

How effective is a double-host format for the World Cup and the Olympic Games? A systematic review of the 2014 World Cup and 2016 Olympics.

By

Jack Chapman

Programme of study: Bachelor of Arts (Honours) in Sport Management

Supervisor: James Bostock

Submitted: 4th May 2023

Key words: Event Legacy, Olympic Games, Football World Cup, Event Sustainability, Sports Mega-Events.

DECLARATION AND STATEMENT OF ORIGINALITY

I declare that:

- a) All work described in this report has been carried out by me, and all the results (including survey findings, etc) given herein were first obtained by me, except where I may have given due acknowledgement to others;
- b) All the prose in this report has been written by me in my own words, except where I may have given due acknowledgement to others and used quotation marks, and except for also occasional brief phrases of no special significance which may have been taken from other peoples work without such acknowledgement and use of quotation marks;
- c) All the figures and diagrams in this report have been devised and produced by me, except where I may have due acknowledgement to others.

I understand that if I have not complied with the above statement, I may be deemed to have failed the project assessment and/or I may have some other penalty imposed upon me by the Board of Examiners.

Signed: Jack Chapman

Date: 04/05/2023

Name: Jack Chapman

Programme of Study: Bachelor of Arts (Honours) in Sport Management

Table of Contents

Abstract	4
Introduction.....	5
Methodology	11
Results and Discussion	20
References	29

Abstract

Introduction: The researcher established the definition and typology of legacies to be utilised for the legacy measurement framework – these included: social, infrastructural, economical and environmental. A literature gap was identified that no study has yet looked at both the events as a holistic model.

Methodology: a systematic literature review was conducted in line with PRISMA guidelines, and an event legacy framework was used to measure these effects based from Muller (2021), Tsaor (2017) & Preuss (2019) legacy models.

Results: Papers researched were heavily bias towards residents perceptions, and rarely studied outside of Rio de Janeiro.

Discussion: Infrastructural legacy was the most positive legacy outcome for Brazil, who overall, did not score highly on the measurement model, scoring 39.2/100.

Introduction

The IOC and FIFA

The International Association Football Federation (FIFA) and The International Olympic Committee (IOC) are the two most influential organisations in the world of sport, with both organisations having more members than the United Nations, and host the two largest mega-sports events (MSE's) spectacles in the world – the Mens Football World Cup and The Olympics (Murray, 2002).

FIFA was founded in 1904 and is responsible for the governance of football in 6 continents across the world (with the exclusion of Antarctica) and aim to grow football globally, ensure accessibility for all with the focus of integrity and fair play (FIFA Statutes, 2015). FIFA has suffered from various corruption allegations, especially relating to former president Sepp Blatter, who was president throughout the bidding process and staging of the 2014 World Cup. However, with football being the most watched sport worldwide, FIFA will never feel the repercussions as they hold the media rights which will always be valuable as long as football is globally popular (Gill & Duarte, 2019).

The IOC was founded in 1894 by Pierre de Coubertin, who set out to improve opportunities within sport and provide practice and competitive elements (Chalkley & Essex, 1999). The Olympics has the greatest reach of any sporting spectacle in the world, with 3.9 billion viewers of the 2004 Athens edition of the games, and with this exposure it is no surprise that nations are desperate to host the prestigious games (Mason, Thibault & Misener, 2006).

Within this article the pinnacle of both of these organisations will be explored with the 2014 edition of the Men's World Cup and the 2016 edition of the Olympics, both staged in Brazil as a double-host format. With the amount of exposure each of these events receive it is essential that they leave an effective legacy for the host nation and cities.

Brazil as a host

When Brazil overtook the UK to become the 6th largest economy in the world in 2011, and had won the right to host the 2014 Football World Cup and 2016 Olympic Games, it was heavily anticipated that these mega-events would be a great success. Despite the sporting spectacles on show having many memorable moments and no major issues within the actual events, researchers must look deeper than what was presented on the surface to deem the double-host attempt successful or not (Grix, Brannagan & Lee, 2019). Brazil, like all host nations, were put on a global pedestal to showcase the attributes of their economy, tourism, infrastructure, culture, politics and event management (Kim, Choi & Kaplanidou, 2015), which can have both positive and negative repercussions depending on the perceived success of the events.

At the time of the bidding process, Luiz Inacio Lula da Silva (Lula) was the president of Brazil and impressed both FIFA and the International Olympic Committee (IOC) with Brazil's bids to host the Men's Football World Cup in 2014 and the Olympic Games in 2016, but by the time both events rolled around, Dilma Rousseff was elected as president, and ruled from 2011 until 31st August 2016, where she was suspended a week after the conclusion of the Rio Olympics. At the time of bidding in 2007 and 2009 respectively, Brazil had emerged as a regional leader and had established partnerships with less economically developed countries (LDC's) so had strong market position and power (de Almeida, 2016), this coupled with the fact that the IOC had stated that the next location for the Olympic Games would ideally be in South America made them the perfect candidates to host the games. The candidate and bidding files for the 2014 World Cup are officially unattainable for the public due to confidentiality of the documents, whereas the candidate files for the 2016 Olympic Games have been made public and can provide an insight to Lula's planning process, aims and objectives. The candidate files (2009) state that the success of the games would be judged against five key strategies: 1) engaging young fans; 2) social transformation; 3) regional outreach; 4) global promotion; 5) successful delivery. These strategies were considered and utilised when designing the legacy framework within this paper.

The budget for the 2014 World Cup was estimated to be \$9bn, but official figures state that the actual figure exceeded \$11bn (Statista, 2014), with some research suggesting actual expenditure was in the region of \$15-\$25bn, but was covered up due to corruption of the government at the time (Grix, Brannagan & Lee, 2019). Statista (2021) also reported that the Olympic games cost just under \$14bn with an original budget of \$4.6bn – overall this shows that the cost for both the World Cup and Olympic Games was over \$30bn, an overspending of 200% of the original budget when combining both events.

Due to this research and similar economical analysis, the spectacle of hosting mega-sporting events has lost its stardom within recent years, due to the inevitable economic risk taken by the host nation, with infrastructure and regeneration costs often outweighing the eventual revenue of the event, causing an increasing number of rejections by countries to bid for mega-events (Leal de Oliveira, Vainer, Mascarenhas, Bienenstein, & Braathen, 2020). In more recent years, Budapest, Rome and Hamburg all withdrew bids from hosting the 2024 Olympic Games due to the public being against hosting the games (Thomson et. Al, 2019). Despite this, there are numerous alternative benefits that can be sought by hosting mega-events that stretch far beyond monetary value,

including new stadia and sporting facilities, urban regeneration, improved international reputation, decreased unemployment rates, increased health amongst the population and increased tourism (Gratton, Shibli, & Coleman, 2006; Kim et al., 2017).

The Mega-Event Legacy

Mega-events are becoming increasingly expensive to host due to the globalisation of sport in the modern era, which has caused many events to become multi-billion-pound projects for host nations and cities (Preuss, 2019), which often leads to the events resulting in a huge financial loss for the host nation, making legacy benefits essential to key stakeholders of the event (Nordenhagen, 2021). Sports legacies have been a discussed concept since the 1980's, but despite this there is still a demand for event organisers to place more emphasis on long-term plans during the bidding and planning processes (Thomson et. Al, 2019). This is most likely down to event organisers having limited resources in the build up to the event, forcing them to reallocate these resources to the operational side of procedures, resulting in a lacklustre legacy strategy (Jago et al., 2010). The importance of legacies is highlighted by the work of Hiller (2012) who stated that mega-events are now only desirable because of their legacy potential to host nations, which is no surprise, as these nations can use the events to act as a catalyst for planning and strategies to transform the host cities (Kassens-Noor et. Al, 2015).

Defining Legacy

Legacy is a concept that has been widely researched and recognised as an essential part of the mega-event process since the early 2000's, but the majority of literature in the topic area is not credible (Preuss, 2015) and lacks a considerable amount of consistency when relating to definitions (Thomson et al., 2013). There is also a lack of papers that study the legacy of a mega-event for a prolonged period of time such as over 5 years after the event has finished, which is a more reliable and valid measure of the long-term impact that an event may have had on the host nation (Preuss, 2019). Cashman (2006) changed the perspective of event legacy and stated legacy is a self-explanatory term so does not require a recognised definition, but despite this many researchers have set out to produce an adequate definition. Fuller and Clinch (2000) defined event legacy as capturing the true value of facilities and public amendments through community and sporting bodies usage after an event has concluded, but this definition is heavily criticised due to its scope which only focuses on infrastructure and social impacts. Setting out to broaden the scope on legacy definitions, Leopkey & Parent (2012) explored various other types of legacy, such as environmental, social, sporting, cultural and political. One of the most credible researchers in the event legacy topic area is Holger Preuss, who defined event legacy in 2007 as planned and unplanned, positive and negative, intangible and tangible structures created not only for the event by organisers, but by the event itself. This was then expanded upon by Chappelet (2012) who added the idea that legacies could be global or local and sporting related or non-sporting related, whilst also emphasising the aspect of key stakeholder perspective on event legacies (i.e., the perspective of the general public could differ from the event organisers) which provides a framework for legacy analysis from different stakeholder groups.

The early definitions of event legacy were heavily focused on the outcome measures of the legacies, but overtime researchers have begun to recognise these legacies as more of a process overtime that begins with the bidding process, is boosted by the successful delivery of the event and then lasts for multiple years after the event, with the essential aid of government policies and schemes (Mair, Chien, Kelly & Derrington, 2021). However, considering this, Leopkey & Parent (2012) recognised that legacies are an unrealistic measurable outcome for organising committees as they are often a temporary organisation and disband once the event has reached its conclusion, demonstrating that long-term legacy planning is never as thorough and efficient as it first seems. Naturally, this provides further issues with pinpointing the causality of potential legacies due to prolonged timeframes and various extraneous variables having the potential to cause certain trends (Preuss, 2007). An implication with the event legacy concept is that researchers are often prone to looking at the positive and tangible aspect that the legacy provides (Matheson, 2010; Thomson et. Al, 2019). When studying legacies, often researchers do not look at the broader picture, and should place more focus on the motivation behind creating a legacy and putting policies and initiatives in place to do so (Kassens-Noor et. Al, 2014).

Collating this body of research, perhaps the most holistic definition and criteria for a mega-event legacy comes from Preuss (2015) who states legacies are a by-product of hosting mega-events, which: 1) last longer than the actual event; 2) offer new opportunities to key stakeholders through government initiatives; 3) produce outcomes that are both positive and negative for these stakeholders; 4) produce outcomes that are both tangible and intangible; 5) have a wider impact than solely the host city or nation, sometimes spanning internationally; 6) develop both directly and indirectly from the event in question.

