Rio de Janeiro's image as the 2016 Olympic Games host city: analysis of the main image formation factors

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Abstract

Purpose – This paper aimed to verify the most important factors (cognitive and affective dimensions) perceived in Rio de Janeiro's image as the host city of the 2016 Olympic Games and to identify the factors that predict better the overall city image and its affective image dimension in this particular context of a sports mega-event.

Design/methodology/approach – This paper employs exploratory factor analysis to define intervening factors in each dimension of Rio de Janeiro's image. By parting from the initial diagnostic analysis, multiple regression analysis was applied to measure how the intervening factors predicted the overall image of the host city, as well as to whether its cognitive dimension was able to predict the affective dimension. Data collection was conducted by applying structured questionnaires with a sample of international respondents ($n = 274$).

Findings – Rio's image as a sports mega-event host city presented two intervening factors for each dimension. For image composition, the most important cognitive factor diagnosed was "Services and Attractions." For the affective dimension, the most important factor diagnosed was "Positive Feelings." The investigation concluded that the cognitive dimension was capable of predicting the affective dimension, as "Positive Feelings" was the factor that better predicted Rio's overall image as the host city of the 2016 Olympic Games, while the "Services and Attractions" factor was not significant in predicting the host city's image.

Research limitations/implications – The main focus of the investigation was the host city's international image as presented by primary sources. The sample for investigation was therefore composed exclusively of foreign students, nonresidents in Brazil, who did not participate in said events. Although this approach provides a partial diagnostic of the host cityvs image, for an overall and accurate image diagnostic it is also relevant to investigate the national residents' point of view, which is beyond the scope of this investigation.

Practical implications – The findings suggest that destination marketers would obtain better results investing in the affective dimension, employing actions that stimulate positive feelings about the host city, especially when relating to sports mega-event. Investment in general infrastructure is also presented as a relevant factor.

Social implications – The host city's image can guide policies to improve local capacity to attract investments and new events that contribute to change in urban areas, as well as to reinforce positive aspects of that image. Investment in general infrastructure, again, is presented as a crucial issue.

Originality/value – The value and originality of the presented investigation lie in a lack of specific studies on Rio's image as a travel destination, despite its being the most important touristic city in Brazil and the host for the 2016 Olympic Games. A separate analysis of individual image dimensions and the examination of intervening cognitive factors in the affective dimension are also not common in a sports mega-event context.

Keywords Brazil, Olympic Games, Rio de Janeiro host city image, Tourist destination image, Cognitive image, Affective image

Paper type Research paper

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1. Introduction

The literature demonstrates that the outcomes of mega-events can either be positive or negative; such outcomes can permeate different fields, often manifesting in infrastructure, economic, touristic, and social impacts for the local population and its sports legacy (Bishnu *et al.*, 2016; Ferreira *et al.*, 2018; Gaffney, 2013; Malhado *et al.*, 2013; Millington and Darnell, 2014; Penna and Bovy, 2014; Preuss and Schütte, 2016; Sanchez and Broudehoux, 2013; Silva *et al.*, 2016; Sousa-Mast *et al.*, 2013; Tasci *et al.*, 2019). One of the positive effects that a sports mega-event can bestow upon the host city and country is the improvement of its image as a destination (Balsas, 2017; Ferreira *et al.*, 2018; Singhand Zhou, 2016; Kaplanidou and Vogt, 2007).

Destination image is a concept that refers to an attitudinal construct, formed by a mental representation of beliefs (cognitive dimension), feelings (affective dimension), and an overall impression of how a location can be perceived as a touristic destination (Baloglu and McCleary, 1999). As part of the overall construct, the cognitive image dimension gathers perceptions related to attributes that represent tangible aspects of a destination, including local infrastructure and safety, as well as the presence of food, accommodation, and touristic attraction services. The affective image dimension gathers aspects that are related to how certain feelings are associated with the location (Baloglu and McCleary, 1999). If it is given that the combination of those aspects forms an overall image, it is useful for assessing how the factors gathered in each dimension affect the construction of an overall image in a sports mega-event host city.

Previous touristic destination image studies have explored how sports mega-events influence the host's image by investigating the impact on visit or revisit intentions, during or even after occurrence, as well as the direct and indirect effects on the host city's image (Gaffney, 2010; Maiello and Pasquinelli, 2015; Rocha and Fink, 2017; Swart *et al.*, 2017). The main factors that compose the host city's image in the specific context of a Summer Olympic Games—the major sports mega-event worldwide—remain to be explored.

The literature has already attested that the mega-event influences the formation of the host's (country or city) image. Lai (2016), for instance, has investigated how a sports mega-event can produce a direct impact in the host city's destination image from an affective and overall perspective. The direct cause-and-effect relationship resulting from a sports mega-event in the host city is important to investigate, but it is also essential to deepen the understanding of the host city image. The main differential of the present investigation is that it does not aim to analyze the problem from a direct perspective but to identify the main aspects of the image dimensions in the particular context of hosting a mega-event.

This is relevant because an event like the Olympic Games can have a significant impact on a destination's brand and image (Brown, 2002), which is a factor that influences tourist behavior (Rezend-Parker *et al.*, 2003; Tasci and Gardner, 2007). Consequently, verifying the most important aspects of destination image composition should be an essential step to secure an attractive and advantageous position and successfully manage that image.

The increase of awareness and visits has been pointed out in the literature as a result of associating with the event image (Kim *et al.*, 2014). This conclusion appeared from various research perspectives, including investigations focusing on the population that attended the event (Kaplanidou and Vogt, 2007; Lai, 2016) or that did not attend (Hahm *et al.*, 2018; Tasci *et al.*, 2019).

As a matter of consequence, especially at the host city level, mega-events are perceived as an opportunity to push forward urban redevelopment and infrastructure projects to reposition the destination image nationally and globally (Steinbrink, 2013). Although literature exists on the impact of sports mega-events on the host image, most of the investigations, especially on the Olympics, employ a national frame, focusing on the country's image (Ferreira *et al.*, 2018). This article, therefore, examines the host city's image in the

context of a sports mega-event, employing a sample of foreign respondents that did not attend the games. More specifically, the object of investigation was the city image of Rio de Janeiro, Brazil, as the host city of the 2016 Olympic Games.

