despite that, Waitt reported a euphoric state among the respondents of his questionnaire regarding the 2000 OG. An additional explanation for differences between results of this study and Waitt's study might

be found in the type of analyses conducted. This study investigated and analyzed perceptions of legacies as antecedents of support intentions. Waitt did not explore antecedents of positive attitudes and simply described temporal variations in attitudes.

Most of the previous studies on sport mega-events were conducted in the context of developed countries (Deccio & Baloglu, 2002; Ritchie et al., 2009; Waitt, 2003), probably because most of these events have been hosted by developed countries. The current study was conducted in the context of a developing country. Brazil was not the only developing country to host a sport mega-event in the last decade. In fact, recently, an increased number of developing countries hosted sport mega-events, such as China (2008 OG), India (2010 Commonwealth Games), South Africa (2010 World Cup), and Russia (2014 Winter OG and 2018 World Cup). Future host cities in developing countries may benefit from the findings reported here. However, results of this study might be applicable not only to other developing countries. In the context of some developed countries, similar results of dropping in support and other positive attitudes were found in the past. Mihalik and Simonetta (1999) showed that Georgia residents' positive attitudes grew weaker as the Atlanta 1996 OG got closer. The trend of dropping support in Atlanta also happened in Rio. While the Atlanta study focused on pre-event stages, the current study added to the literature by showing that the drop in support tend to continue in the year of the event and even two years after the event.

Beyond the description of variations in support, the current investigation explored how perceptions (expectations and evaluations) of legacies vary over time. On average, only in 2012, residents reported positive expectations of legacies (values equal to or above 5). As the Games got closer, from 2014 on, they reported negative expectations of legacies (except for tourism legacy in 2014). Kim et al. (2006) and Karadakis and Kaplanidou (2012) investigated how some perceptions of legacies changed over time for the FIFA World Cup 2002 and the Vancouver 2010 Winter OG, respectively. Kim et al. concluded that the event



failed to meet local residents' perceptions of benefits for the host country (South Korea). Karadakis and Kaplanidou reported that perceptions of legacies tend to be stable over time. In addition to different socioeconomic contexts, target populations, instruments and events, the most striking difference between this and previous studies is the time span. While Kim et al. and Karadakis and Kaplanidou investigated differences in a short period (months before and after the event), the current study investigated differences in a long period (two-year differences, over six years). The literature has established that legacies take years until they are fully accomplished (Horne, 2007; Toohey & Veal, 2007). Therefore, perceptions of legacies may not change in a couple of months. This study added evidence to the literature by showing that perceptions of all legacies dropped consistently over years and did not stop dropping even two years after the event.

Differences between dimensions of legacies were not surprising. The fact that the residents rated the tourism legacy as the most likely to stay after the Games confirmed propositions and results of previous studies (Chalip, 2002; Getz, 1998; Hall, 1994; Solberg & Preuss, 2007). A reduction in perceptions for tourism legacies is also consistent with the literature. For example, Heslop, Nadeau, and O'Reilly (2010) reported that, after the Beijing 2008 OG, perceptions of national residents and international tourists about China as a tourism destination decreased substantially. Meanwhile, concerns about environmental legacies are not new either. Both Sydney 2000 and Beijing 2008 used the motto "Green Olympics" to highlight their intentions to explore environmental legacies (Mead & Brajer, 2008). The project for London 2012 was based on the tripod sport, health, and environment (Samuel & Stubbs, 2012). However, Samuel and Stubbs (2012) reported that environmental and sustainability plans of organizing committees for OG have become highly institutionalized, looking more for legitimation than for actual and effective actions. The negative perceptions of Rio residents for environmental legacies show that people were aware that authorities and

organizers have not been serious about environmental sustainability. Some facts contradicting the environment sustainability discourse of organizers were largely publicized during the preparation and hosting stages. For example, the Rio 2016 golf course was constructed over a conservation area (affecting and destroying local fauna and flora) and the cleaning of the Guanabara Bay was never concluded (Gaffney, 2013).