Classifications of Legacies

Ritchie (1984) was a pioneer of legacy research and provided that event legacies had multiple different forms such as economic, physical, psychological, socio-cultural and political, which all could affect international perception, cultural knowledge, infrastructure improvements and increased tourism spending. Brown & Massey (2001) and Nordenhagen (2021) support the work of Ritchie, but added the aspect of sporting legacies, and proposed that infrastructure had its own legacy, and was not simply a by-product of another legacy type. Though this research is heavily focused on what Brazilian citizens would gain from the double-hosting, Travis and Cioze (1987) highlighted that legacies are multi-dimensional and various stakeholders can benefit from legacy impacts. They placed emphasis of the importance of psychological legacies on event organisers and governing bodies, stating that hosting events would contribute to the gaining of knowledge, to ensure they were better prepared for the running of any future events. This theory can be applied to Brazil's strategy to hosting the two largest sporting events in the world, as prior to this they hosted the 2007 Pan American Games and the 2013 Confederations Cup which was seen as a trial run for the World Cup and Olympics (Mundim & Silva, 2019). In 2009, the IOC categorised legacies with their own definition, stating that sporting, cultural, economic, urban and social legacies were all a recognised priority by the governing body, which would later materialise into a key pillar of the Olympic Agenda (2020). Expanding on this, Witt et. Al (2015) provided an insight into a further category of legacy – a health legacy, which was deemed a vital part of planning for event organisers and policy makers, and

after the 2014 World Cup there was a large demand for a better integration of public services, healthcare and event security. Overall, Preuss (2015) stated that amongst all legacy literature, the most frequently mentioned are economical, infrastructure, social, sport and environmental, which will be used as a key measurable within this systematic review.

Economical Legacies

Economical legacies relate directly to the impact that a mega-event has on the host nation/cities gross domestic product (GDP), job opportunities and employment/unemployment figures, tourism numbers, economic welfare and event revenue, with all these factors needing to be considered within the context of the overall expenditure for the event in question (Li & McCabe, 2013). Measuring the economic legacy can be extremely difficult due to there being numerous monetary streams for mega-events in the form of the city, the state, federal government and the public sector and multiple sources are in the form of 'opaque costs' such as land grants and tax benefits (Zimbalist, 2016). Muller et al. (2021) found supporting evidence of this difficulty and found that budget balance is amongst the least sustainable aspects of mega-events. A key finding from this study was that the Olympic games have become less economically sustainable every time a new edition of the games is staged, this is despite an increased emphasis on sustainability, with it being one of the IOC's pillars of Olympism. This paper will set out to collate literature relating to the economic legacy of both the 2014 World Cup and 2016 Olympics by looking at the abovementioned measures of economic legacies.

Environmental Legacies

An environmental legacy is designed to use sporting events to promote environmentally friendly practices from the organising committees, and can influence fan behaviour to comply with these initiatives (Casper & Pfahl, 2015). Although Konstantaki & Wickens (2010) found that spectators and the general public showed little to no awareness of environmentally friendly initiatives whilst at mega-events, showing that governing bodies should do more to promote these types of legacies. The environmental legacy can be measured by assessing the components of transportation advances, urban regeneration, sustainable construction, environmental conservation clean up and waste management (Kellison & Casper, 2017). Both governing bodies in question within this research paper, the IOC and FIFA, have been accused of 'greenwashing' – a term that means they have claimed to promote and implement positive environmental impacts, whilst actually making a minimal effort to incorporate these into planning processes (Thomson, Schlenker, & Schlenker, 2013). This is supported by the work of Kellison & Casper (2017) who state that advances in technology has allowed stadia to become more environmentally friendly, but often, aesthetics is seen as more of a priority for organising bodies to uphold a strong image of the host nation or city. Kellison (2015) supports this further with evidence that stadiums built for one-off sports events are used infrequently after the event, and when in use can place large strain on public resources due to masses of individuals travelling to one venue. Preuss (2013) states that these shortcomings are as a result of temporary organisations disbanding once mega-events have finished, so therefore the

responsibility should be shifted onto the permanent government to continue the environmental legacy.

Social Legacies

The social classification of legacies relates to the perceptions of local residents as well as the wider community within the host nation (Chappelet & Junod, 2006). Although social legacy is an adequate measure of legacy impacts after the staging of a mega-event, event organisers tend to favour an emphasis on economic legacies as they are easier to measure and relay back to the public (Kim & Petrick, 2005). This neglect is because social legacies are the most difficult to measure, due to their heavily qualitative nature (Mair, Chien, Kelly & Derrington, 2021; Weed, 2011). Though, the 'feel-good factor' felt by residents post-event is short in duration and relies heavily on how the host nation have performed at the event (Ritchie 2000). Social legacies can be measured by sporting participation numbers, crime rates, health of the population and public opinions (Bob & Swart, 2010). It is evident with this classification of legacy, that different types of legacies are interlinked, with new facilities having the ability to impact participation, whilst also leaving an infrastructure legacy (Allmers & Maennig, 2008). Although, there is a large responsibility for National Governing Bodies (NGB's) to have strategies in place to unlock the social legacies full potential (Frawley & Cush, 2011), hence, engaging stakeholders such as NGB's in the planning phase of the event can enable them to create legacy strategies to maximise the reach of sporting programmes (Attwell, Morgan & Parker 2019). An example of where this had failed was at the Sydney Olympics in 2000, where Toohey and Veal (2005) found there was no change in participation amongst multiple sports due to failing to secure an adequate strategy beyond the games.

Infrastructural Legacies

The majority of overspending in major events is due to the need of new facilities and infrastructure, but this can lead to improved participation within local communities and sports clubs (Nordhagen, 2021), but many of these venues are not used after the event has reached its conclusion (Gratton, Shibli, & Coleman, 2006; Jago et al., 2010). Despite this conception, in a systematic review of every Olympic Games held between 1992-2020 Muller et al., (2021) found that venue usage is amongst the most sustainable aspects of the games, although, countering this, a longitudinal study would be required for events hosted between 2004-2020 as measuring the full effects of legacies can be most effectively done 15-20 years after the event, as event legacies have a much longer life span than many researchers and stakeholders realise, spanning from the moment that the bidding process has begun, to 15-20 years after the event, producing a 25-year period where legacy effects can be felt (Reis et al., 2019).

Rationale

In 2017, when the IOC abandoned the usage of their Games Impact Study (OGI) there then became no recognised framework or benchmark for the evaluation of mega-events to assess their legacy

impacts on host nations. The rationale behind this paper is to provide an updated framework from Muller's sustainability framework (2021) by combining the framework with aspects of the OGI study (2014). Although multiple papers have studied Rio 2016 and the 2014 World Cup as separate phenomenon's, no current paper takes a more holistic approach and focuses solely on the double-host format of both events. This paper will take this holistic approach, aiming to aid with advances in legacy literature and legacy policy, and inform decisions made by policy makers and authorities that are bidding for future games when considering if the ends justify the means. With the United States of America having won bids for the 2026 World Cup and 2028 Olympics this paper will act as a baseline of what is deemed a sustainable legacy strategy and what is not in the context of a double-host format, and will allow decision makers to adapt and assess current policies. It will also materialise as a framework for scholars to conceptualise and evaluate mega-events which have not been explored in this paper, to evolve the field of research in the topic area.

Methodology

The search strategy

The researcher selected a systematic literature review in order to compile a body of relevant research and present conclusions to inform evidence-based decisions (Xiao & Watson, 2019). This is done through systematically searching, filtering, reviewing, critiquing, interpreting, synthesising, and reporting information in the research process (Pati & Lorousso, 2018). The following systematic literature review was created in line with the checklist from the Preferred Reporting Items for Systematic Reviews and meta-analysis (PRISMA). To conduct the literature review, the researcher undertook a comprehensive literature search to identify all papers relating to the legacy impacts of the 2014 Men's Football World Cup and the 2016 Rio Olympics. The search strategy was compiled before undertaking any research and gathering materials. This involved selecting two reliable search engines that would generate a large depth of articles and knowledge surrounding the subject area – the two search engines selected were Google Scholar and the University of Derby (UDO) Online Library Service.

8 separate searches were devised, 4 for each legacy typology for both the 2014 World Cup and the 2016 Olympics. The key search terms were selected for inclusion after analysing a combination of papers surrounding each typology of legacy (economical, environmental, infrastructural and social legacies) and selecting the most frequently used subject terms from these papers.

For the environmental legacy category, the search terms were: 1) 'environment' 2) 'sustainability' 3) 'green' 4) 'eco-(friendly)'.

For the economic legacy category, the search terms were: 1) 'economic' 2) 'GDP' 3) 'Tourism' 4) 'expenditure'.

For the Infrastructural legacy category, the search terms included 1) 'Infrastructure' 2) 'Urban regeneration' 3) 'transport' 4) 'facilities'.

For the social legacy category, the search terms included 1) 'social' 2) 'public perceptions' 3) 'sports participation' 4) 'health'.

Each advanced search contained Boolean operators according to which thematic category was being searched – these operators combined the key words with the baseline search terms of '2014 World Cup' or '2016 Olympics' with the words AND, OR which can broaden results, ensuring articles where synonyms have been used are not ignored within the review (Bramer et al., 2018). These key words were searched to be anywhere within the title of the articles. To ensure no paper was missed from this search, the researcher conducted 3 insurance searches to increase the possibilities of collating all relevant data – these insurance searches consisted of searching less specifically than the abovementioned search strategies with the terms '2014 World Cup Impact', '2016 Olympics Impact', '2014 World Cup and 2016 Olympics'. Finally, the researcher also utilised official reports published only on FIFA and the IOC website relating directly to the impacts of the games.