The bibliographic review indicates that there are few destination image studies about Brazil (Leal, 2004; Mariutti *et al.*, 2013; Olivieri *et al.*, 2018; Pérez-Nebra, and Torres, 2010; Rezend-Parker *et al.*, 2003; Tasci *et al.*, 2019) and no specific studies at all on Rio's destination image. The lack of literature has occurred, although Rio de Janeiro is the most renowned tourist city in Brazil, as well as the host city for the 2016 Summer Olympic Games.

The present study is, thus, entirely novel. The investigation also encompasses both cognitive and affective destination image dimensions, as well as how the main factors for each dimension are related to the overall host city image and whether the cognitive dimension affects the affective dimension. Thus, the objective of this study was to verify the most important perceived factors in Rio de Janeiro's image (cognitive and affective dimensions) as the host city of the 2016 Olympic Games and to identify the factors that predict better the overall city image and its affective image dimension in this particular context of a sports mega-event.

As Rio is located in a developing country (Brazil) adds another important layer of consideration for the sports mega-events context. The literature on the Olympic Games indicates that developing countries often have different image effects when compared to cases involving developed countries (Ferreira *et al.*, 2018; Heslop *et al.*, 2010), sometimes with no satisfactory change (Rocha and Fink, 2017; Tasci *et al.*, 2019). Holding sports mega-events in developing countries has become common in just the last few years (Knott *et al.*, 2015). The experience of Rio de Janeiro as a host city for sports mega-events began with the 2007 Pan-American Games, which was soon followed by other enterprises more relevant to the present study, such as the World Military Games (2011), FIFA Confederations Cup (2013), FIFA World Cup (2014), and finally the Summer Olympics and Paralympic Games of 2016, which can be considered the most prominent sports mega-event in the world, according to Muller (2015).

In academic terms, obtaining information about the host city's image is essential to increase knowledge of the factors of the image dimensions that are more relevant for the city to mobilize in a mega-event context, especially when considering hosts located in developing countries, which are often characterized by the presence of structural problems and unresolved social demands that may be reflected in the host image. From a managerial perspective, identifying the characteristics considered most important in the composition of the host city image can help improve future marketing decisions to enhance the city's urban policies and image management. It can also provide a framework for the decision-making process to carry out new events of the same or similar magnitude.

The article is organized as follows. First, the concepts of city destination image and the specific context imposed by sports mega-events are briefly discussed; then, the literature on destination image models is presented, followed by an explanation of the employed methodological approach. The empirical findings are then analyzed and the conclusions extracted from the investigation are presented, with a diagnostic focus primarily on academic and managerial implications, as well as suggestions for future considerations of the problem.

2. City image and sports mega-events

The literature defines city image as a mix of people's beliefs, ideas, and impressions (Cassia *et al.*, 2018). The definition is very similar to that of a tourist destination image, which can be defined as "an interactive system of thoughts, opinions, feelings, visualizations, and intentions toward a destination" (Tasci *et al.*, 2007, p. 200). A tourist destination can be a country, region, state, city, or simply a tourist attraction (Mossberg and Klepp, 2005).

Developing a positive image is part of the location brand strategy, and is a way that a destination can assume a competitive position (Baloglu and McCleary, 1999; Gartner, 1993). The destination image, thus, consists of both cognitive/reasoned and affective/emotional components, formed by a variety of information sources (Nghiêm-Phú, 2014).

Regarding the relationship between destination image and sports mega-events, studies have found positive results concerning the destination image after occurrence of the mega-event (Caizza and Mini, 2012; Dembek and Wloch, 2014), including in developing countries, such as China (Berkowitz *et al.*, 2007; Gibson *et al.*, 2008; Heslop *et al.*, 2010; Lai, 2016), South Africa (Hemmonsbey and Tichaawa, 2018; Knott *et al.*, 2015) and Brazil (Rocha and Fink, 2017; Tasci *et al.*, 2019).

Gibson *et al.* (2008) have noted an improvement in China's image after the 2008 Beijing Olympic Games. Based on a survey conducted with a sample of North American students regarding their perception of Beijing, and its development, they found that, during the period of the Olympic Games, there was a perception that it would be less risky to visit the country than it had been before. China focused its management on three areas that corresponded to the gaps in its image: popularity, high-tech, and green Olympics (Berkowitz *et al.*, 2007). However, Heslop *et al.* (2010) found that, despite the apparent technical success of the Games, post-event assessments were overwhelmingly lower.

Rocha and Fink (2017) described the effects of the interaction between Olympic image, the Brazilian brand (as a tourist destination), and the attitudes toward participating in the Rio 2016 Olympic Games and visiting the country afterward. The results suggested that the interaction between the hospitality perceived in the Olympic Games and that of Brazil positively affected the attitudes toward visiting the country afterward. However, they found that the association with the Olympic brand brought fewer gains to Brazilian tourism than expected. Similarly, Tasci *et al.* (2019) measured the perceptions of Brazil prior to and after the 2016 Summer Olympics in Brazil and found differences in the country's image in each period, but they were not significant, particularly for its destination image.

Both studies about Brazil failed to find real positive impacts/changes in the country's image after the occurrence of the sports mega-event. However, these studies intended to measure the event impacts on the country's image, and as such, did not focus specifically on Rio's image as the host city. The results for the host city image would not necessarily be the same as those found for the national level. This encourages complementary studies to investigate the host city of these events. The particular reality of a developing country also requires further study to determine whether the occurrence of this type of event is really beneficial to the image of the country and city.

In general, few studies have focused primarily on the image of mega-event host cities. Ferrari and Guala (2017) investigated the intangible effects of mega-events in Genoa, Turin, and Milan, including either identity, image, and repositioning of the host city at an international level. Kenyon and Bodet (2018) evaluated the domestic image impact for London of hosting the 2012 Summer Olympic Games. Although the event was perceived as a success, their investigation determined that pre-event concerns regarding its potential to negatively affect the city's pre-established image were, to a degree, fulfilled.

