

# Evaluating the impact of mega-sporting events on hotel pricing strategies: the case of the 2014 FIFA World Cup

Albert A. Barreda, Sandra Zubieta, Han Chen, Marina Cassilha and Yoshimasa Kageyama

Albert A. Barreda is Assistant Professor at the Department of Hospitality Leadership, Missouri State University, Springfield, Missouri, USA. Sandra Zubieta is Program Director at Carrera de Administración Hotelera, Universidad San Ignacio de Loyola, Lima, Peru. Han Chen is PhD Candidate at the Department of Nutrition, Dietetics, & Hospitality Management, Auburn University, Auburn, Alabama, USA. Marina Cassilha is Academic Coordinator at Carrera de Administración Hotelera, Universidad San Ignacio de Loyola, Lima, Peru. Yoshimasa Kageyama is Assistant Professor at the Department of Hospitality Leadership, Missouri State University, Springfield, Missouri, USA.

## Abstract

**Purpose** – *This study aims to examine the impact of a mega-sporting event “2014 FIFA World Cup” on hotel pricing strategies and performance.*

**Design/methodology/approach** – *The present project examines the host regions’ response to the 2014 FIFA World Cup which was established by the variance in the main hotel key performance indexes: occupancy, average daily rate, revenue per available room (RevPAR) and supply. Using data gathered from STR, this research distinctly shows how the Brazilian host regions reacted to the World Cup.*

**Findings** – *Results suggest that the key performance indicators of Brazil’s lodging sector reacted differently to the World Cup. Although all hosting cities experienced significant RevPAR growth because of the increase in hotel room rates during the event, the supply and occupancy performed differed from each city.*

**Research limitations/implications** – *Research is limited to the case of hotel performance at the country level for mega-events. The study focused on the reaction of revenue managers in the Latin America context. Other contexts may generate different results.*

**Practical implications** – *The study helps revenue managers to examine how the FIFA World Cup travel demand affected pricing strategies and revenue management practices in the Brazilian hotel sector in areas undergoing seasonal growths in overnight tourism. This study serves to inform hoteliers and practitioners about revenue management pricing strategies to improve hotel performance during mega-sporting events.*

**Social implications** – *This study reveals that the benefits brought by a mega-event are not always translated into strong hotel revenue performance. This study highlights an important but understudied research area of revenue management pricing strategies and the effect of mega-sporting events in the hotel sector. This study contributes to the literature as one of the few investigations to benefit hotel pricing strategies and overall revenue performance.*

**Originality/value** – *This study is one of the few studies about exploring the reaction of revenue managers during the execution of a mega-sporting event. The value of the present study lies in the fact that the authors extend previous studies examining the impact of the most important sporting event in the hotel industry at the country-level perspective. This study serves to inform hoteliers and practitioners about revenue management pricing strategies to improve hotel performance during mega-sporting events.*

**Keywords** *Revenue management, RevPAR, Pricing strategies, Price elasticity of demand, Mega events, ADR*

**Paper type** *Research paper*

## 1. Introduction

Global mega-sports events such as the FIFA World Cup (WC) of soccer and the Olympic Games are considered as hallmark mega-events. Ritchie (1984) conceptualized hallmark events as “major one-time or recurring events of limited duration, developed primarily to enhance the awareness, appeal, and profitability of a tourism destination in the short and/or

Received 10 February 2017  
Revised 21 March 2017  
Accepted 24 March 2017

long term" (p. 2). The FIFA WC symbolizes a worldwide icon of major sport events (Kaplanidou *et al.*, 2013). Approximately 3.3 million people attended the 2014 WC. The FIFA (2014) WC hosted by Brazil (12 venues) took place over a period of four weeks from June 12 to July 13, 2014. Brazil renovated five venues and developed seven new venues to accommodate all the activities to ensure a successful WC.

Hosting the FIFA WC produces favorable shifts in tourism demand on a short- and long-term basis (Schwambach, 2012). The FIFA WC attracts travelers from different countries to visit the hosting destination. The host destinations certainly become attractive travel destinations for tourists (Solberg and Preuss, 2007). Because of the significant advantages resulted from hosting the FIFA WC, the process of becoming a host destination is exceptionally complex. Government officials and tourist leaders certainly forecast that a WC generates vast financial and economic benefits for the destination (Caiazza and Audretsch, 2015).

The prospects of these multiple benefits are driven by built and renovated event venues, goodwill among multiple stakeholders, increased civic pride, community empowerment, enhanced partnerships, greater commercial activity, urban restoration, augmented tourism, increased worldwide image, additional employment opportunities and local business prospects (Kaplanidou *et al.*, 2013).

With respect to the travel and lodging sector, the FIFA WC has a significant contribution because it is a decisive event for the host destination. Brazil showed its competence of complete technique and power through accommodating a successful FIFA WC. In the four-week FIFA (2014) WC, the event was expected to insert \$3.03 billion into Brazil's economy, and tourists were expected to spend \$2.97 billion during the event (Jelmayer, 2014). The FIFA WC was also the main reason of the booming of many business sectors, including travel, hospitality, sex tourism, television, food, alcohol and major retailers (Wiener-Bronner, 2014). Tourism officials announced that one million international travelers visited the country for the four-week mega-event. The number surpasses the 600,000 travelers from abroad that Brazil's Tourism Board initially projected to attend. In comparison, just 310,000 international travelers visit South Africa for the FIFA WC in 2010 (Chao, 2014).

All market players understand the significance of a mega-event (Gordon and Vidal Barbosa, 2014; Lamla *et al.*, 2014). The hotel and tourism industry (Giampiccoli *et al.*, 2015), as one of the principal players during WC events, do not miss the opportunity and always prepare to welcome this international sporting event. Hotel developers and operators enthusiastically increase their supply by developing new properties and allocating financial resources on renovating existent hotel properties (Lopes *et al.*, 2014). The substantial effects are closely related to the different industries and markets. The hotel sector is influenced remarkably by the FIFA WC.