Inclusion and exclusion criteria

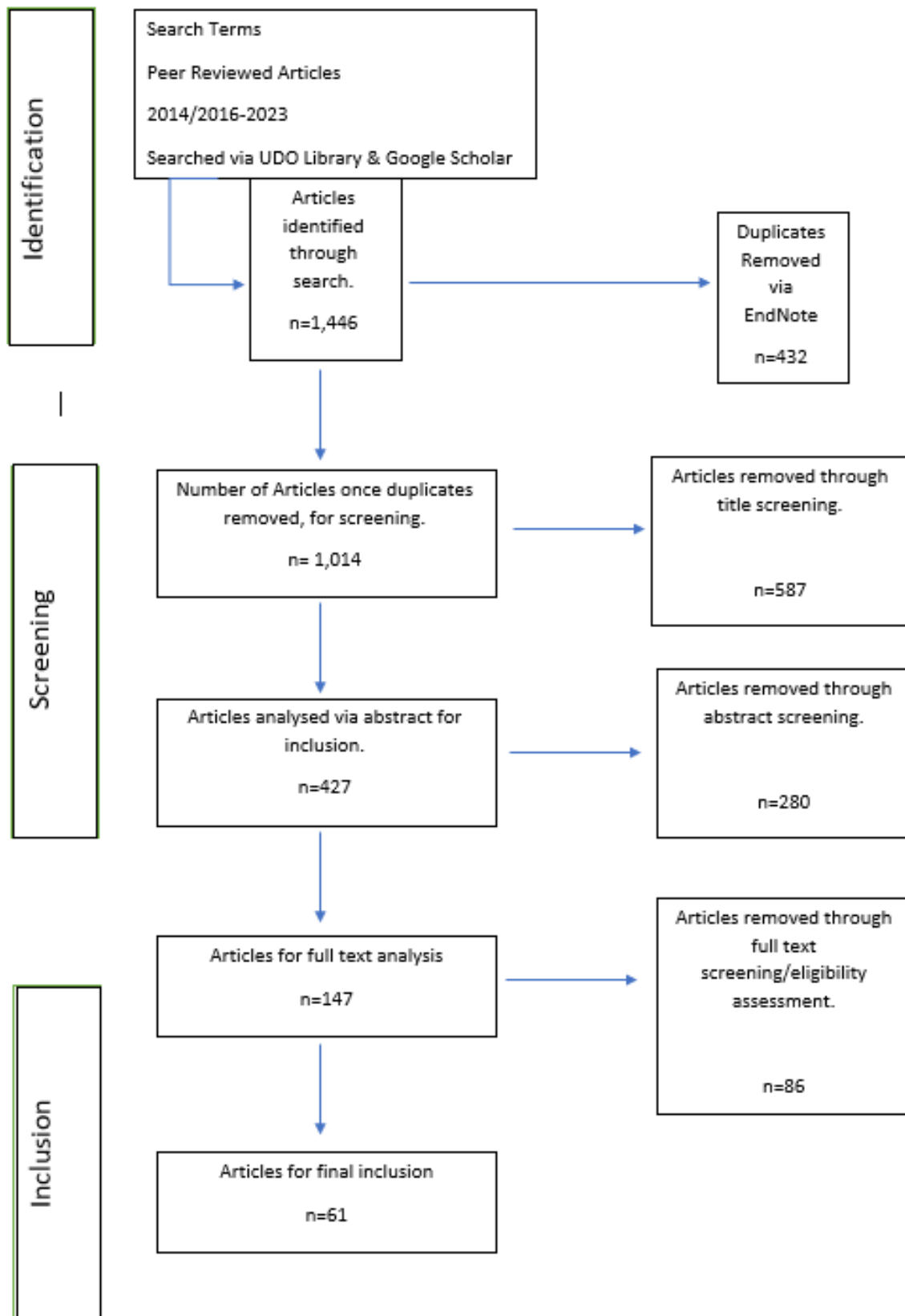
The researcher wanted to put an emphasis on peer-reviewed journal articles and official reports only for the literature review, so other academic works such as book chapters, thesis papers and conference notes were all excluded from the search. All articles searched were published from 2014-April 2023 for the World Cup literature and from 2016- April 2023 for the Olympic literature, to ensure that only post-games legacy effects were monitored and to ensure a degree of temporal validity, meaning findings were relevant to the time (Hulling, Henry & Noon, 1990), and have been peer reviewed by industry experts to guarantee the quality and accuracy of information provided (Tennant & Ross-Hellaur, 2020). Any articles chosen for further screening must provide a direct link to the legacy of either of the two events or both. Any articles that exclusively focused on other staging's of either of the events were discarded as this study solely looked at the Brazilian hosting of the events. To eliminate misinterpretation through language barriers, any articles written in a language other than English were discounted.

Screening process

The search terms and filters were applied to the initial searches, which returned 1,446 articles, which were then screened for duplicates using the software EndNote – these were then removed from the research list to ensure data was only encoded once (n=432). The first phase of screening saw 1,014 articles screened through a title analysis – articles that were written on either of the MSE's in question were then inputted them into an excel spreadsheet database (n=427). Within this database, the researcher recorded the following categories of each paper: Title, Authors, Year and Abstract. The secondary phase of screening was an eligibility process which involved analysing the abstract of the articles within the database, and then grading them based on their alignment with the inclusion criteria – papers that were certain for inclusion were graded as a number 3, articles that needed further examination were graded as a number 2, and articles that were certain for

exclusion were graded a number 1, and subsequently removed from the database (n=280). Finally, grade 2 and grade 3 papers (n=147) entered the last stage of screening, which involved the researcher accessing the full text for a deeper understanding of the literature. At this stage, the methodology, sample size, geographical location, legacy perspective and key findings were all recorded. Papers at this stage were removed if they did not explore legacy outcomes post-games compared to pre-games, lacked a recognised methodology for data collection, or did not qualify for the inclusion criteria (n=86). All papers then deemed to be eligible for inclusion (n=61) were inputted into the legacy measurement framework proposed below. This screening process was adapted from the one used by Pahlevan-Sharif, Mura & Wijesinghe in their systematic literature review of systematic reviews in tourism (2019). The full screening process is shown visually in Figure 1.

Figure 1: PRISMA Flowchart showing number of articles within each phase of screening.



Data Extraction

An extraction model for the data was derived from the model suggested by Thompson et al., (2019) which details the categories that were screened, a definition of these proposed categories, and the methods used to extract this data. Primary authors were screened in order to identify accredited researchers in the event legacy field, and the year of the publications were screened to ensure no papers were published before either event commenced, and to evaluate the temporal effects on legacies, as they can last up to 20 years after the conclusion of the event (Reis et al., 2019). Within this methodology, using the work of Preuss (2015), a legacy typology was devised categorising the papers into social, environmental, infrastructural and economic legacy types – in some cases, papers analysed multiple legacy types so were coded twice within the results section. The perspective angle of the legacy was also extracted, based on the work from Chappelet (2012) who emphasised that legacies are dependent on the stakeholders perspectives (i.e. what is deemed a positive effect for a construction company, may have been a negative legacy for communities that have been evicted as a result of the works). Data collection methods and sample size of the articles were extracted by analysing the methods section of articles, and geographical location was also deemed an important categorisation by the researcher as legacies can have differing effects on different communities. Finally, key findings were extracted from the full text and results section of the papers ready for analysis in the results section of this paper. The full details of the data extraction process are detailed in Table 1:

Table 1: Data extraction categories, definitions and methods

Category	Description	Extraction Methods
Author	Categorised by: • First/Primary Author responsible for writing the article.	Direct extraction via citation
Year of Publication	Categorised by: • Year article was published in academic journal.	Direct extraction via citation
Type of Legacy	Categorised by: • Type of legacy investigated – social, infrastructural, economic and environmental. • Some papers may be coded twice due to multiple typology approach. • For papers that had no clear typology within the abstract, a full text analysis was undertaken.	Direct extraction via abstract/key words/title and/or interpretation via abstract/full text.
Methodology and	Categorised by:	Direct extraction via abstract and/or interpretation via full

Sample Size	• Type of data collection used. • Sample size of participants. • Abstract screened initially, if no methodology was present then a full text analysis was undertaken.	text/methodology sections
Region of Analysis	Categorised by: • Area or region participants were from. • National or Regional classifications	Direct Extraction from Abstract/Full text
Perspective of Legacy	Categorised by: • What groups of individuals were interviewed. • Whose opinions were considered. • Key stakeholders all have differing legacy impacts (i.e., Residents, Government, Tourists)	Interpretation via full text analysis
Key Findings	Categorised by: • Most important conclusions taken from the articles. • Any hypotheses that were supported. • Wider effects on the community/host nation.	Interpretation and direct extraction from abstracts, results sections and full text.

Legacy Framework Model:

Using existing literature as a basis for a model

In order to analyse the findings of this systematic literature review, the researcher developed a legacy framework model, which is versatile and can be adapted to measure previous and future MSE legacy effects. According to Preuss (2019), there is a gap in literature surrounding the measurement of legacies, but an adequate starting point is using the pre-determined objectives set by governing bodies detailed in the bidding process of the games. Despite this, Muller et al., (2021) highlights how measuring event legacy is highly subjective, and differing models will produce differing results, and, in some cases, some researchers using the same model will produce differing results due to interpretation differences. This is in line with the findings of Chappelet (2012) who states that legacies subjective nature makes the measurement of them less credible.

Model Development

The framework used within this paper uses aspects of Preuss' Legacy Measurement model (2019), Muller et al.'s sustainability model (2021) and Tsaor et al.'s Legacy measurement framework (2017). After an analysis of legacy measurement framework literature, the researcher decided upon combining attributes from these three models as they were the most suitable models that aligned with this study. Preuss' model (2019) influenced the proposed model as the measurement indicators are interchangeable according to the events objectives, and provided a basis for the 4 types of legacy within the model. Muller's model (2021) is responsible for the weighting of each legacy typology, which contains 3 separate legacy indicators that are interchangeable according to the event – this increases reliability as legacy types are able to be measured across a range of different attributes. This model also shaped the data scoring aspect of the model, assigning an equal weight to each legacy typology, to be detailed below. Tsaor's model (2017) contributed by providing measurable indicators for each legacy typology, and further developed the weighting framework, by recognising some indicators were primary objectives that required more weighting, and some were secondary objectives that required less.

The legacy framework model

The analysis within this model provides a holistic framework that considers and incorporates social, economical, infrastructural and environmental indicators to provide a judgement on the overall sustainability of Brazil's MSE era. The researcher used Preuss' definition and typologies of legacies (see introduction) as a basis for this model, along with other literature that made up the other components of the model (as described above). The idea of the model stemmed from the researcher identifying a gap in event legacy literature, which was that little research had been done to analyse the effects of both MSE's that Brazil hosted from 2014-16, which was surprising as given the prolonged time periods that legacies are effective for, these effects should overlap, creating one mega-legacy.

The model features three measurable indicators for each legacy typology – two of these indicators were considered 'primary' measures, meaning the data was rated out of 10, and one of the indicators was considered a 'secondary' measure, meaning the data was scored out of 5. Overall, this gave each 4 legacy typologies an equal weighting of a maximum of 25 points, amassing to an overall legacy spectrum score rated from 1-100, where 100 is a fully positive event legacy, and 1 is a fully negative event legacy. The measurable indicators for each legacy typology were designed by cross referencing Tsaor's legacy measurement framework (2017) with data collected within the systematic literature review. The indicators were as follows:

For economic legacies i) Budget Balance Analysis (Primary); ii) Tourism effects analysis (Primary); iii) Local Economy and Business Analysis (Secondary).

For Social Legacies i) Training and Education Analysis (Primary); ii) Social Capital Analysis (Primary); iii) Health and Participation Analysis (Secondary).

For environmental legacies i) Air and emissions analysis (Primary); ii) Water Contamination Analysis (Primary); iii) Project Fulfilment Analysis (Secondary).

For Infrastructural legacies i) After usage of venues (Primary); ii) Transport impact analysis (Primary); iii) City image analysis (Secondary).

The differentiation of primary and secondary weighted indicators related to the impact and relevance of the indicators on the overall legacy impacts – this was predetermined by the researcher before data collection took place, although there is never a full degree of certainty that the impact of the indicators is as a result of the MSE's in question (Muller et al., 2021). The full visual model can be seen in figure 2.