The RQ<sub>2</sub> asked, “Does the relationship between legacies and support to host the OG vary over the years – from pre- to post-event stages?” Results showed that the relationship between legacies and support to host varied over the years. Analysis of structural models showed that perceptions of different types of legacies affect intentions of support in different ways over the period of six years. In preparing-to-host stages, four and two years before the Games (2012 and 2014), perceptions of intangible legacies and environmental legacies had affected intentions to support the Rio 2016 OG, but tangible legacies had not. In the year of the Games and two years after, the relationship was inverted; perceptions of tangible legacies had affected intentions to support the Rio 2016, while intangible and environmental legacies had not. The literature does not offer similar investigations for comparison, but some studies can help in the discussion. Waitt (2003) investigated influences of socioeconomic variables (education, income, and employment) on residents’ attitudes toward Sydney 2000. He found that none of those variables could predict variance in attitudes. Waitt did not try to establish relationships between plausible attitudinal antecedents (e.g. perceptions of legacy) and support. Kaplanidou (2012) found that many years after the Games, residents from different host cities (Atlanta 1996, Sydney 2000, Athens 2004 and Beijing 2008) had different perceptions about what type of legacy had the highest importance for their quality of life. Residents from Athens and Beijing ranked tangible legacies (e.g. infrastructure, transportation) higher than intangible legacies. Ma and Kaplanidou (2017) reported that intangible legacies (e.g. sporting legacy) are associated with evaluations of quality of life for

future events, but not for past events. These results might partially corroborate with the current findings, where Rio residents have associated their support before the Games with intangible legacies and after the Games with tangible legacies. Comparisons should be made with cautious because they investigated the relationship between legacy evaluations and quality of life (not support). Moreover, they investigated different events, while the current study focused on only one event.

Drawing on the principles of social exchange theory, current findings showed that residents exchange their support for expectations (pre-event) or evaluations (post-event) of legacies. Controlling for demographic characteristics of respondents (age, gender, education, and household income), different legacies affected intentions of support in different moments of the hosting process. The positive relationship between intangible and environmental legacies and support at early stages reinforces the current argument for expanding the investigations beyond tangible legacies. Recently, the literature has seen an increasing number of studies on sport participation, cultural, and psychological legacies (Chalip et al., 2017; Taks et al., 2016). Likewise, environmental legacies have received an increased attention (Collins et al., 2009; Jin et al., 2011). However, most of those studies so far have only described and discussed the importance of intangible and environmental legacies. Findings of the current study contributed to the literature in two ways. First, the empirical findings clarified that perceptions of intangible and environmental legacies can explain attitudes toward OG, even in a model with tangible legacies. Second, the findings showed that residents' perceptions about intangible and environmental legacies are fundamental to develop attitudes of support toward sport mega-events in early stages of preparation.

In later stages of the preparation process and after the event, results showed that perceptions of tangible legacies were predictors of support, but intangible and environmental legacies were not. The first explanation for this shift may be found in the premises of the

construal level theory (Trope & Liberman, 2003). This theory posits that people use abstract mental models (higher-level construals) to develop opinions about distant events. For near events, people tend to rely on more concrete information (lower-level construals), which include subordinate, contextual, and incidental features of events (Trope & Liberman, 2003). Intangible legacies have characteristics of higher-level construals, due to their abstract nature. On the other hand, tangible legacies have characteristics of lower-level construals, due to their direct and concrete elements (e.g. new facilities, better infrastructure). Therefore, temporal construal changes (from higher to lower levels as the Games got closer) could explain the shift from intangible to tangible legacies as significant predictors of support for Rio 2016.

The second explanation for this shift might be associated with the fact that tangible legacies (e.g. infrastructure, transportation, etc.) are mostly expected at the time of and after the event. In early stages, residents seemed to trust that tangible legacies would be delivered. Then, residents exchanged their support for extra benefits, explaining why variations in intangible and environmental legacies affected variance in support. At the time of the event, the importance of delivered tangible legacies to explain support grew, up to the point that the correlation between tangible legacies and support became significant. The context of Rio 2016, where many of the structural changes were not concluded until months before the Games, might have created a fertile terrain not only for that shift, but also for lower levels of support as the Games got closer (Oliver, 2014). However, this context is far from being unique to Rio. Reports of recently-hosted and future sport mega-events have shown similar problems in Beijing 2008 OG, Sochi 2014 Winter OG, Russia FIFA World Cup 2018, and Qatar FIFA World Cup 2022 (Brannagan & Rookwood, 2016; Broudehoux, 2007; Van Rheenen, 2014).