The choice of city-level image and not the country-level image as the object of investigation for the present work is justified by its being a smaller geographic unit, as the effects of a mega-event can often be highlighted in the host city, especially in the case of Olympic Games, which are usually concentrated in a single city. Singh and Zhou (2016), for example, investigated the perceptions of Beijing tourism industry professionals and residents and found positive effects of holding the Olympic Games on the transformation of the host city (Beijing). A positive correlation between destination image and event image in the Beijing Olympic Games has also been found (Lai, 2016).

A number of studies have been based on the transference of the event image to the host city image, as in America's Cup at Naples, which had a positive impact on the city (Caiazza and Minis, 2012), or the transference of the event image to the host country image, as in the case of FIFA 2014 World Cup in Brazil (Rocha and Fink, 2017). However, these investigations did not focus intensely on evaluating the cognitive and affective image dimensions of those locations in this context. Fulfilling that role is proposed for the present study.

In the literature of sports mega-events, the influence of event image on destination image is a complex phenomenon with diverse manifestations in various contexts (Lai, 2016). However, some characteristics can secure the event's success in branding a destination and enhancing its image, and these include longevity, community support, organization's professionalism, destination compatibility, media coverage, and research (Brown *et al.*, 2002). Most of these characteristics made the Sydney Olympics, for example, a successful case. In the Brazilian case, however, to change people's image perceptions positively in a context filled with negative media coverage such that leading up to and during the Olympic Games is a huge challenge. The consequence for a destination management organization's activity is the necessity of controlling the media narrative when forming a destination image (Tasci *et al.*, 2019).

In the sports mega-events context, the affective image dimension has often been emphasized (Lai, 2016). In contrast, image studies have traditionally focused on the cognitive aspects and tangible physical attributes (Gallarza *et al.*, 2002; Gartner, 1989; Pike and Page, 2014; Schroeder, 1996). For expanding and harmonizing the complementary nature of both perspectives, the present investigation employed a multidimensional approach, investigating both the cognitive and affective dimensions to find critical factors in Rio de Janeiro's host city image for the 2016 Olympic Games. As such, it adds an original and significant contribution to the scientific knowledge on this theme.

3. Tourist destination measure models

There are many different models available to measure a destination image, some of which relate the image to multidimensional aspects, especially in recent studies. The pioneering study models have associated image with elements based on visitation experience at the destination (Fakey and Crompton, 1991; Gunn, 1972; Phelps, 1986). Others authors have divided the tourist image into dimensions considering tangible and intangible aspects, such as functional/cognitive aspects, psychological/affective aspects, and uniqueness (Echtner and Ritchie, 1991) or functional/cognitive aspects, psychological/affective aspects, and overall image (Baloglu and McCleary, 1999). Gartner (1993) and Tasci *et al.* (2007) have included a conative component in addition to the cognitive and affective dimension, and this is related to tourist actions through the destination.

Kim and Chen (2016) have proposed an image formation based on schema theory, including the mega-event as a schema that contributes to destination image formation. This approach highlights the image as a simultaneous result of cognitive and affective components, including five types of schema: (1) place schemas, which are the common impressions of tourism destinations; (2) mega-event schemas, which include some particular and occasional impressions of destinations; (3) crisis schemas, which are associated with destinations where distasteful events have taken place; (4) self-schemas, in which the concept of self-perception drives the individual's view of the object; and (5) emotional schemas, which are intricately linked with the four previous schemas.

The model presented by Baloglu and McCleary (1999) was chosen for this study to measure Rio de Janeiro's city image. In this model, the image is based on two dimensions—cognitive and affective—that together form the location's overall image. This model was chosen because it is one of the most often employed models in the current literature of image

structure investigation (Nghiêm-Phú, 2014). The image cognitive dimension—or just cognitive image—is related to how individuals perceive the tourist destination attributes (Baloglu and McCleary, 1999). Most image researchers have focused more on cognitive aspects than affective ones, especially in the pioneering works of this field of investigation (Hanyu, 1993). The literature indicates that the cognitive component influences the affective image and both dimensions influence the overall image (Baloglu and McCleary, 1999; Beerli and Martín, 2004; Lin *et al.*, 2007; Nadeau *et al.*, 2008; Nghiêm-Phú, 2014). Table I shows the factors and attributes in the cognitive image found in the literature.

Table I encompasses studies of tourist destination image, including works in the context of sports mega-events, such as Lee *et al.* (2005) and Gibson *et al.* (2008). Even with different terminology, the attributes are similar and include both more tangible/functional aspects and more intangible/psychological ones. The first category encompasses aspects, such as the following: general and/or tourist infrastructure; natural environment; attractions; convenience; culture; accommodation, food, transportation, bars and entertainment; shopping, cleaning, security. The second category, by contrast, encompasses aspects, such as the following: value, hospitality, and social environment; economic and political elements; the atmosphere of the place; and quality of experiences. There are also specific attributes that are more context dependent, such as destination brand, Olympic competence, and novelty, among others. The affective attributes, meanwhile, transmit affective qualities of places that are associated with human sensations or characteristics, as shown in Table II.

Fakeye and Crompton (1991)	(1) Social opportunities and attractions; (2) Natural and cultural attractions; (3) Accommodations, transportation and infrastructure; (4) Food and friendly people; (5) Bars and evening entertainment
Baloglu and McCleary (1999)	(1) Quality of the experience; (2) Attractions; (3) Value/environment
Chalip *et al.* (2003)	(1) Environment developed; (2) Natural environment; (3) Value; (4) Sightseeing tour; (5) Risk; (6) Novelty; (7) Climate; (8) Convenience; (9) Family atmosphere
Hui and Wan (2003)	(1) Leisure and tourism facilities; (2) Shopping and food paradise; (3) Local residents and nightlife; (4) Political stability; (5) Adventure and time; (6) Culture; (7) Cleanliness; (8) Personal safety and convenience
Beerli and Martín (2004)	(1) Natural resources; (2) General infrastructure; (3) Tourist infrastructure; (4) Tourism, leisure, and recreation; (5) Culture, history and art; (6) Political and economic factors; (7) Natural environment; (8) Social environment; (9) Atmosphere of the place
Lee *et al.* (2005)	(1) Attraction; (2) Comfort; (3) Monetary value; (4) Exotic atmosphere
Obenour *et al.* (2005)	(1) Priority; (2) Night attractiveness (3) Resources; (4) Facilities; (5) Peripheral attractiveness; (6) Reputation
Chen and Tsai (2007)	(1) Destination brand; (2) Entertaining; (3) Nature and Culture; (4) Sun and sand; (5) Hospitality; (6) Attractions; (7) Convenience
Gibson *et al.* (2008)	(1)Attractions; (2) Olympic Competence; (3) Convenience; (4) Atmosphere; (5) People; (6) Money
Aksu *et al.* (2009)	(1) Shopping; (2) Health and hygiene; (3) Information; (4) Transportation; (5) Accommodation
Pérez-Nebra and Torres (2010)	(1) Specific scenario; (2) Infrastructure; (3) Luxury and comfort; (4) Local culture; (5) Recreation and entertainment
Qu *et al.* (2011)	(1) Quality of the experiences; (2) Tourist attractions; (3) Environment and infrastructure; (4) entertainment and outdoor activities; (5) Cultural traditions
Pan *et al.* (2014)	(1) Natural resources; (2) General infrastructure; (3) Tourist infrastructure; (4) Tourism, leisure, and recreation; (5) Culture, history and art; (6) Political and economic factors; (7) Natural environment; (8) Social environment; (9) Atmosphere of the place