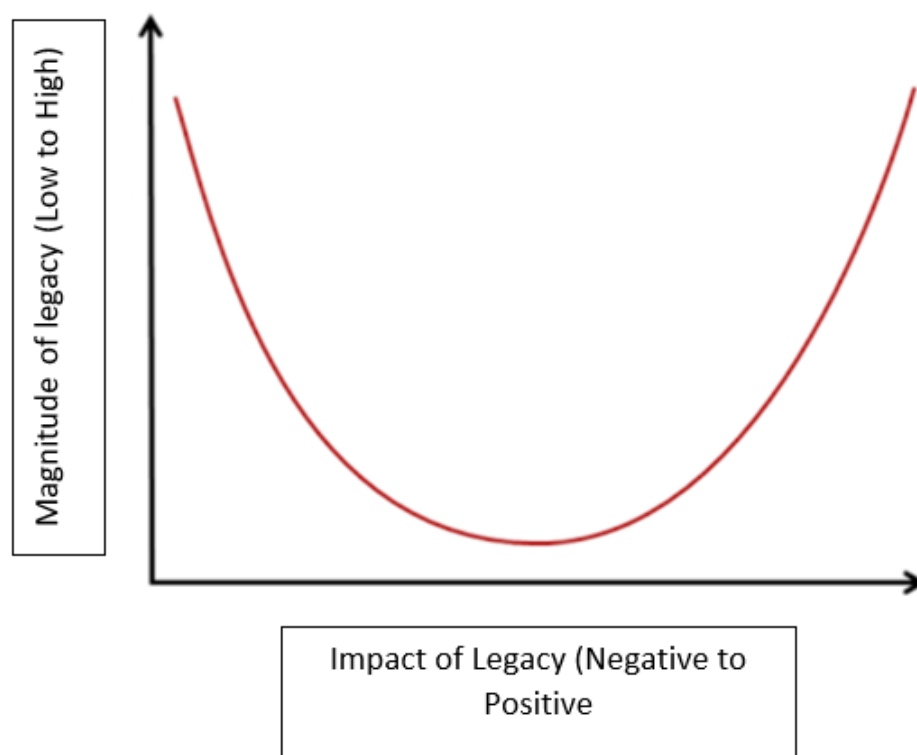
Figure 2: The proposed event legacy framework



The model in practice

Once the literature review was compiled, the researcher conducted a thematic categorisation of key findings across all literature and all findings were then assorted across the 12 indicators of event legacy. Each key finding was then ranked from 1-5 or 1-10, depending on its primary or secondary objective classification – this ranking was analysed by the researcher, considering the magnitude of the impact and whether it was positive or negative – i.e., a strong, positive impact would result in a 8-10 rating, a weak, positive impact would result in a 5-7 rating, a weak, negative impact would result in a rating of 3-5 and a strong negative impact would result in a rating of 1-2. This enabled the results of the legacy framework to be presented along a spectrum, as shown in Figure 3. These ratings were then accumulated within their indicator categories and divided by the number of datasets or findings that had been analysed. This produced the indicator sub-category score, which was then combined with the remaining two indicator scores to produce an overall score for the legacy typology. Once all four legacy typologies had a score, this score was then accumulated to give a total score out of 100.

Figure 3: The event legacy spectrum



Results and Discussion

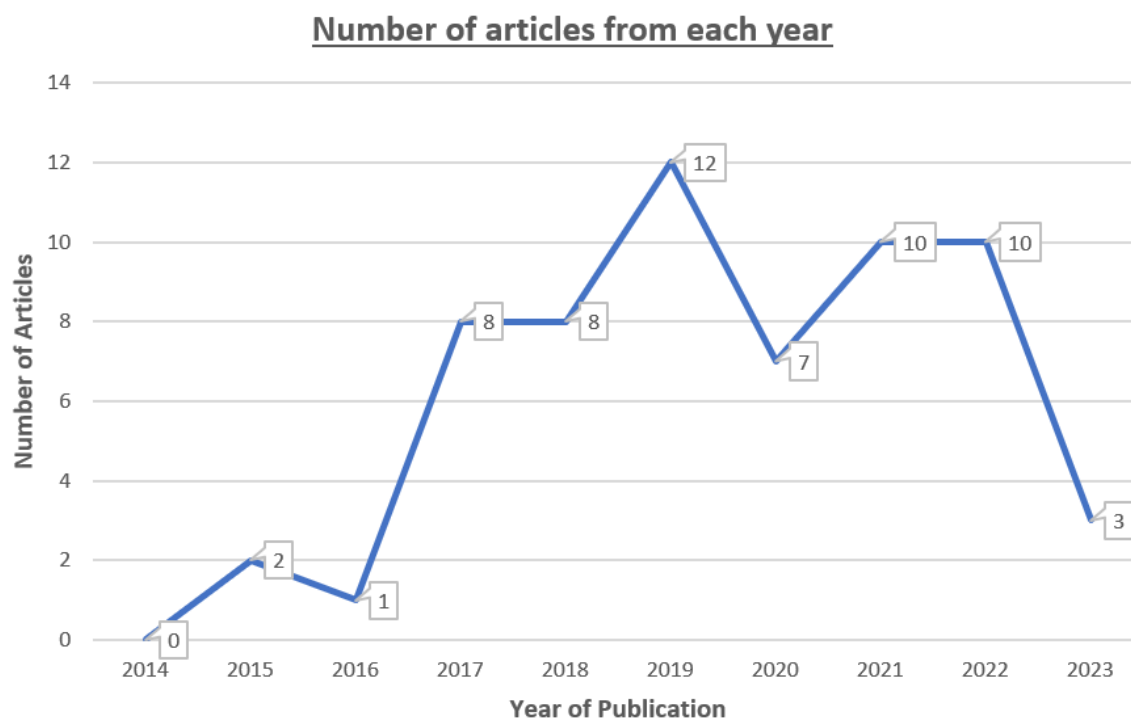
The following section will be a combined results and discussion – the results will be split in to two parts, the first being the results from the systematic literature review, and the second being the measurement of the legacy impacts using the proposed legacy framework (detailed in methodology).

Systematic Literature Review

Year of Publication

As highlighted in table 2, the publications that were reviewed were most frequently published from the periods of 2019-2022, with 64% of articles coming from this 4 year time period, the peak coming in 2019. At both ends of the time scale there is little to no literature available – in the earlier years this may be because analysing legacies is a process that takes time, so longitudinal datasets may not complete (Ribeiro, Yoda, Papadimitriou & Correia, 2022); and in the more recent years this could be explained as there have now been newer staging's of both events, causing researchers to prioritise these events instead.

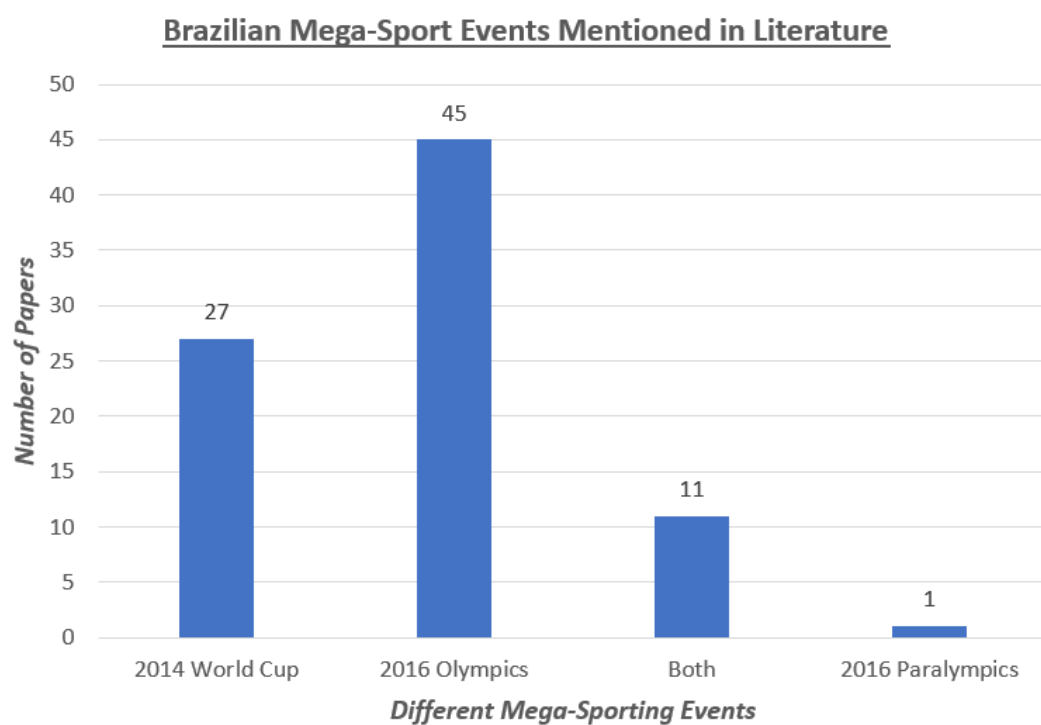
Table 2: Year of publication by number of articles



Is the sample even for both events?

As shown in table 3, it is clear that there is considerably more research regarding the legacy of the 2016 Olympics than there was the 2014 World Cup, with almost double the number of papers. This suggests that the World Cup could require a larger body of literature to understand the legacy effects to the fullest. Considering their legacy impacts have an overlapping timeline, only 18% of the papers that were reviewed looked at both MSE's, which further highlights this gap in literature; furthermore, only one article mentioned the impacts of the Paralympics in conjunction with the Olympics, supporting the work of Misener, Darcy, Legg & Gilbert (2013) which states that paralympic legacies are under researched and not seen as much of a priority as the Olympic Games.

Table 3: Number of Papers directed towards each mega-event that Brazil hosted.

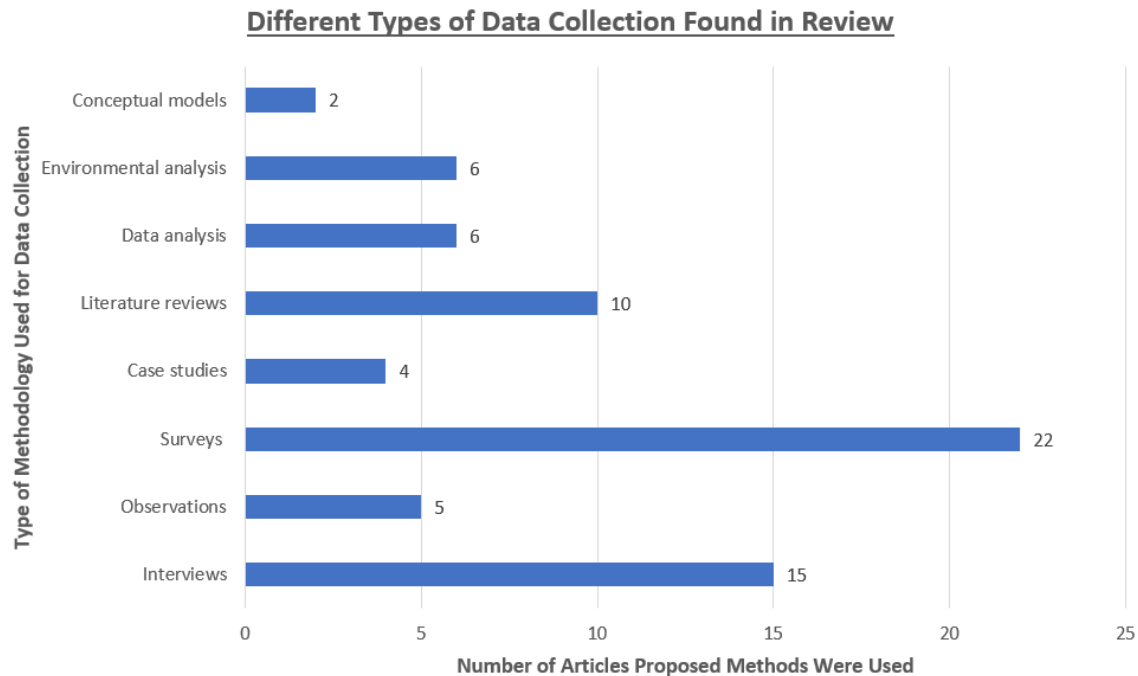


Data Collection Methods

As shown in table 4, many different methods are deployed by researchers to measure event legacy, with surveys and interviews amongst the most frequently used methods (36% and 24.5% respectively). 13% of articles used a mixed methods approach, combining multiple data collection techniques. A recognised data collection method has not been developed as of yet for legacy outcomes, due to the numerous different perspectives that need to be considered (Chappelet,

2012), and the tangible and intangible nature of some legacies (Preuss, 2015) – this explains the widespread variety of methods used within legacy literature.