### **Managerial Implications**

The IOC, local governments and organizing committees for OG can benefit from the findings reported in this study. The trend of decreasing popular support for hosting the OG can create problems for organizers, because the Games have been largely subsidized by public money (Giulianotti, Armstrong, Hales, & Hobbs, 2015; Rocha et al., 2017). Although governments can subsidize sport mega-events without any type of public support, they are unlikely to do so because it can create political problems for those in power. That is, politicians do not want to be associated with controversial or unpopular events, which have potential to damage their public images. In this sense, organizers have strived to build popular support during the preparation process to provide a stronger argument for governments to fund the OG with as little opposition as possible. However, they have been very ineffective in this task.

To get popular support, organizers and local governments should above all deliver what they have promised in a timely manner. Initial promises are usually tangible. Results of the current study indicated that residents tend to be patient in the early stages of the preparation regarding tangible legacies, not associating their support intentions to expectations of hard legacies. They may understand that structural transformations, tourism development and even economic growth take a while to materialize. Therefore, popular support is mostly exchanged by expectations of intangible and environmental legacies in early stages. Organizers can explore this by working to build up intangible and environmental legacies, such as boosting sport participation, supporting local pride, promoting cultural exchanges, and respecting the environment and natural resources of the city. This is especially important some years before the event, when people are still waiting for the tangible legacies to become reality. Nevertheless, people do not forget about tangible legacies, which must be delivered over time.

Even though Rio 2016 has failed to plan effective leveraging strategies for intangible and environmental legacies, residents had good expectations of such legacies at earlier stages. Rio 2016 did have a sustainability management plan, which presented some strategic objectives related to environment and intangible legacies (Rio2016, 2013). In practice, these objectives were summarized in three programs – “Abraça” environmental sustainability, “Transforma” culture, and “Celebra” education. The existence of those programs before the Games might have helped residents to hope for positive intangible and environmental legacies. However, those programs had a very short life span, not surviving after the Games and not providing any effective leveraging strategy. The programs had a premature death because Rio 2016 did not have a budget to fund them after the Games, indicating a lack of commitment with sustainable legacies. Actually, the fate of those three programs exemplifies what has consistently happened after all Games: very little attention is paid to intangible legacies once the party is finished. The lack of commitment confirms Samuel and Stubbs’ (2012) assumption that environmental and sustainability plans exist basically to legitimize organizing committees, which rarely plan effective and realistic actions. This study showed that the same happened not only for environmental legacies, but also for intangible legacies, such as culture and education, in Rio 2016. Future hosts should bear this in mind, create long-term programs, and care about effective leveraging strategies for intangible and environmental legacies. This should give residents a good reason to support the Games.

Effective strategies to leverage intangible and environmental legacies do not cancel out the necessity of effective plans to leverage tangible legacies. As the Games get closer and some of the promised tangible legacies are not delivered (as it happened in Rio), residents tend to support less and less the event. Despite the clear appeal of tangible legacies, research has informed that such benefits are often overstated in pre-stage periods and not delivered timely (Porter & Fletcher, 2008). Consequently, results of the current study pose a challenge

for organizers of sport mega-events. If tangible legacies are promised and not delivered by the year of the event, perceptions of legacies will be negative, and residents will support significantly less the event. Considering the importance of popular support, organizers and governments should work honestly and establish realistic goals in terms of structural and economic benefits for the host community. To build local support, they should benefit more from fewer and more attainable goals than from numerous and unrealistic ones. Longitudinal findings show that residents cannot be deceived, mainly in the long run. To summarize, from a practical point of view, organizers should have leveraging strategies to attain realistic tangible legacies. In the long term, the association between these strategies and those to turn intangible and environmental legacies into reality should be the best strategy to foster support in local communities. However, in the case study of Rio 2016, longitudinal findings showed that, to gain support, organizers have promised unattainable legacies, which then led to dwindling support as they fail to deliver them.