Table I.
Factors/attributes of cognitive tourist destination image measurement

Author	Affective qualities of places	Descriptive adjectives
Russell and Pratt (1980)	Arousing	Intense, arousing, active, alive, forceful
	Exciting	Exhilarating, sensational, stimulating, exciting, interesting
	Pleasant	Pleasant, nice, pleasing, pretty, beautiful
	Relaxing	Tranquil, serene, peaceful, restful, calm
	Sleepy	Inactive, drowsy, idle, lazy, slow
	Gloomy	Dreary, dull, unstimulating, monotonous, boring
	Unpleasant	Dissatisfying, displeasing, repulsive, unpleasant, uncomfortable
	Distressing	Frenzied, tense, hectic, panicky, rushed
Zube and Pitt (1981)	Common-unusual, angular- rounded, like-dislike, high-low scenic value, inviting-uninviting, bright-dull, smooth- rough, closed-open, varied- monotonous, pleasant-unpleasant, colorless-colorful, tidy-untidy, boring-interesting, obvious-mysterious, beautiful- ugly, hard-soft, light-dark, natural-man-made	
Olsen *et al.* (1986)	Stimulating	Enjoyable, dull, thrilling, exciting, adventurous, attractive, interesting, alive, energetic, pleasant, curious, brave, fascinating
	Frightening	Spooky, frightening, cautious, scary, dangerous, afraid, confusing, mysterious
	Relaxing	Mellow, relaxed, calm, carefree, comfortable
	Human qualities	Considerate, sensitive, honest, helpful, friendly
	Beautiful	Colorful, beautiful, brilliant
	Inner reflection	Contemplative, emotional, dramatic, tranquil, exotic
	Untamed	Wild, savage, magical
	Empty and isolated	Solitude, desolate, loneliness
	Romance	Sensuous, romantic, sexy
Aaker (1997)	Sincerity	Down-to-earth, honest, wholesome, cheerful
	Excitement	Daring, spirited, imaginative, up-to-date
	Competence	Reliable, intelligent, successful
	Sophistication	Upper class, charming
	Ruggedness	Outdoorsy, tough

Source: Pan *et al.* (2014, p. 62)

Table II.
Adjectives related to places/landscapes

The affective dimension has still not received sufficient attention in studies on destination image investigations (Nghiêm-Phú, 2014). There is, thus, little knowledge of the influence of affective components for destination image formation (Pike and Page, 2014). Prebensen (2007) concluded that the majority of studies focus on directly observable functional characteristics and only a few focus on aspects related to psychological characteristics. Image attributes that relate to destination services and attractions have been highlighted by tourist destination literature like Baloglu and Mangaloglu (2001), Basaran (2016), Kaplanidou *et al.* (2012) and Rezend-Parker *et al.* (2003).

Destination affective image appears to be slightly more influential on tourists' behavioral intentions than destination cognitive image (Iordanova, 2015). This is particularly so in cases of increasing visitors' composite loyalty. As a consequence, destination marketers should not neglect the impact of visitors' feelings, attachment, and attitudes toward the destination (Iordanova, 2017). Despite the importance of the cognitive dimension as a predecessor of the affective dimension and overall image (Gartner, 1993; Ryan and Cave, 2005), it is not more important than the affective dimension. The cognitive and affective image dimensions still represent a significant gap in the literature of tourist destination image, supporting the need for more research in this area (Iordanova, 2015).

Based on the literature review, the cognitive and affective image dimensions of tourist destinations need to be investigated further, and especially in the context of sports mega-event host cities, as in the present investigation. It is possible that some variables that

compose each dimension can gain more importance because of the sports mega-event context, presenting different results when compared to other destination image studies. The overall image of a destination is a significant indicator for destination management, and comprehending the dimensions that form it is essential to better understand the overall image, as well as the factors that can better predict that image and as to how the cognitive dimension can impact the affective one. For that reason, the research problems this study addresses are as follows:

(1) What are the most important factors in the cognitive dimension of the destination image of Rio as the host city of the 2016 Olympic Games?

(2) What are the most important factors in the affective dimension of the destination image of Rio as the host city of the 2016 Olympic Games?

(3) Which tourist destination image dimensions better predict the overall image of Rio as the host city of the 2016 Olympic Games?

(4) Do the cognitive destination image factors of the city predict the affective destination image factors in a sports mega-event context?

4. Methods

The study was conducted through a survey with a sample of international students, who were regular students at a university in the United States of America. Data collection was performed by applying a structured questionnaire, both online and face-to-face, from April to May 2017. This places the data collection only a year after the occurrence of the 2016 Rio de Janeiro Olympic Games. The time placement near the event was defined so that the perceptions about the city could be captured while they were still fresh and in the influence of the sports mega-event, as well as to help remedy the lack of ex-post studies on the Olympics (Ferreira *et al.*, 2018). The sample was non-probabilistic for convenience, composed of 274 university students made up of online respondents (n = 106) and face-to-face respondents (n = 168).