Table 4: Frequency of methodology types within analysed papers.



Sample sizes

Where applicable, sample sizes were extracted from the articles, and then categorised in intervals of 500. The largest sample contained 3,909 participants (Taks & Rocha, 2022), and 19 articles had no explicit sample size, typically due to the nature of their methodology. As shown in table 5, the majority of studies that had a sample of participants only studied a very small number of individuals, with 64% of these studies having 1-500 participants. Legacy is something that can affect large amounts of people indirectly or directly, so the sample sizes should be a reflection of this and should be measured according to an 80% statistically significant outcome (Andrade, 2020), but smaller samples may be as a result of low research budgets.

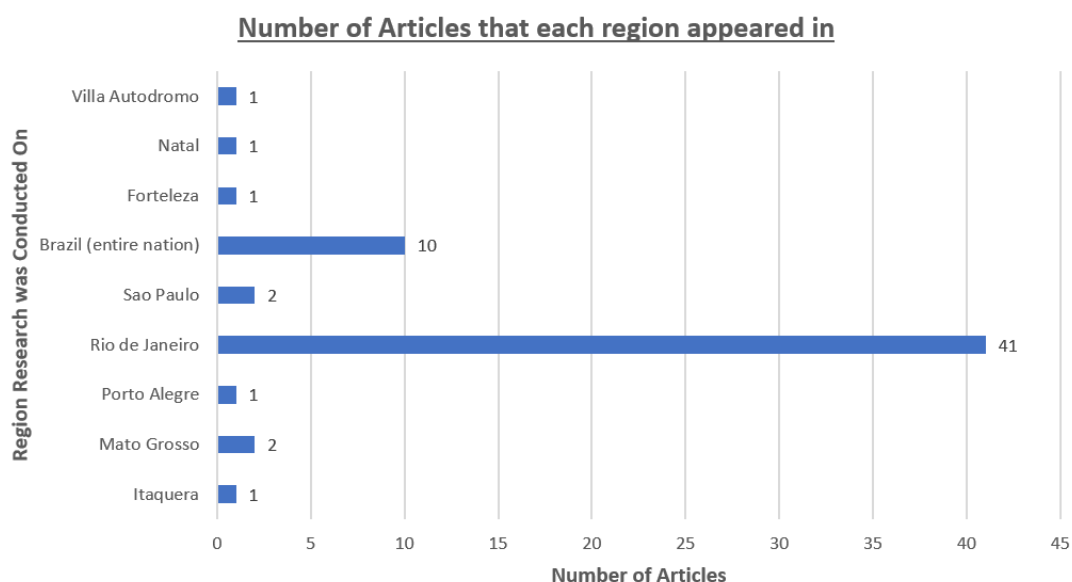
Table 5: Sample Size Analysis

Number of Participants	Frequency of Sample Size
1-500	27
501-1000	5
1001-1500	2
1501-2000	3
2001+	5

Geographical Location

The researcher identified a gap in literature during the narrative literature review (see introduction) relating to the effects of legacy and how this can differ based on proximity to the host cities. Within the systematic review, it was clear that Rio de Janeiro was the most frequently researched area, accounting for 67% of the literature used. Other small communities such as Villa Autodromo were investigated, but only on singular occasions, often with small participant numbers. A reasoning for this could be because of the safety concerns for researchers entering dangerous areas such as favelas, known for their gang culture (Cade, Everett & Duignan, 2020). These safety precautions could lead to researchers predominantly doing their research in wealthier areas, excluding the legacy impacts of these smaller communities.

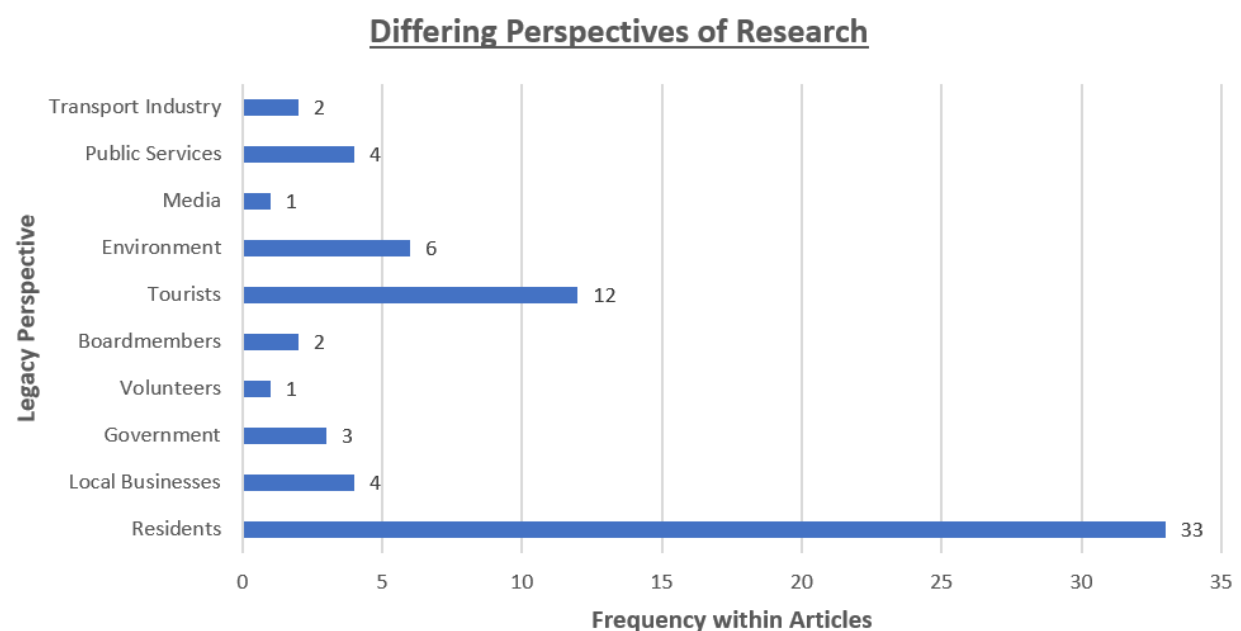
Table 6: Regional Analysis of Papers



Perspectives

The work of Travis and Crioze (1987) & Chappelet (2012) emphasises that legacy impacts can differ according to which stakeholders they affect. In table 7, there is a clear trend that residents are often the most studied stakeholders in event legacy, with 54% of articles having them as the focus groups. This also unearthed the gap in literature of studying multiple different perspectives for the same legacies, as only 11% of articles adopted a multiple-stakeholder viewpoint approach. Multiple groups in the table, such as volunteers, the media and local businesses need a more in-depth body of research in order to analyse true event legacy impacts for different stakeholder groups.

Table 7: Frequency of differing perspectives within analysed papers.



Legacy Typologies

Table 8 details the legacy typologies used to thematically categorise key findings which were used for the model framework, the definitions in the table were used by the researcher during this process. Social legacies were the most frequently researched legacy type, appearing in 59% of articles – this is in line with the perspective findings, which show that residents are the most researched stakeholder groups. Economic, infrastructure and environmental categories appearing in 28%, 26% and 24% of articles respectively. The lower number of environmental legacy articles may be because they are the most difficult to ensure validity, due to extraneous variables affecting researchers abilities to pin the effects with a degree of certainty (Ventura et al., 2019), but there is certainly more literature needed to gauge the full environmental effects of sporting events.

Table 8: Classifications of Legacies, Definitions and Frequency with the Literature Review

<u>Legacy Type</u>	<u>Definition</u>	<u>Number of Articles</u>
Social	Refers to social capital gained by residents, skills and education and community development (Tsaur, 2017).	36
Economic	The degree to which an event impacts tourism, economic growth and enhances local businesses, creating long lasting economic benefits (Tsaur, 2017).	17
Infrastructure	The degree to which an event enhances urban regeneration, transport and facilities in order to develop the host-nation (Chappelet & Junod, 2006).	16
Environment	The direct impact that a mega-event has on the ecological surroundings, such as green space, air emissions and water contamination (Kearney, 2005).	15

Key findings:

Due to the large number of articles being reviewed, the key findings of the articles were established into themes in-line with the framework model, for further analysis (see below). The overall quality of research within the systematic literature review was found to be generally quite poor, and it is clear that certain aspects of the Brazilian event legacies are widely neglected. These were found to include a lack of variation of differing legacy perspectives, a lack of geographical representation for Brazil outside of Rio de Janeiro, and literature heavily focusing on social legacies and disregarding other legacy impacts. These findings coincide with the widely interpreted idea that legacy research lacks credibility and consistency (Preuss, 2015; Thomson et al., 2019; Thomson, Schlenker & Schulenkorf, 2013).

Economic

The general consensus from the literature review was that the Brazilian Government's budget plans were widely criticised by all stakeholder groups, and in particular local residents, who believe there were more outstanding issues that required a larger budget than new stadia (Mundim & da Silva, 2019). The categories that residents felt were more vital and required more attention were education, safety, unemployment, housing deficits and healthcare (Azzali, 2019; Butler & Aicher,

2015; Malhado & Araujo, 2017; Rocha, Barbanti & Chelladurai, 2017; Vico & Gustavo, 2019; Yamawaki, Castro Filho & Costa, 2020). Overspending in other areas such as transport, at sometimes three times estimated costs (Malhado & Araujo, 2017), has left public funding to become relied upon for covering these costs (Muller & Gaffney, 2018) – the overall effect of this overspending causes economic inefficiency (Solberg & Preuss, 2015), which has ultimately led to Brazil's substantial economic decline since the beginning of the 2014 World Cup (Kobierecki & Pierzgalinski, 2022). A criticism of the literature within this field is that there is no consistent methodology for measurement, leading to misinformation of positive legacies, when, in turn, hosting mega-events usually causes more harm than good (Matheson, 2009; Song, 2010).

One of the impacts associated with the economy is tourism activity, the Olympics and the World Cup attracted over 6 Million foreign tourists (Bondarik, Pillati & Horst, 2020), leveraging tourism receipts by 50% during the World Cup and 28% in the Olympics. Despite this, issues with safety and hospitality negatively influenced tourism revisit intentions (Brown, Assaker & Reis, 2018; Rocha & Fink, 2017; Swart, Cassar & Sneyd, 2018), so tourism effects were short-lived and did not cement a positive long-term legacy (Meurer & Lins, 2018).

One would assume that an increase in tourism brings in revenue for local businesses and job opportunities, but 89% of jobs during the event period were temporary (Vico & Gustavo, 2015) and 60% of street vendors reported a loss in profits during the World Cup and after (Hummel, 2018) and similar trends were seen after the Olympics, with startup businesses in Rio not able to grow or flourish (Hadyuk & Naraine, 2022). Though this may seem like a one off, Piggin et al. (2019) suggest that this negative impact is as a result of official sponsors of the games, who are internationally established companies, taking priority through selling official merchandise and refreshments. This seems contradictory on FIFA and the IOC's part, as they aim to promote economic legacies, but instead starve the local economy of revenue through their own official partners.