### **Limitations and Future Research**

The use of only one data collection point after the Games is a limitation of this study. Even with data being collected two years after the event, some legacies may need more time to be established. Therefore, future studies should consider multiple data collection times after the Games to assess legacies. Another limitation was the lack of control of other variables that might have affected residents' perceptions of legacies and intentions of support. Although we have controlled for demographic characteristics (age, gender, education, and household income), other personal characteristics might affect attitudes toward the Games. For example, profession and geographic location of residence of respondents (Weimar & Rocha, 2019) should be considered in future studies. Beyond personal characteristics, social experiences may have some influences on support intentions (Deccio & Baloglu, 2002; Gursoy & Kendall, 2006; Taks et al., 2016). For instance, Deccio and Balogly (2002)

proposed that community attachment plays an important role on popular support for sport mega-events. Previous investigations were not conclusive whether community attachment has a negative or positive effect on support (Gursoy & Kendall, 2006). Future studies may consider community attachment and other social variables as possible predictors of support.

After a comprehensive quantitative description of the relationship between perceptions of legacies and support reported in this study, future studies could consider an approach to understand how support is fostered in individuals and communities. Qualitative approaches, such as focus groups and in-depth interviews with residents may shed additional light in the quest to understand the process of how support is constructed and/or deconstructed in host communities. A possible limitation to extrapolate results of the current study to other host cities is the context in which Rio 2016 was hosted. The socioeconomic and political moment of Brazil during the Games might have added some extra negativity to people's answers, mainly at later stages of the preparation process and post-event. However, a turbulent socioeconomic context is far from being unique to Rio. Similar external context may happen in other host cities, but it should be taken into account when conducting comparisons. Future studies replicating the longitudinal design can clarify how much of the current results were in fact related to the investigation socioeconomic context.

The current investigation brought a contribution to theory and practice of organization of sport mega-events, in general, and the OG, in particular. The importance of understanding legacy as a multidimensional construct is highlighted in practice when the results show that, in different moments of the process, support relies upon either intangible and environmental legacies or tangible legacies. Plans and actions of sport mega-events' organizers should change. To garner support in local communities, they should focus on attainable tangible legacies and on effective actions to deliver intangible and environmental legacies.



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Table 1

*Important macro and micro socioeconomic facts surrounding Rio 2016 Olympic Games*

Period	Date	Fact
First	October 2009	Rio de Janeiro wins the bid to host the XXXI Olympic Games
	October 2010	Dilma Rousseff is the first woman to be elected president of Brazil
	December 2010	Brazil has an economic growth of 7.5% in the year (annual variation of gross domestic product - GDP)
	December 2011	Brazil becomes the world's sixth largest economy
	January 2012	Expansion of the International Airport of Rio de Janeiro starts
	June 2012	Bus rapid transportation (BRT) system starts running
	July 2012	Barra da Tijuca Olympic Park construction starts
Second	August 2012	London 2012 Olympic Games end
	August 2012	Rio Organizing Committee of the Olympic and Paralympic Games launches
	August 2013	Olympic Stadium Nilton Santos renovation starts
	December 2013	Brazil has an economic growth of 3% in the year (annual variation of gross domestic product - GDP)
	June 2014	Brazil hosts FIFA World Cup
Third	July 2014	Deodoro Olympic Park construction starts
	August 2014	People apply for Rio 2016 volunteer programme
	October 2014	Dilma Rousseff is re-elected president of Brazil
	December 2015	Brazil has an economic retraction of 3.8% (annual variation of gross domestic product - GDP)
	March 2016	Deodoro Olympic Park construction is ready
	April 2016	More than 500 families are evicted from Vila Autódromo favela, close to the Barra Olympic Park
	April 2016	Expansion of the International Airport of Rio de Janeiro concludes
	April 2016	Bus rapid transportation (BRT) system is 90% ready
	May 2016	Olympic Stadium Nilton Santos renovation ends
	June 2016	Olympic Village is ready
	July 2016	Plan to clean 80% of the Guanabara Bay fails
	July 2016	Barra da Tijuca Olympic Park is ready
	August 2016	Rio 2016 Olympic Games
After the Olympic Games	August 2016	National Senate removes Dilma Rousseff from office
	December 2016	Brazil has an economic retraction of 3.5% (annual variation of gross domestic product - GDP)
	February 2017	Olympic Park does not received adequate maintenance after the Games
	October 2017	President of Rio Organizing Committee, Carlos Arthur Nuzman goes to jail
	December 2017	Rio Organizing Committee has US\$ 884 million in debts