For characterizing the sample, the questionnaire included questions on demographic characteristics and travel behavior (e.g., whether the respondents had already traveled overseas and how many times). For measuring the constructs (cognitive and affective dimensions of the Rio 2016 Olympic Games host city image), a seven-point Likert scale (1 = totally disagree to 7 = totally agree) was employed.

For measuring the cognitive image dimension, the items were based on the Baloglu and McCleary (1999) scale with 11 items. For measuring the affective dimension, a semantic differential scale based on Russell and Pratt (1980) was used, adapted to the seven-point Likert scale with eight items: reliable, friendly, pleasant, exciting, stressful, relaxing, hectic, and terrifying. The explanation that preceded the image questions asked the respondents to evaluate Rio not just as a city, but also as the host city of the 2016 Olympic Games. Finally, a question was employed to classify the overall image of Rio as the Olympics host city with a seven-point scale, with levels varying from extremely negative = 1 to extremely positive = 7 (Stern and Krakover, 1993).

The adaptation of the indirect scales is in agreement with the literature; this type of approach meets the requirements of reliability (Devellis, 2003), and studies on tourist destinations commonly use indirect scales (Basaran, 2016; Iordanova, 2017; Kaplanidou and Gibson, 2010; Lee *et al.*, 2005; Um and Crompton, 1990). The choice of items to compose the scale was based on the destination image and sports mega-events literature (Martínez and Alvarez, 2010; Custodio and Gouveia, 2007; Hankinson, 2004; Kaplanidou and Vogt, 2007).

Studies on destination image and sports mega-events have mostly used seven-point Likert scales to measure the image cognitive dimension and semantic differential scales for the

affective dimension. This last was based on the proposal of Russell and Pratt (1980), who adapted it to a seven-point Likert scale (Baloglu and McCleary, 1999; Kaplanidou and Vogt, 2007; Moon *et al.*, 2011; Pan *et al.*, 2014; Zhang *et al.*, 2014). Table III shows the literature justification of each group of questions.

Exploratory factor analysis (EFA) was used to explore the dimensionality of the destination image concept prior to the regression analysis. The extraction technique employed was principal component analysis (PCA) with orthogonal varimax rotation (Hair *et al.*, 2009). The choice of this technique was made to achieve the minimum number of factors responsible for the maximum variance presented by the original variables (Hair *et al.*, 2009). The EFA was performed to detect the underlying factor structure of the cognitive destination image attributes and affective destination image characteristics, a procedure similar to that used in studies, such as Brown *et al.* (2016) and Al-Emadi *et al.* (2017), although the scale has already been tested. The intention was to analyze separately the two constructs that make up the overall image formation (cognitive and affective), identifying the most critical items in each image dimension. For this purpose, EFA for each image dimension was used, reproducing the procedure in the studies of Iordanova (2017) and Lai (2016).

According to Hair *et al.* (2009), some parameters must be observed for exploratory factor analysis to be validated. The explained variance must be higher than 60% for internal consistency; the Kaiser–Meyer–Olkin (KMO) test, which forms the measure of sample adequacy and examines the degree of correlation between the items on the questionnaire, should approach 1 (the closer to 1 the better, but above 0.5 is considered acceptable); and Bartlett's test of sphericity should approach a level of significance of $p < 0.05$. For the extracted factors be considered valid, their eigenvalues must be greater than 1. For the factorial loads, the minimum level indicated by Hair *et al.* (2009) is ± 0.3, but the ideal values are above 0.5, as well as for communalities. The reliability of the scale was determined by calculating Cronbach's alpha, which must be greater than 0.6 (Hair *et al.*, 2009).

The reduction of items with EFA was important because the regression analyses would become rather cumbersome otherwise (Lai, 2016). After the factor analysis, the regression model was performed to test the factors that most reliably predicted Rio de Janeiro's image as the host city of the 2016 Olympic Games, as well as to whether the cognitive factors could predict the affective factors. SPSS 23 software was used to perform the statistical analyses. Before and during the regressions, some assumption tests were made (Hair *et al.*, 2009). The Mahalanobis test was employed to identify and drop the outliers, and a histogram graphic test was used to observe the normality. Multicollinearity, auto-correlation, and homoscedasticity were also checked.

First group of questions – *Travel experience*	Destination image literature considers it important to observe both demographic and travel experience aspects to better characterize the sample (Baloglu and McCleary, 1999; Lai, 2016)
Second group of questions – *Image of rio de Janeiro as the 2016 Olympic Games host city*	(1) Overall image - Stern and Krakover (1993), (2) Cognitive image dimension - adapted from Baloglu and McCleary (1999) (3) Affective image dimension - adapted from Russel and Pratt (1980)
Third group of questions – *Sociodemographic information*	Destination image literature considers it important to observe both demographic and travel experience aspects to better characterize the sample (Baloglu and McCleary, 1999; Lai, 2016)

Table III.
Questions and authors

5. Results

The sample consisted of 59% of females and 41% males. The age of the respondents ranged from 17 to 74 years, with an average age of 28 years. The largest percentage of the respondents fell between the ages of 17 and 25 (52.1%), followed by those between 26 and 35 years (29.7%), so the sample was young. The ethnicity was predominantly White (48.7%), followed by Asian (23.2%), Hispanic (14.2%), and Black (10.1%).

The education level was high, with significant percentages having post-graduate (35.8%), university level (30.3%), or some college 24.8%) education. The annual income was generally low, with the largest percentage earning less than $2,00,000 (29.7%) or $20,000–$39,999 (19.3%), although 18.9% earned $100,000 or more. For country of birth, the most were from the USA (56.8%), followed by China (7.1%), while others respondents were from diverse countries from all the inhabited continents: North America (58.1%), Asia (19.2%), Europe (12.5%), South America (4.5%), Central America (2.6%), Africa (2.3%), and Oceania (0.8%). For the profile of traveler experience, the majority of the sample had undertaken international travel outside their countries (86.9%). Most of them (66.3%) had traveled up to five times outside of their home country.