Based on the available evidence and literature, a framework scoring of 8.7/25 was scored for the economic section, broken down into 2.2/10 for budget analysis; 4.7/10 for tourism analysis; and 1.8/5 for local economy analysis.

Environmental:

Environmental legacies are the easiest legacy typology to measure due to their quantitative nature, but are the hardest to ensure validity (Ventura et al., 2019). Through key findings analysis, it was clear that transport legacies and environmental legacies were closely linked, but within this classification transport has been allocated to the infrastructural category. As a result of this system, air pollution was decreased due to less individual vehicles being on the roads (De la Cruz, Donisio Calderon, Franca, Requia & Gioda, 2019; Ventura et al., 2022). In some areas of Rio, emissions were reduced by 48% from the beginning of the World Cup, compared to after the Olympics (Ventura et al., 2022). A cause for concern in this department was the increase in Ozone levels as a result of the event, which were still within regulatory guidelines, but is the most hazardous greenhouse gas to humans and living organisms (De la Cruz, Donisio Calderon, Franca, Requia & Gioda, 2019; Ventura et al., 2022).

Going into the Olympic Games especially, light was shed on the sewage problems and water contamination across Brazil's open water venues, such as for rowing and sailing – this exposure via the media meant that Brazil had a motive to rectify these problems which had been an ongoing concern. In the post-event period, a water sample was carried out by Staggemeier et al. (2017) which showed that 95.9% of sample sites around Rio contained faeces and were contaminated with viruses – 90% of these sites contained infectious and harmful viruses. Considering athletes, residents and tourists were exposed to these conditions during and after the games, this left an extremely negative legacy impact on the host city.

Environmental project fulfilment was a systematic failure of the Brazilian government, with multiple projects being delayed and abandoned such as tree planting and water site cleaning (Crabb, 2018; Dendura, 2020; Gutierrez et al., 2021). This led to the Rio Olympics becoming one of the only cities in recent years to host the games and become less 'green', showing a lack of planning from the government (Tu, Yang & Xu, 2023)

The overall framework scoring for the environmental legacy typology was graded at 8.7/25, with the breakdown: Air Emissions: 5.6/10; Water Contamination: 1.8/10; and Project fulfilment: 1.3/5.

Social

Training and education was established as a key legacy variable by the Brazilian government for both events. The education system itself took a large hit, due to construction and disruption – 48% of Rio households had to change daily routines and schooling quality was reported to be of worse quality than pre-event period (Butler & Aicher, 2015; Graeff & Knijnik, 2021). Despite this, 8 million children took part in the Olympic Environmental Education System across 16,000 schools (Dendura, 2020), though this figure was meant to be 65 million, again showing an unachievable target that was abandoned by the Brazilian government in 2017 (Kirakosvan, 2020). A key stakeholder that benefitted as a result of the events were teachers, who showed vast knowledge development as a result of training and education programmes (Ribeiro, Figueiredo & Biscaia, 2022; Ribeiro & Maroco, 2021).

Social capital was amongst the worst ranked indicators, due to the broadening of the social gap between the rich and the poor, which was the most common theme amongst research within this field (Azzali, 2019; Butler & Aicher, 2015; de Sousa et al., 2017; Hummel, 2018; McGillivray, Duignan & Mielke, 2020; Penfold, 2019; Pereira, 2018; Vico & Gustavo, 2019). Forced evictions and being disconnected from the wealthier parts of the cities meant poorer residents were alienated from the other social classes within Brazil.

The health industry saw vast improvements through training as a result of hosting large sporting events (Witt et al., 2015). But despite this, hospitalisations rocketed as a result of the games construction (Campos, Pereira, Freire & da Silva, 2021) – traffic density also had a direct correlation with the number of respiratory hospitalisations. Subjective wellbeing also improved as a result of the games, but was short-lived, as the majority of legacies from these two events were (Schlegel & Koenigstorfer, 2017). A direct correlation between enjoyment of the events and participation

legacies was found, suggesting sports fans are more likely to benefit from sporting events than non-sports fans (Pfitzner & Koenigstorfer, 2016; Ribeiro, Calapez & Cunha de Almeida, 2022).

The overall framework scoring for the environmental legacy typology was graded at 9.7/25, with the breakdown: Training and Educational Analysis: 4.9/10; Social Capital Analysis: 2.5/10; and Health and Participation Analysis: 2.3/5.

Infrastructure

Venues were not used after the events, due to numerous stadiums being built in communities that have low interest in football (Gutierrez et al., 2021).

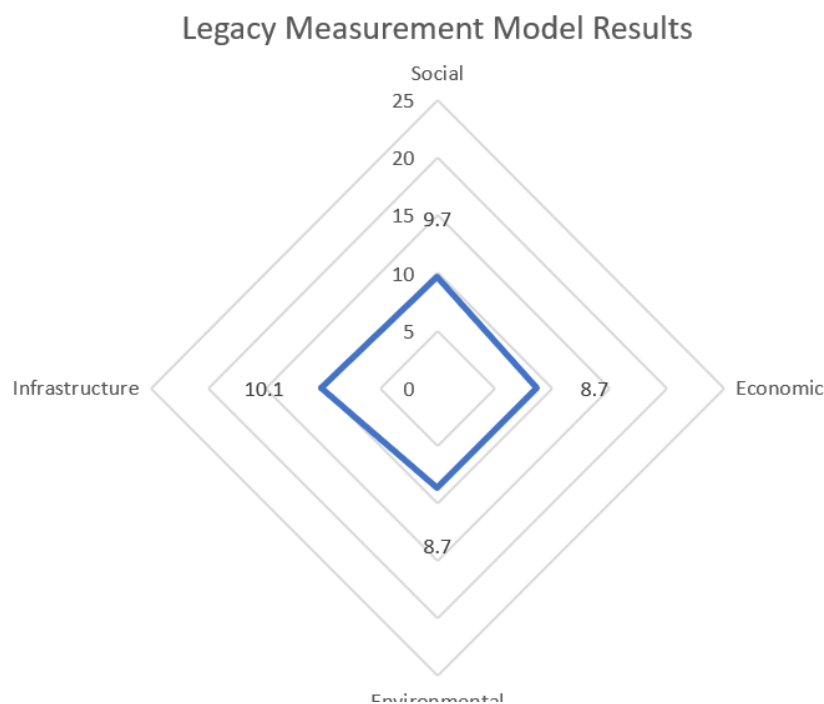
The transport impact analysis showed that although security is a major issue,

The overall framework scoring for the environmental legacy typology was graded at 10.1/25, with the breakdown: Usage of Venues 2.7/10; Transport Impact 4.9/10; and City Image analysis 2.5/5.

Conclusions

The aim of this study was to contribute to existing literature surrounding Brazil's double-host status between 2014-2016 and to analyse them as a collective due to the overlapping nature of their legacies. The results of this systematic literature review show that from all perspectives researched, the Brazilian Government failed to deliver numerous promises regarding legacy impacts. Even within their triumph of an effective transport legacy, there are issues with safety and individuals from lower class backgrounds have become further disconnected from other areas of the country as a result of this. Overall, when accumulating the sub-category scores from the social (9.7/25), economic (8.7/25), environmental (8.7/25) and infrastructural (10.1/25), the double-hosting of the 2014 World Cup and 2016 Olympics collates to an overall ranking of 37.2/100, which would fall on the negative, slight impact classification of the spectrum proposed in the methods section. Figure 4 showcases a breakdown of each legacy typology and it is clear that infrastructure had the best legacy on Brazil, although this was still a negative one.

Figure 4: The overall legacy in radar chart form



Limitations of this study include that only data looking at the post-games effects were analysed within the literature review, even though legacy impacts can begin from the candidate process (Thomson et al., 2019). A further limitation could be the lack of a research team for a review of this magnitude – utilisation of the delphi method when ranking indicators within the framework could lead to more reliable results as a team of experts will produce a better understanding than a singular researcher (Tsaur, 2017). Research also was extremely one-dimensional, almost always analysing from residents' point of view, in Rio de Janeiro and at social legacies. In order to come to a more coherent conclusion, other perspectives are needed, in different areas other than the capital city.

References

- Allmers, S., & Maennig, W. (2008). South Africa 2010: Economic scope and limits. *Hamburg contemporary economic discussions*, (21).
- Andrade, C. (2020). Sample size and its importance in research. *Indian journal of psychological medicine*, 42(1), 102-103.
- Attwell, S., Morgan, H., & Parker, A. (2019). Major sporting events: Achieving an international sport development legacy. *Managing Sport and Leisure*, 24(6), 356-371.
- Azzali. (2019). Mega sporting events as tools of urban redevelopment: lessons learned from Rio de Janeiro. *Proceedings of the Institution of Civil Engineers. Urban Design and Planning*, 172(3), 81–89.
- Bob, U., & Swart, K. (2010). Sport events and social legacies.

Bondarik, Pilatti, L. A., & Horst, D. J. (2020). Sports mega-events and overestimated promises: the case of the 2014 FIFA World Cup in Brazil. *Journal of Tourism and Cultural Change*, 18(3), 351–367.

Bramer, W. M., De Jonge, G. B., Rethlefsen, M. L., Mast, F., & Kleijnen, J. (2018). A systematic approach to searching: an efficient and complete method to develop literature searches. *Journal of the Medical Library Association: JMLA*, 106(4), 531.

Brown, Assaker, G., & Reis, A. (2018). Visiting Fortaleza: motivation, satisfaction and revisit intentions of spectators at the Brazil 2014 FIFA World Cup. *The Journal of Sport Tourism*, 22(1), 1–19.

Brown, A., & Massey, J. (2001). Literature review: The impact of major sporting events. *Manchester Institute for Popular Culture, Manchester Metropolitan University*.

Butler, & Aicher, T. J. (2015). Demonstrations and displacement: social impact and the 2014 FIFA World Cup. *Journal of Policy Research in Tourism, Leisure and Events*, 7(3), 299–313.

Cabral, Lusby, C., & Uvinha, R. (2021). Tourism Mobility at the Summer Olympic Games Rio 2016. *Event Management*, 25(4), 399–410.

Cade, Everett, S., & Duignan, M. (2021). Leveraging digital and physical spaces to “de-risk” and access Rio’s favela communities. *Tourism Geographies*, 23(1-2), 249–274.

Campos, Pereira, C. A. R., Freire, C., & da Silva, I. F. (2021). Respiratory Hospitalizations and Their Relationship with Air Pollution Sources in the Period of FIFA World Cup and Olympic Games in Rio de Janeiro, Brazil. *International Journal of Environmental Research and Public Health*, 18(9), 4716–.

Cashman, R. I. (2006). *The bitter-sweet awakening: The legacy of the Sydney 2000 Olympic Games*. Pan Macmillan.

Casper, J. M., & Pfahl, M. E. (Eds.). (2015). *Sport management and the natural environment: Theory and practice*. Routledge.

Chalkley, B., & Essex, S. (1999). Urban development through hosting international events: a history of the Olympic Games. *Planning perspectives*, 14(4), 369-394.

Chappelet, J. L. (2012). Mega sporting event legacies: a multifaceted concept.

Chappelet, J., & Junod, T. (2006). A tale of 3 Olympic cities: What can Turin learn from the Olympic legacy of other Alpine cities. *Major sport events as opportunity for development. Valencia: Valencia summit proceedings*, 1-8.