Table 2  
*Samples characteristics*

		2012	2014	2016	2018
Sample size		900	900	723	550
Confidence Interval		95%	95%	95%	95%
Margin of Error		3.3%	3.3%	3.6%	4.2%
Age					
	<i>M</i>	42.9	42.5	42.3	42.4
	<i>SD</i>	16.0	15.4	15.4	15.7
Gender					
	Female	53.9%	54.4%	55.0%	54.2%
	Male	46.1%	45.6%	45.0%	45.8%
Education					
	No college degree	78.9%	78.9%	81.1%	81.3%
	College degree	21.1%	21.1%	18.9%	18.7%
Household monthly income					
	Up to 3 minimum wages (low)	50.6%	50.1%	45.4%	48.9%
	Up to 9 minimum wages (medium)	32.7%	33.2%	37.6%	35.3%
	10 or more min. wages (high)	16.7%	16.7%	17.0%	15.8%

Table 3  
*Descriptive statistics and MANOVA results*

Legacies	2012 (n = 900)				2014 (n = 900)				2016 (n = 723)				2018 (n = 550)				MANOVA			
	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	<i>F</i>	<i>p</i>	$\eta^2$	Power
Economic	5.32	1.23	-1.02	.79	4.66	1.50	-.49	-.70	4.04	1.58	-0.30	-0.94	3.57	1.43	-.05	-.89	203.546	< .001	.166	1.00
Tourism	5.72	1.14	-1.38	2.18	5.04	1.42	-.74	-.22	4.44 <sup>a</sup>	1.62	-0.43	-0.69	4.36 <sup>a</sup>	1.44	-.35	-.64	156.077	< .001	.133	1.00
Structural	5.14	1.25	-.85	.39	4.57	1.49	-.52	-.56	4.01	1.51	-0.21	-0.77	3.59	1.33	.07	-.71	167.317	< .001	.141	1.00
Environmental	4.87	1.29	-.68	.04	4.31	1.60	-.33	-.87	3.51	1.57	0.16	-0.81	3.21	1.35	.28	-.54	195.308	< .001	.160	1.00
Sporting	5.58	1.15	-1.11	1.27	4.97	1.48	-.66	-.33	4.34	1.56	-0.30	-0.66	4.07	1.47	-.17	-.74	170.612	< .001	.143	1.00
Cultural	5.52	1.16	-1.06	1.10	4.93	1.44	-.62	-.38	4.32 <sup>a</sup>	1.56	-0.38	-0.67	4.25 <sup>a</sup>	1.46	-.25	-.69	139.163	< .001	.120	1.00
Psychological	5.37	1.23	-1.07	1.06	4.78	1.51	-.63	-.42	4.06 <sup>a</sup>	1.60	-0.29	-0.85	4.04 <sup>a</sup>	1.52	-.18	-.79	147.449	< .001	.126	1.00
Support	5.45	1.44	-1.20	.96	4.41	1.87	-.38	-1.10	3.86 <sup>a</sup>	1.67	-0.04	-0.99	3.81 <sup>a</sup>	1.49	-.10	-.96	169.810	< .001	.143	1.00

Note. <sup>a</sup> Difference is not statistically significant at  $p < .05$ .