In terms of participation in the 2016 Olympic Games, (99.3%) of the sample did not participate in the games, but the image can be formed by primary or secondary sources (Phelps, 1986; Gunn, 1972). The formation of Rio de Janeiro's image as the host city of the 2016 Olympic Games occurred, among the interviewees, through secondary sources, because the majority of the sample did not visit the city. This is a significant group to analyze because people that have not yet visited a city can still be potential visitors. Tasci and Gartner (2007) have emphasized the need for a visit or post-visit image investigation. Studies on tourism images in a mega-event context were previously conducted with visitors (Gibson *et al.*, 2008; Kaplanidou and Vogt, 2007; Lai, 2016). One of the novel aspects of this study is that the results are with potential visitors, so the image is influenced by external sources (Baloglu and McCleary, 1999), which include not only the visit perception but information, marketing communications, and contact with people from the destination.

After the EFA, two factors were identified from the Rio de Janeiro cognitive dimension: Factor 1, Services and Attractions, with six items: interesting historical and cultural attractions (0.928), beautiful scenery and natural attractions (0.915), attractive local cuisine (0.883), good options for nightlife and entertainment (0.713), good climate (0.674), and good value for money (0.614). Factor 2 was General Infrastructure, with three items: good infrastructure (0.876), values hygiene and cleanliness (0.857), and safety (0.805). The KMO test yielded a result of 0.853 and significance <0.05. Table IV summarizes the information.

For the affective dimension (Table V), two rounds were held with two factors extracted, which accounted together for 76.665% of the variance. Factor 1, Positive Feelings, had four items: pleasant (0.912), friendly (0.897), reliable (0.828), and exciting (0.793). Factor 2, Negative Feelings, had two items: hectic (0.875) and stressful (0.830). The KMO test had a value of 0.785, indicating that factorial analysis was appropriate and significant (<0.05).

Tests of homoscedasticity and the normality of error distribution of the model variables did not reveal any violations; thus, the analysis continued with the regression tests. Tests of multicollinearity revealed no concerns, as variance inflation factor values were less than 10 and tolerance >0.1. The p-value was set to $p < 0.01$ to detect statistical significance. A regression model was performed to find the factor that best predicted Rio's overall image, with the Rio 2016 Olympics host city overall image as the dependent variable and cognitive and affective factors as independent variables (Table VI). Regressions models were also performed to verify if the cognitive factors predicted the affective factors (Table VII).

In the first multiple linear regression performed, the dependent variable was Rio de Janeiro's overall image as the host city of the 2016 Olympic Games, and the independent

Item – Rio de Janeiro Items/Factors	Cognitive image dimension Factor 1	Factor 2	Communalities
Interesting historical and cultural attractions	0.928		0.867
Beautiful scenery and natural attractions	0.915		0.849
Attractive local cuisine	0.883		0.819
Good options for nightlife and entertainment	0.713		0.582
Good climate	0.674		0.512
Good value for money	0.614		0.475
Good infrastructure		0.876	0.813
Values hygiene and cleanliness		0.857	0.753
Safe		0.805	0.704
Eigenvalue	4.768	1.606	
% Variance	52.981	17.844	
% Cumulative variance	52.981	70.825	
Reliability (Cronbach's alpha) factor mean	0.896	0.844	
	5.395	4.063	

Table IV.
Rio de Janeiro's cognitive image dimension

Item – Rio de Janeiro	Affective image dimension Factor 1	Factor 2	Communalities
Pleasant	0.912		0.857
Friendly	0.897		0.818
Exciting	0.828		0.714
Reliable	0.793		0.699
Hectic		0.875	0.768
Stressful		0.830	0.743
Eigenvalue	3.149	1.451	
% Variance	52.478	24.187	
% Cumulative variance	52.478	76.665	
Reliability (Cronbach's alpha)	0.884	0.658	
Factor mean	4.951	3.966	

Table V.
Rio de Janeiro's affective image dimension

variables were the factors found in each image dimension: Rio positive feelings, Rio negative feelings, Rio services and attractions, and Rio general infrastructure. The factor that best explains Rio's image as the host city of the 2016 Olympic Games was the positive feelings ($\beta = 0.517$) in the affective dimension, and general infrastructure ($\beta = 0.208$) in the cognitive dimension. Both factors were found to be significant and with a higher power of explanation ($p < 0.05$; $R^2 = 0.389$).

For answering the final research question, two multiple regressions models were applied to observe if the cognitive dimension factors predicted those in the affective dimension, as indicated in the literature (Table VII). One model was applied to observe if the cognitive factors predicted the negative feelings, and the other model was applied to observe whether the cognitive factors predicted positive feelings. The result showed that only general infrastructure predicted negative feelings ($\beta = -0.117$, $p < 0.1$). However, the explanation power of this model was small ($R^2 = 0.029$), and there was no significance for Rio's services and attractions as a predictive factor for negative feelings ($\beta = -0.81$, $p = 0.240$). Both general infrastructure and services and attraction predicted positive feelings with high beta values and a high power of explanation ($\beta = 0.462$; $\beta = 0.455$; $R^2 = 0.606$). General infrastructure was the factor that best predicted positive feelings, but with only a small difference from services and attractions.

Table VI.
Regression results - Rio's overall image

Model Rio de Janeiro as the 2016 Olympic games host city (DV)*	Standardized coefficients β	t	Sig.*	Collinearity statistics VIF	Tolerance
1 (Constante)		1.979	0.050		
Rio positive feelings	0.517	6.513	0.000	2.555	0.582
Rio negative feelings	−0.046	−0.909	0.364	1.053	0.551
Rio services & attractions	−0.107	−1.640	0.102	1.718	0.391
Rio General infrastructure	0.208	3.118	0.002	1.816	0.950
R square	0.389				
Adjusted R square	0.379				
Durbin–Watson	1.953				

Note: *Sig $p < 0.05$

Table VII.
Regressions results-cognitive and affective factors*

	Standardized Coefficients β	t	Sig.*	Collinearity statistics VIF	Tolerance
Model Rio negative feelings (DV)					
1 (Constante)		18.833	0.000		
Rio services & attractions	−0.081	−1.178	0.240	1.260	0.794
Rio general infrastructure	−0.117	−1.186	0.093	1.260	0.794
R square	0.029				
Adjusted R square	0.021				
Durbin–Watson	2.045				
Model Rio positive feelings (DV)					
1 (Constante)		1.820	0.070		
Rio services & attractions	0.455	10.388	0.000	1.253	0.798
Rio general infrastructure	0.462	10.539	0.000	1.253	0.798
R square	0.609				
Adjusted R square	0.606				
Durbin–Watson	2.194				