Chen, Riddell, J. R., Hill, J. B., Chen, P., Piquero, A. R., & Kurland, J. (2022). Gold, silver, and bronze: Measuring the impact of the Beijing 2008, London 2012, and Rio de Janeiro 2016 Olympics on crime. *Journal of Criminal Justice*, 78, 101880–.

Crabb. (2018). Debating the success of carbon-offsetting projects at sports mega-events. A case from the 2014 FIFA World Cup. *Journal of Sustainable Forestry*, 37(2), 178–196.
<https://doi.org/10.1080/10549811.2017.1364652>

de Almeida. (2016). Megaeventos esportivos, politica e legado: o Brasil como sede da Copa do Mundo Fifa 2014 e os Jogos Olimpicos e Parolimpicos Rio 2016/Sports mega-events, politics and legacy: Brazil hosting the 2014 Fifa World Cup and the Olympic and Paralympic Games Rio 2016. *Espacio Abierto*, 25(2), 67–.

De La Cruz, Dionisio Calderon, E. R., França, B. B., Réquia, W. J., & Gioda, A. (2019). Evaluation of the impact of the Rio 2016 Olympic Games on air quality in the city of Rio de Janeiro, Brazil. *Atmospheric Environment* (1994), 203, 206–215.

Dendura. (2020). Olympic Infrastructure—Global Problems of Local Communities on the Example of Rio 2016, PyeongChang 2018, and Krakow 2023. *Sustainability* (Basel, Switzerland), 12(1), 141–.

de Oliveira Santos, Gursoy, D., Ribeiro, M. A., & Netto, A. P. (2019). Impact of Transparency and Corruption on Mega-Event Support. *Event Management*, 23(1), 27–40.

dos Santos Neto, Cardoso, V. D., Santos, T., de Oliveira, A. F. S., Terezani, D. R., & Haiachi, M. D. C. (2018). Rio 2016 Olympics: Urban regeneration and social legacy. *Journal of Human Sport and Exercise*, 13(1), 116–133.

de Sousa-Mast, Reis, A. C., Vieira, M. C., Sperandei, S., Gurgel, L. A., & Pühse, U. (2017). Does being an Olympic city help improve recreational resources? Examining the quality of physical activity resources in a low-income neighborhood of Rio de Janeiro. *International Journal of Public Health*, 62(2), 263–268.

Duignan, & McGillivray, D. (2019). Disorganised host community touristic-event spaces: revealing Rio's fault lines at the 2016 Olympic Games. *Leisure Studies*, 38(5), 692–711.

Fagerlande. (2022). Landscape and tourism in Rio de Janeiro's favelas. *Landscape Research*, ahead-of-print(ahead-of-print), 1–15.

FIFA. (2015). FIFA Statutes April

2015. <https://digitalhub.fifa.com/m/7f2465cba84de27b/original/lybxekc8pvueit0gdwbc-pdf.pdf>

Frawley, S., & Cush, A. (2011). Major sport events and participation legacy: The case of the 2003 Rugby World Cup. *Managing leisure*, 16(1), 65-76.

Fuller, S. S., & Clinch, R. (2000). *The Economic and Fiscal Impacts of Hosting the 2012 Olympic Games on the Washington-Baltimore Metropolitan Area*. Jacob France Center.

Gill, S., Adelus, E., & de Abreu Duarte, F. (2019). Whose Game? FIFA, Corruption and the Challenge of Global Governance.

Gratton, C., Shibli, S., & Coleman, R. (2006). The economic impact of major sporting events: a review of ten events in the UK. *Sociological Review Monograph*, 54(2), 41-58.

Graeff, Ghiggi, M. V., & Knijnik, J. (2021). The Impact of a Sport Mega Event in the Right to Access Public Education: The Case of the Porto Alegre Communities Affected by the 2014 Brazil World Cup. *Journal of Sport and Social Issues*, 45(5), 447–463.

- Grix, Brannagan, P. M., & Lee, D. (2019). Brazil's Double Host Status. In *Entering the Global Arena* (pp. 37–51). Springer Singapore Pte. Limited.
- Gursoy, Milito, M. C., & Nunkoo, R. (2017). Residents' support for a mega-event: The case of the 2014 FIFA World Cup, Natal, Brazil. *Journal of Destination Marketing & Management*, 6(4), 344–352.
- Gutierrez, de Almeida, M. A. B., Gutierrez, G. L., Pedersen, Z. P., & Williams, A. S. (2021). Two Events, Two Brazils: A Critical Discourse Analysis of the FIFA World Cup and the Olympic Games. *International Journal of Sport Communication*, 14(4), 591–607.
- Hayduk III, & Naraine, M. L. (2022). Can Entrepreneurial Ecosystems Optimize the Impact of Mega Sport Events? Evidence from the 2014 FIFA World Cup and 2016 Summer Olympic Games in Brazil. *Event Management*, 26(5), 1057–1076
- Hiller, H. H. (2012). *Host cities and the Olympics: An interactionist approach*. Routledge.
- Hummel. (2018). Do Poor Citizens Benefit from Mega-Events? São Paulo's Street Vendors and the 2014 FIFA World Cup. *Latin American Politics and Society*, 60(4), 26–48.
- Hulin, C. L., Henry, R. A., & Noon, S. L. (1990). Adding a dimension: Time as a factor in the generalizability of predictive relationships. *Psychological Bulletin*, 107(3), 328.
- IOC. (2009). 2016 Olympics Candidature Files. https://web.archive.org/web/20090320033502/http://uratau.proderj.rj.gov.br/rio2016_imagens/suamario/English/Per%20Volume/Volume%201_eng.pdf
- IOC. (2014). Olympic Games Impact (OGI) Study Rio Olympics Report 1 2016. <https://www.kennisbanksportenbewegen.nl/?file=8014&m=1500889249&action=file.download>
- IOC. (2020). Olympic Agenda 2020. <https://olympics.com/ioc/documents/international-olympic-committee/olympic-agenda-2020>
- Jago, L., Dwyer, L., Lipman, G., van Lill, D., & Vorster, S. (2010). Optimising the potential of mega-events: an overview. *International Journal of Event and Festival Management*, 1(3), 220-237.
- Justo, Quijano, M. F. C., Beringui, K., Ventura, L. B., Pereira, G. M., Vasconcellos, P. de C., & Gioda, A. (2023). Assessment of the impact of the bus fleet and transportation infrastructure works on the air quality in Rio de Janeiro (Olympic Games 2016). *Air Quality, Atmosphere and Health*, 16(2), 289–309.
- Kassens-Noor, E. (2014). Managing Transport at the Football World Cup. *Managing the Football World Cup*, 149-174.
- Kassens-Noor, E., Wilson, M., Müller, S., Maharaj, B., & Huntoon, L. (2015). Towards a mega-event legacy framework. *Leisure Studies*, 34(6), 665-671.
- Kearney, A. T. (2005). Building a legacy: sports mega-events should last a lifetime. *Chicago: AT Kearney*.

- Kellison, T. B., & Hong, S. (2015). The adoption and diffusion of pro-environmental stadium design. *European Sport Management Quarterly*, 15(2), 249-269.
- Kellison, T. B., & Casper, J. M. (2017). Environmental legacy of mega sport events. In *Legacies and Mega Events* (pp. 135-156). Routledge.
- Kim, A., Choi, M., & Kaplanidou, K., (2015). The role of media in enhancing people's perception of hosting a mega sport event: The case of Pyeongchang's Winter Olympics bids. *International Journal of Sport Communication*, 8(1), 68-86.
- Kim, M. K., Kim, S., Park, J., Carroll, M., Yu, J., & Na, K. (2017). Measuring the economic impacts of major sports events: the case of Formula One Grand Prix (F1). *Asia Pacific Journal of Tourism Research*, 22(1), 64-73.
- Kim, S. S., & Petrick, J. F. (2005). Residents' perceptions on impacts of the FIFA 2002 World Cup: The case of Seoul as a host city. *Tourism Management*, 26(1), 25-38.
- Kirakosyan. (2020). Educational Legacy of the Rio 2016 Games: Lessons for Youth Engagement. *Societies* (Basel, Switzerland), 10(2), 39–.
- Kirby, & Crabb, L. A. H. (2019). Priming Host City Physical Legacy Plans: The Bidding Chronicles of Brazil's Derailed Sporting Event Infrastructure Projects. *Event Management*, 23(4), 627–640.
- Konstantaki, M., & Wickens, E. (2010). Residents' perceptions of environmental and security issues at the 2012 London Olympic Games. *Journal of Sport & Tourism*, 15(4), 337-357.
- Kobierecki, & Pierzgalski, M. (2022). Sports Mega-Events and Economic Growth: A Synthetic Control Approach. *Journal of Sports Economics*, 23(5), 567–597.
- Leal de Oliveira, F., Vainer, C., Mascarenhas, G., Bienenstein, G., & Braathen, E. (2020). Mega-events, legacies and impacts: notes on 2016 Rio de Janeiro Olympics. *International Journal of Urban Sustainable Development*, 12(1), 89-102.
- Leopkey, B., & Parent, M. M. (2012). Olympic Games legacy: From general benefits to sustainable long-term legacy. *The international journal of the history of sport*, 29(6), 924-943.
- Li, S., & McCabe, S. (2013). Measuring the socio-economic legacies of mega-events: Concepts, propositions and indicators. *International Journal of Tourism Research*, 15(4), 388-402.
- Mair, J., Chien, P. M., Kelly, S. J., & Derrington, S. (2023). Social impacts of mega-events: A systematic narrative review and research agenda. *Journal of Sustainable Tourism*, 31(2), 538-560.
- Malhado, & Araujo, L. M. (2017). Welcome to Hell: Rio 2016 Olympics Failing to Secure Sustainable Transport Legacy. *Event Management*, 21(4), 523–526.
- Mason, D. S., Thibault, L., & Misener, L. (2006). An agency theory perspective on corruption in sport: The case of the International Olympic Committee. *Journal of sport management*, 20(1), 52-73.
- Matheson, C. M. (2010). Legacy planning, regeneration and events: the Glasgow 2014 Commonwealth Games. *Local Economy*, 25(1), 10-23.