Table 4  
*Fit indices and Wald chi-square test for parameter equalities*

	Moment			
	2012	2014	2016	2018
Wald test				
$\chi^2$	360.6	374.9	261.3	221
<i>df</i>	28	28	28	28
<i>p</i>	<.001	<.001	<.001	<.001
CFA				
CFI	0.954	0.965	0.970	0.951
TLI	0.949	0.961	0.966	0.945
RMSEA	0.052	0.060	0.073	0.064
[90% CI]	[0.050; 0.054]	[0.058; 0.061]	[0.070; 0.076]	[0.061; 0.068]
SEM				
CFI	0.960	0.983	0.986	0.970
TLI	0.957	0.982	0.985	0.967
RMSEA	0.051	0.049	0.044	0.046
[90% CI]	[0.048; 0.053]	[0.056; 0.051]	[0.041; 0.047]	[0.042; 0.049]

Table 5

*Item wordings, factor loadings ( $\lambda$ ), average variance explained (AVE), Cronbach's alphas, and composite reliabilities ( $\rho$ )*

Factors and items	2012				2014				2016				2018			
	$\lambda$	AVE	$\alpha$	$\rho$	$\lambda$	AVE	$\alpha$	$\rho$	$\lambda$	AVE	$\alpha$	$\rho$	$\lambda$	AVE	$\alpha$	$\rho$
LEGACIES																
Economic		0.50	0.776	0.781		0.62	0.850	0.851		0.58	0.843	0.844		0.50	0.763	0.764
Create more jobs	0.671				0.731				0.715				0.578			
Attract more investments	0.729				0.789				0.778				0.792			
Generate economic benefits for the population	0.703				0.827				0.797				0.699			
Improve the quality of life of the population	0.712				0.806				0.765				0.729			
Tourism		0.55	0.808	0.809		0.60	0.841	0.841		0.61	0.854	0.854		0.50	0.769	0.766
Increase the country's visibility as a tourism destination	0.752				0.757				0.756				0.643			
Increase the number of tourists in the country	0.684				0.706				0.734				0.640			
Improve the country's image as a tourism destination	0.788				0.825				0.803				0.766			





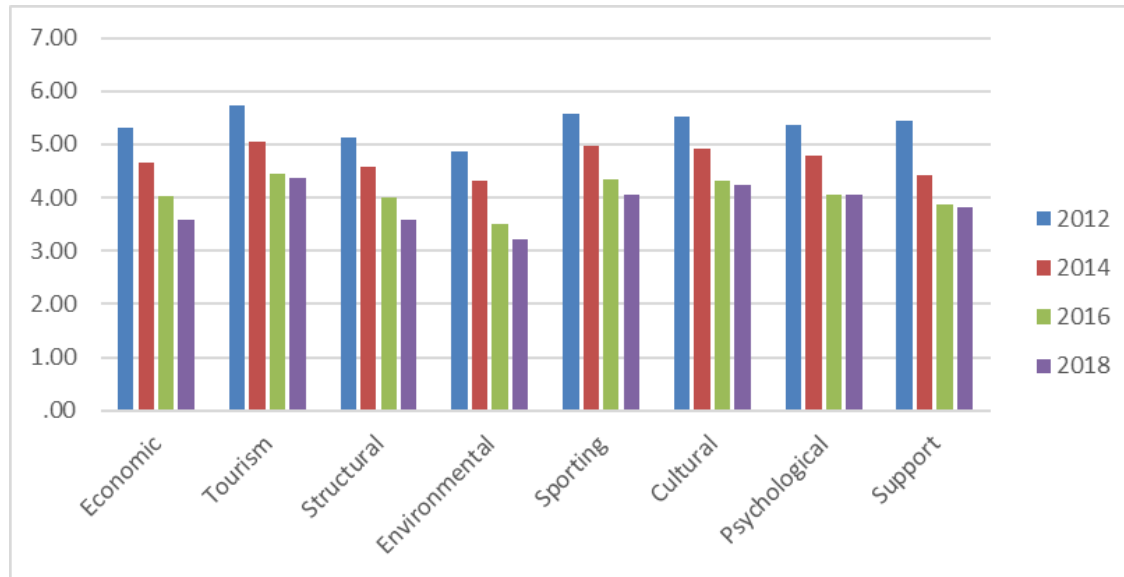


Figure 1. Variation in perceptions of legacies and support for the 2016 Rio Olympic Games