Note: *Sig $p < 0.01$

6. Discussion

The EFA allowed verification of the main cognitive and affective factors of the dimensions of Rio de Janeiro's image. It was thus possible to reduce the variables involved in building the location's cognitive and affective image as the host city of the 2016 Olympic Games. The terminology of the extracted factors was defined considering the nature of the items. In the cognitive image dimension, Factor 1 (services and attractions) was the most important, which makes sense, because it includes the variables related to tourist attractions. Even considering Rio as a host city, it requires services/attractions like any other touristic destination. Even with some variations, this seemed to be one of the most important factors highlighted by the tourist destination literature, considering similar items from adapted scales (Basaran, 2016; Kaplanidou *et al.*, 2012; Rezend-Parker *et al.*, 2003). This factor explained 52.981% of the variance, with an eigenvalue of 4.768, and six items indicated by the literature as part of tourism services and attractions, such as in Echtner and Ritchie (1991) and Baloglu and Mangaloglu (2001). Factor 1 (services and attractions) was the most important not only in the perception of the interviewees, but also in other investigations, such as those by Fakey and Crompton (1991), Lai (2016), and Leal (2004), who considered it outside of a sports mega-event context, and Kaplanidou *et al.* (2012) who viewed it in a mega-event

context, although without the same magnitude as the Olympic Games. The conclusion is that, whether a sports mega-event is hosted or not, the destination image has similar factors.

Factor 2 (general infrastructure) included three items: good infrastructure (0.876); values, hygiene, and cleanliness (0.857); and safety (0.805). The importance of this factor is also supported by the literature. It includes items that are not directly related to tourism, but which are essential for its development. Fakey and Crompton (1991) found a similar dimension, which they called infrastructure, food, and friendly people, and similar dimensions were also assigned by Kaplanidou *et al.* (2012)—quality of experience—and Lai (2016)— infrastructure and reputation.

The two cognitive factors found in this study included variables that correspond to factors found in other studies, such as natural and cultural amenities and bars and evening entertainment (Fakey and Crompton, 1991); reputation, attractiveness, and locals and gastronomy, restaurants and accommodation (Leal, 2004); natural attractions and interest (Rezend-Parker *et al.*, 2003); and infrastructure and reputation and safety (Lai, 2016). One important aspect is that previous studies of Brazil's destination image have not considered a sports mega-event context and did not distinguish the two image dimensions—cognitive and affective. Working sperately with each dimension revealed the factors that might yield the greatest improvement to the overall destination image.

In Brazil, image studies, such as Leal (2004), Rezend-Parker *et al.* (2003), and Pérez-Nebra and Torres (2010), have applied scales of their creation, based on a previous qualitative step of the investigation, which included items specifically related to Brazil. However, adopting a more general scale, such as the one chosen for this investigation allows replication and comparison with other tourist destination studies, which helps to further develop this field.

The organization of cognitive image attributes in two large groups, as pointed out by EFA results, can be beneficial for public and private policies that reflect in the improvement of the destination image. These two factors include essential variables related to public investment, such as security and hygiene and cleanliness, as well as private ones, such as historical and cultural attractions, attractive cuisine, and accommodations.

Although studies on the affective aspects are still relatively scarce, one of the predecessors of image formation is a cognitive aspect: the beliefs previously held about the country (Nadeau *et al.*, 2008). The literature also indicates that cognitive aspects may precede or influence the affective ones (Nghiêm-Phú, 2014; Baloglu and McCleary, 1999). In this sense, the results of this work are compatible with the literature. The cognitive dimension predicted the affective dimension. However, new findings were added, because we identified the factors of the cognitive dimension, which could better predict the affective dimensions. Both independent factors predicted the affective factor positive feelings, and the general infrastructure was particularly useful in this regard, as well as being relevant in the context of investigating a sports mega-event.

Regarding the relationship between the same independent variables and negative feelings, only general infrastructure was significant, but with a small beta. Perhaps the negative feelings factor can be linked to negative media coverage, and it may be a possible reason for the lack of improvement to the country's image, as pointed by Tasci *et al.* (2019).

Considering that Rio is part of Brazil, the city is probably influenced by these country perceptions. This probably explains the negative feelings factors, which can be related to problems like corruption and crime. These are structural problems that need investment in safety policies to be improved. This suggestion is reinforced by the results of the regression models of cognitive and affective factors, which indicate that services and attractions did not predict negative feelings. Even so, general infrastructure—including the variable safety—predicted negative feelings, although with little explanatory power, which indicates that more studies are needed.

Negative feelings about the city were the weaker factor found in the EFA. The crucial affective factor was Factor 1 (positive feelings), which contained variables with higher factor loads and a higher eigenvalue. This means that, despite belonging to an emerging country with many social and economic issues (Swart *et al.*, 2017), positive feelings prevailed in the affective image dimension for Rio as an Olympic host city. In the Rio overall image regression, positive feelings were the factor that better predicted the overall image, which shows that the affective dimension is crucial to the city's image. Services and attractions and negative feelings were not significant in predicting the overall image.

This is a positive result for the city and the country. Beerli and Martín (2004) have argued that the image management process is not easy, because the image of a place is usually anchored in long-lasting stereotypes, clichés, history, and traditions, and as such, is not easily malleable. It is noteworthy that, despite the social contradictions that the country and city can present, the main factor related to Rio's affective image was that of positive feelings, including the variables pleasant, friendly, reliable, and exciting. However, the variable relaxing was not included in the final result. The variable terrifying was dropped out too, which is a good result for the city's image, although it was considered a city with a high perceived crime risk (Swart *et al.*, 2017) and there was harsh media coverage of the country and city leading up to and during the Olympic Games mega-event (Tasci *et al.*, 2019).

The second factor that most predicted Rio's image was general infrastructure. That makes sense, because hosting an event like the Olympics requires a substantial investment in infrastructure, which often raises doubts when considering the gaps attributed to an emerging country like Brazil.