- Matheson, V. (2009) Economic multipliers and mega-event analysis. *International Journal of Sport Finance*, 4(1), 63–70.
- McGillivray, Duignan, M. B., & Mielke, E. (2020). Mega sport events and spatial management: zoning space across Rio's 2016 Olympic city. *Annals of Leisure Research*, 23(3), 280–303.
- Meurer, & Lins, H. N. (2018). The effects of the 2014 World Cup and the 2016 Olympic Games on Brazilian international travel receipts. *Tourism Economics : the Business and Finance of Tourism and Recreation*, 24(4), 486–491.
- Misener, Darcy, S., Legg, D., & Gilbert, K. (2013). Beyond Olympic Legacy: Understanding Paralympic Legacy Through a Thematic Analysis. *Journal of Sport Management*, 27(4)
- Müller, & Gaffney, C. (2018). Comparing the Urban Impacts of the FIFA World Cup and Olympic Games From 2010 to 2016. *Journal of Sport and Social Issues*, 42(4), 247–269.
- Müller, M., Wolfe, S.D., Gaffney, C., Gogishvili, D., Hug, M., & Leick, A. (2021). An evaluation of the sustainability of the Olympic Games. *Nature Sustainability*, 4, 340-348.
- Mundim, & Silva, G. M. A. da. (2019). The World Cup and Presidential Popularity in Brazil. *Brazilian Political Science Review*, 13(3), 1–32.
- Murray, B. (2002). FIFA. In *The international politics of sport in the twentieth century* (pp. 38-57). Routledge.
- Mondo, Marques, O. R. B., & Gândara, J. M. G. (2020). Rio 2016 Olympics: analysis of the tourist perception of quality using TOURQUAL. *Tourism & Management Studies*, 16(2), 26–34
- Mourão, Ribeiro, T., & Cunha de Almeida, V. M. (2022). Psychic income benefits of the Rio 2016 Olympic Games: comparison of host community pre- and post-Games perceptions. *The Journal of Sport Tourism*, 26(1), 21–41.
- Nordhagen, S. E. (2021). Leveraging sporting events to create sport participation: A case study of the 2016 Youth Olympic Games. *International Journal of Sport Policy and Politics*, 13(3), 409-424.
- Pahlevan-Sharif, S., Mura, P., & Wijesinghe, S. N. (2019). A systematic review of systematic reviews in tourism. *Journal of Hospitality and Tourism Management*, 39, 158-165.
- Pati D., Lorusso L.N. (2018). How to Write a Systematic Review of the Literature. *HERD*, 11(1), 15-30.
- Penfold. (2019). National identity and sporting mega-events in Brazil. *Sport in Society*, 22(3), 384–398.
- Pereira. (2018). Transport legacy of mega-events and the redistribution of accessibility to urban destinations. *Cities*, 81, 45–60.
- Pfitzer, & Koenigstorfer, J. (2016). Quality of life of residents living in a city hosting mega-sport events: A longitudinal study. *BMC Public Health*, 16(1), 1102–1102.

- Piggin, Souza, D. L. de, Furtado, S., Milanez, M., Cunha, G., Louzada, B. H., Graeff, B., & Tlili, H. (2019). Do the Olympic Games promote dietary health for spectators? An interdisciplinary study of health promotion through sport. *European Sport Management Quarterly*, 19(4), 481–501.
- Preuss, H. (2007). The conceptualisation and measurement of mega sport event legacies. *Journal of sport & tourism*, 12(3-4), 207-228.
- Preuss, H. (2013). The contribution of the FIFA World Cup and the Olympic Games to green economy. *Sustainability*, 5(8), 3581-3600.
- Preuss, H. (2015). A framework for identifying the legacies of a mega sport event. *Leisure studies*, 34(6), 643-664.
- Preuss, H. (2019). Event legacy framework and measurement. *International journal of sport policy and politics*, 11(1), 103-118.
- Reis, DaCosta, L. P., & Telles, S. de C. C. (2021). Measuring the legacy of mega-events: sportive usage index of the Brazil 2014 FIFA World Cup. *Motriz : Revista de Educação Física. Unesp*, 27.
- Reis, Malina, A., Dacosta, L. P., & De Cássio Costa Telles, S. (2019). Management and legacy of the Brazil 2014 Fifa World Cup during its candidacy bid. *Motriz : Revista de Educação Física. Unesp*, 25(2).
- Ribeiro, & Almeida, V. (2021). The Rio's transport legacy: pre- and post-Games resident perceptions. *International Journal of Sports Marketing & Sponsorship*, 22(1), 32–52.
- Ribeiro, Calapez, A., & Cunha de Almeida, V. M. (2022). Does the Olympic legacy and sport participation influence resident support for future events? *Leisure Studies*, 41(4), 471–486.
- Ribeiro, & Correia, A. (2021). The relationship between organisational issues and social impacts of Rio Olympic Games: a volunteer's perspective. *Journal of Policy Research in Tourism, Leisure and Events*, 13(1), 124–145.
- Ribeiro, Correia, A., & Biscaia, R. (2021). The social impact of the 2016 Rio Olympic Games: comparison of residents' pre- and post-event perceptions. *Sport, Business and Management*, 11(2), 201–221.
- Ribeiro, Correia, A., Biscaia, R., & Bason, T. (2021). Organizational Issues in Olympic Games: a Systematic Review. *Event Management*, 25(2), 135–154.
- Ribeiro, Correia, A., Figueiredo, C., & Biscaia, R. (2022). The Olympic Games' impact on the development of teachers: the case of Rio 2016 Official Olympic Education Programme. *Educational Review (Birmingham)*, 74(5), 992–1011.
- Ribeiro, Correia, A., & Marôco, J. (2021). Exploring the Games' Intangible Legacy on Individuals: A Longitudinal Study of Teacher's Community. *Social Sciences (Basel)*, 10(10), 359–.
- Ribeiro, Yoda, R., Papadimitriou, D. A., & Correia, A. (2022). Resident attitudes toward the Rio 2016 Olympic Games: A longitudinal study on social legacy and support behaviours. *Journal of Hospitality and Tourism Management*, 50, 188–198.

- Ritchie, J. B. (2000). Turning 16 days into 16 years through Olympic legacies. *Event management*, 6(3), 155-165.
- Ritchie, J. R. (1984). Assessing the impact of hallmark events: Conceptual and research issues. *Journal of travel research*, 23(1), 2-11.
- Rocha. (2023). Rio 2016 Olympic Legacy for Residents of Favelas: Revisiting the Case of Vila Autódromo Five Years Later. *Social Sciences (Basel)*, 12(3), 166–.
- Rocha. (2020). Temporal variations in the relationship between legacies and support: A longitudinal case study in rio 2016 olympic games. *Journal of Sport Management*, 34(2), 130–146.
- Rocha, Barbanti, V. J., & Chelladurai, P. (2017). Support of Local Residents for the 2016 Olympic Games. *Event Management*, 21(3), 251–268.
- Rocha, & Fink, J. S. (2017). Attitudes toward attending the 2016 Olympic Games and visiting Brazil after the games. *Tourism Management Perspectives*, 22, 17–26.
- Schlegel, Pfitzner, R., & Koenigstorfer, J. (2017). The Impact of Atmosphere in the City on Subjective Well-Being of Rio de Janeiro Residents During (vs. Before) the 2014 FIFA World Cup. *Journal of Sport Management*, 31(6), 605–619.
- Solberg, & Preuss, H. (2015). Major Sports Events: The Challenge of Budgeting for the Venues. *Event Management*, 19(3), 349–363.
- Song, W. (2010). Impacts of Olympics on exports and tourism. *Journal of economic development*, 35(4), 93.
- Staggemeier, Heck, T. M. S., Demoliner, M., Ritzel, R. G. F., Röhnelt, N. M. S., Girardi, V., Venker, C. A., & Spilki, F. R. (2017). Enteric viruses and adenovirus diversity in waters from 2016 Olympic venues. *The Science of the Total Environment*, 586, 304–312.
- Statista. (2021). The Massive Costs Behind The Olympic Games.
Statista. <https://www.statista.com/chart/5424/the-massive-costs-behind-the-olympic-games/>
- Statista Research Department. (2014). *Total Costs of the FIFA World Cup 2014 in Brazil*.
Statista. <https://www.statista.com/statistics/296493/total-costs-fifa-world-cup-2014-brazil/>
- Swart, George, R., Cassar, J., & Sneyd, C. (2018). The 2014 FIFA World Cup™: Tourists' satisfaction levels and likelihood of repeat visitation to Rio de Janeiro. *Journal of Destination Marketing & Management*, 8, 102–113.
- Taks, & Rocha, C. (2022). Involvement, social impacts and subjective well-being: Brazilians' experiences from Rio 2016 Olympic and Paralympic Games. *World Leisure Journal*, 64(4), 361–382.
- Tasci, Hahm, J. (Jeannie), & Terry, D. B. (2019). A longitudinal study of Olympic Games' impact on the image of a host country. *Journal of Travel & Tourism Marketing*, 36(4), 443–457.
- Tennant, J. P., & Ross-Hellauer, T. (2020). The limitations to our understanding of peer review. *Research integrity and peer review*, 5(1), 6.

Thomson, A., Cuskelly, G., Toohey, K., Kennelly, M., Burton, P., & Fredline, L. (2019). Sport event legacy: A systematic quantitative review of literature. *Sport management review*, 22(3), 295-321.

Thomson, A., Schlenker, K., & Schulenkorf, N. (2013). Conceptualizing sport event legacy. *Event management*, 17(2), 111-122.

Tu, Chen, B., Yang, J., & Xu, B. (2023). Olympic effects on reshaping urban greenspace of host cities. *Landscape and Urban Planning*, 230, 104615–.

Toohey, K., & Veal, A. J. (2005). Sport for all & the legacy of the Sydney 2000 Olympic Games. *Internacional Event Management Research Conference*.

Travis, A. S., & Croize, J. C. (1987, August). The role and impact of mega-events and attractions on tourism development in Europe: a micro perspective. In *Proceedings of the 37th congress of AIEST* (Vol. 28, pp. 59-78).

Tsaur, Yen, C.-H., Tu, J.-H., Wang, C.-H., & Liang, Y.-W. (2017). Evaluation of the 2010 Taipei International Flora Exposition from the perceptions of host-city residents: a new framework for mega-event legacies measurement. *Leisure Studies*, 36(1), 65–88.

Ventura, Almeida, I. R. P. L. de, Ramos, M. B., D’agosto, M. de A., & Gioda, A. (2022). Impact of the transport system on air quality: the case of Rio de Janeiro, Brazil. *Sustentabilidade Em Debate*, 13(3), 121–137.

Ventura, Ramos, M. B., Gioda, A., França, B. B., & de Oliveira Godoy, J. M. (2019). Air quality monitoring assessment during the 2016 Olympic Games in Rio de Janeiro, Brazil. *Environmental Monitoring and Assessment*, 191(6), 369–14.

Vico, Uvinha, R. R., & Gustavo, N. (2019). Sports mega-events in the perception of the local community: the case of Itaquera region in São Paulo at the 2014 FIFA World Cup Brazil. *Soccer and Society*, 20(6), 810–823.

Weed, M. (2011). The Human Impact of Major Sport Events. *Journal of Sport and Tourism*, 16(1), 1-4.

Witt, R. R., Kotlhar, M. K., Mesquita, M. O., da Silva Lima, M. A. D., Marin, S. M., Day, C. B., ... & Hutton, A. (2015). Developing legacy: health planning in the host city of Porto Alegre for the 2014 Football World Cup. *Prehospital and Disaster Medicine*, 30(6), 613-617.

Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of planning education and research*, 39(1), 93-112.

Yamawaki, Castro Filho, F. M. d., & Costa, G. E. G. d. (2020). Mega-event transport legacy in a developing country: The case of Rio 2016 Olympic Games and its Transolímpica BRT corridor. *Journal of Transport Geography*, 88, 102858–.

Zimbalist, A. (2016). The economic legacy of Rio 2016. *Rio*, 207-237.

Zouain, Lohmann, P. B., Cardoso, G. D. L., Virkki, K. B., & Martelotte, M. C. (2019). Residents’ Perceptions of the Impacts of the Rio 2016 Olympic Games: Before, During and After the Mega-Event. *Revista Brasileira de Pesquisa Em Turismo*, 13(2), 93–112.