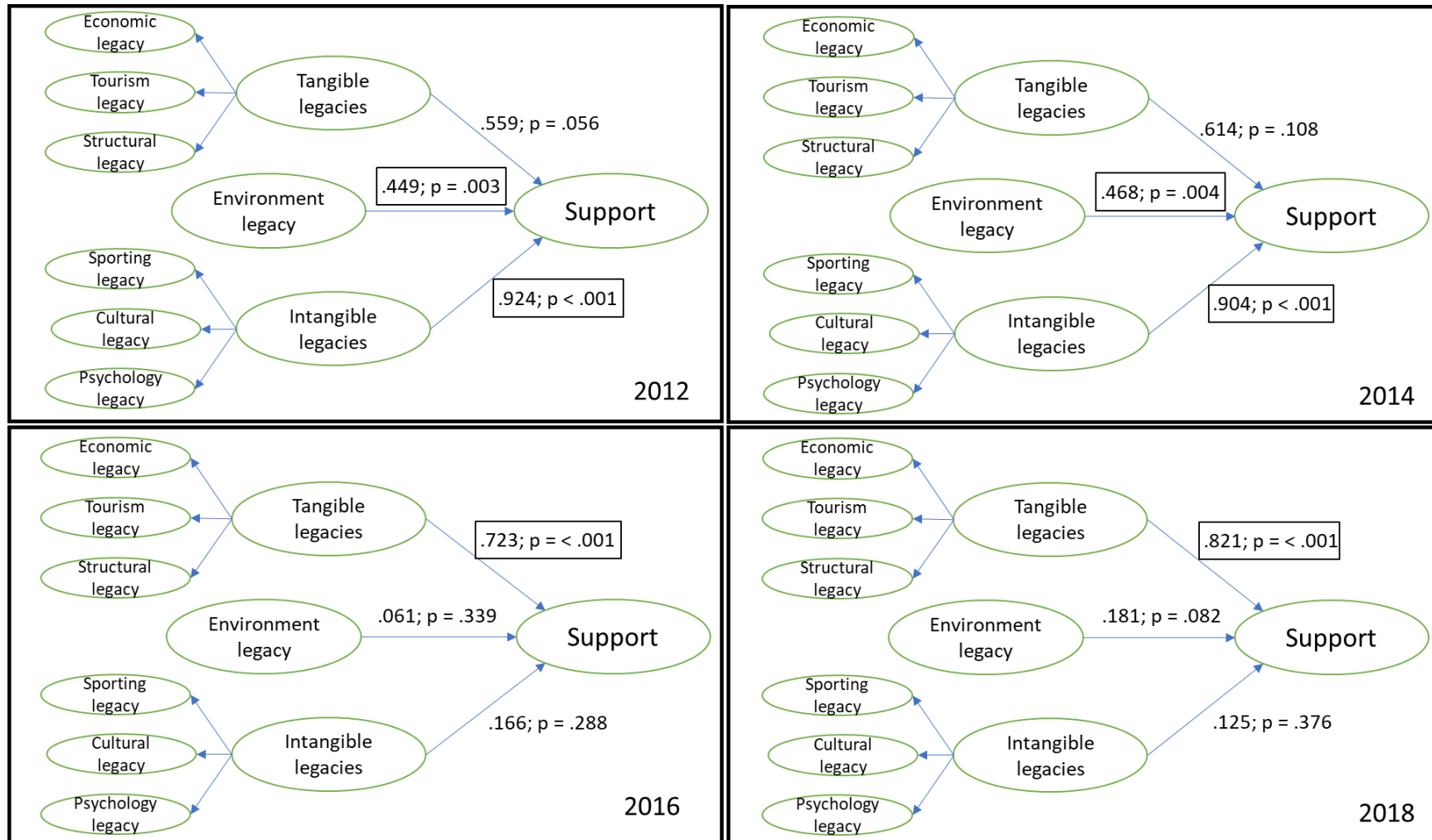


Figure 2. Standardized estimates of the relationships between legacies and support intentions for Rio 2016 in different moments of the process (significant path coefficients in frames)