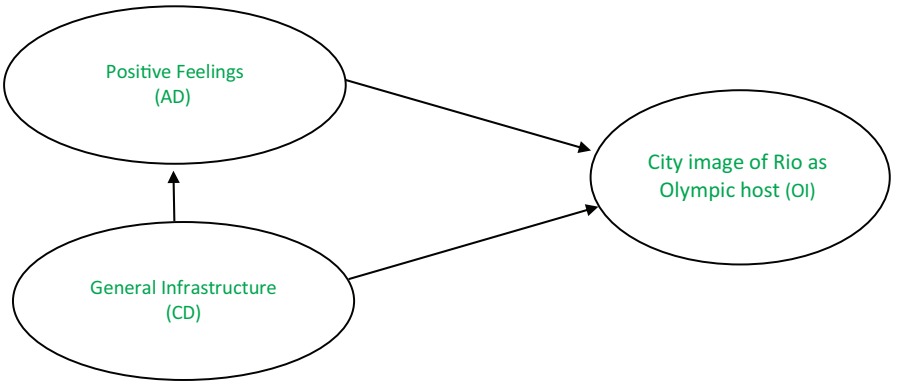
However, the factor services and attractions, considered an essential factor for a tourist destination and an important factor in the EFA results, did not predict the Rio overall image. It should be highlighted that the factor loads of the variables that explain this factor represent the correlations between original variables and the generated factor. As a consequence, the higher the factor load presented, the greater should be the correlation with the factor (Hair *et al.*, 2009). In the regression, the beta value, or standardized regression coefficient, indicates a variation of the dependent variable as a function of variation in one unit of the independent variable (Hair *et al.*, 2009). The coefficient related to the dependent variable Rio host city image may thus be negative or positive—independent of the EFA results. In the present study, it was negative, indicating that the services and attractions factor, which is an independent variable, would have a negative influence on the overall image, but this relationship was not significant.

General infrastructure was a factor that positively predicted Rio's overall image and also predicted positive feelings (affective dimension). This factor includes good infrastructure, values hygiene and cleanliness, and safety—all of which are key issues for a developing country. Figure 1 illustrates the presence of general infrastructure as an important factor for both the overall image and the main affective image factor.

The research questions were thus answered, identifying the main factors of the Rio image dimensions as the host city of the 2016 Olympic Games, and also verifying the factor that best predicted its overall image, as well as the factors of the cognitive dimension, which predicted better the affective dimension factors.

7. Conclusion, theoretical/managerial implications, and limitations

The main objective of this study was to investigate the image of Rio de Janeiro as the host city of the 2016 Olympic Games by analyzing its cognitive and affective dimensions, seeking the factors that predicted Rio's overall image better in the investigated context, and how cognitive image predicted the affective image. This paper considered the city image in a sports mega-event context not to confirm what the prior literature emphasized—that hosting



* CD – Cognitive Dimension; AD – Affective Dimension; OI – Overall Image

Figure 1.
Resume of the main results*

of a sports mega-event can be useful for the tourist city that hosts it in terms of tourist image—but rather to determine the essential factors for the image formation in this situation. The motivation for this approach is the usefulness of possible findings to improve the destination.

The place studied was a city in an emerging country, Brazil, which has not been thoroughly subject to a variety of research and is troubled by many social issues that demand priority investments other than spending for a sports mega-event. Nonetheless, once the mega-event was hosted, it is vital to not only know the tangible aspects of the outcomes to the city and consequently to the country, but also the intangible losses or gains like those related to the image. This is important because the intangible results, such as the positive image, can influence the city's capacity to attract investments and new events that can change the urban environment.

The EFA results show that the structure of the destination image was similar to other investigations that studied non–host city destination image. One important finding was that the positive feelings factor of the affective image dimension was more relevant than the negative feelings factor, even considering all of the demands of a city in a developing country. Thus, destination marketers should not only invest in cognitive aspects to improve the image, but also in affective ones. This can be done by marketing actions that stimulate positive feelings about the city through information sources, as well as investing in general infrastructure, because that factor predicted the overall image and positive feelings about Rio.

Marketing communication can reinforce the feelings related to the place than other attributes. Because positive feelings are an important part of the overall image, and the image is a relevant aspect for tourist decision-making to visit a location, this factor could be explored further with the cognitive aspects in marketing communication for locations that host sports mega-events, such as Rio. The positive feelings factor was not only the most important factor in the EFA, but was also the one that predicted the image of Rio better in this context. General infrastructure and services and attractions were important attributes that predicted these feelings. These results are also relevant for Brazil, which often has its tourism associated with Rio de Janeiro. General infrastructure was a predictor of Rio's overall image. However, the factor services and attractions were more important considering the cognitive dimension EFA. This indicated that a factor related explicitly to tourism (historical and cultural

attractions, beautiful scenery, attractive cuisine, and entertainment) was more relevant in the image composition. This could be explained by the fact that infrastructure is a big issue in developing countries like Brazil.

This investigation mainly contributes to destination image research. Although the image dimensions (cognitive and affective) seem to be already consolidated in the literature, many studies do not approach each dimension separately, especially the affective dimension. The approach chosen allowed the verification of what is important in each dimension, bringing academic and managerial contributions such as a framework that can be used to improve decision-making related to destination image management. The public investigated were potential tourists, and the results with this sample could help in managerial actions to improve media and other sources of information. It is essential to not only know the image effects on people that participated in the games but also on people that did not, as this indicates that the media and other sources of information can contribute to building the host image in a sports mega-event context. Investment in general infrastructure should also be a priority, as this factor had a relevant impact on the overall image, as well as in the affective image dimension.

Despite the positive results regarding Rio de Janeiro's image as the host city of the 2016 Olympic Games, this is just one aspect to be evaluated regarding the losses or gains of the city and country. Other aspects should be observed to conclude whether or not the event was positive for the city, considering all of the issues. That is also dependent on the study's point of view. This research was focused on the international image, but the citizens' point of view should also be considered. It is essential to evaluate how the gains or losses of image and infrastructure are perceived by Brazilian citizens in future research. It could also be interesting to investigate Rio's image in a typical tourist context in future studies, which could be used in comparison with the results of the present work and to define the presence or absence of image reinforcement in a sports mega-event context. Finally, the foreign student sample imposed limitations as to the generalizability of the results of this study.

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