Past researchers have considered several methods to detect and examine the impact of a mega-sport event such as the WC on the host destinations (Késenne, 2012). Even though, there are some studies examining the impact of external events such as depression, NFL games, recession and natural events (Garcia *et al.*, 2015; Fourie and Santana-Gallego, 2011). It is not easy to locate vast investigations which focus on the understanding of the effects of WC on hotel performance at the country level.

Taylor and Young (2005) and Dermody *et al.* (2003) indicated that few studies have studied the impact of sporting events in the hotel industry at the macro level. Specifically, the reaction of the destination's hotel market to the FIFA WC has received little consideration. There are limited investigations which study the relationship between hotel performance and the FIFA WC. The FIFA WC, as an international mega-sport event, has major influence not only to the host destination's tourism industry but also to the destination's hotel industry (Sun *et al.*, 2013). Thus, it is essential to investigate how the hotel industry at the host

destination reacts to the FIFA WC and the significance of the reaction. The present study attempts to illustrate the host destination's response to the [FIFA \(2014\) WC](#). The goal is to investigate how travel demand influences hotel pricing and revenue management strategies during this worldwide sporting event in cities experiencing seasonal growths in sport fans. The study establishes how the key performance indicators (KPIs) of the Brazil's lodging sector reacted to the WC. Additionally, the study presents the distinctive performance of KPIs across the host cities. The aim of the study is to examine the variability of KPIs (including revenue per available room [RevPAR], average daily rate [ADR], revenue, occupancy levels and supply) of the participating host cities during the [FIFA \(2014\) WC](#) and provide a discussion comparing the performance of each hosting city, and to determine whether the percentage differences increase or decrease before, during or after the sporting event. Additionally, the study examines whether hosting cities with strong RevPAR showed similar performance before and after the FIFA WC.

The value of the present study lies in the fact that we extend previous studies examining the impact of the most important sporting event in the hotel industry at the country-level perspective. This study serves to inform hoteliers and practitioners about revenue management pricing strategies to improve hotel performance during mega-sporting events. The present research is the one of the few investigations focusing on the relationship between the destination's hotel sector and the FIFA WC. Therefore, the study provides significant evidence of the influence of the FIFA WC on the host destination's hotel market. A well-defined comprehension of this influence helps hoteliers to execute more precise and efficient pricing strategies before, during and after sporting events. Additionally, hotel operators might be able to forecast more accurate outcomes based on the results of this investigation.

## 2. Literature review

This section provides readers with a foundation to develop their comprehension of the paper. The authors have divided this section into the followings streams of research: hotel performance considering RevPAR, research examining RevPAR, large-scale sport events, the impact of these events, sport events as demand generator and the concept of price elasticity of demand.

### *2.1 Hotel performance considering revenue per available room*

RevPAR is almost always measured by multiplying ADR by occupancy percentage ([Jacobs, 1997](#)). Alternatively, it is also estimated by dividing rooms revenue by available rooms supply ([Zheng, 2014](#)). The key variables used to operationalize RevPAR are primarily rooms supply, ADR, hotel occupancy and rooms revenue. RevPAR is considered as a predictor hotel indicator that is used for more than 80 years as an indicator to project upcoming rooms' income, calculate and project a hotel participation in the market and reveal the level of guest satisfaction ([Ismail et al., 2002a, 2002b](#)).

RevPAR permits hoteliers to make comparisons and assessments in relation to revenue variances and relative improvement overtime. As described in the study of [Ismail et al. \(2002a, 2002b\)](#), annual RevPAR generates an assessment of rooms revenue by including the variance over time and impact of ADR and the occupancy levels jointly instead of just seeing the two factors individually ([Brown and Dev, 1999](#)). This inclusion uncovers the real dynamics of room supply and demand in a hotel market performance ([Slattery, 2002](#)).

The importance of analyzing the changes of RevPAR overtime has been vastly mentioned in the literature. Hoteliers use the variations of RevPAR as a criterion of growth and impact of demand and supply in a lodging market performance ([Chen et al., 2011](#)). Moreover, many industry experts in the hospitality (hotel developers and managers) and tourism (destination developers and event organizers) industries consider RevPAR as a critical KPI in estimating the lodging performance in a macro market. [Cross et al. \(2009\)](#) also identified

RevPAR as a critical indicator for revenue productivity, brand positioning, quality of service and sales efficacy.

## **2.2 Research examining revenue per available room**

Our comprehensive review of the literature has located few scholars who examine RevPAR per cent variations fluctuations and other lodging performance from a macro-view perspective during events (Zheng, 2014) using operating indicators such as ADR, Occupancy percentage, Demand, and Revenues. Using KPIs from five distinct shale regions, Mount *et al.* (2014) investigated the total revenue impact of the Marcellus Shale regions in the area of Pennsylvania. They found that incremental revenue was generated by both demand and ADR increases. They estimated that around \$685 million of hotel revenue was made by Marcellus Shale drilling activities. The authors suggested that hotel performance in the regions studied was influenced by the dynamics of the events related to the Marcellus Shale drilling and that future studies must focus on the continuous dynamic of external events on the analysis of hotel performance. Morse and Smith (2015) study how fall foliage tourism demand influences hotel pricing practices in markets experiencing cyclical growths in overnight hotel visitors. They investigate how revenue management pricing strategies during a special event affects the hotel performance in a market. Zheng (2014) investigates whether the increase in hotel room supply in the US market had a substantial influence on RevPAR during an economic event. The study offers hoteliers empirical findings on the relation between oversupply and projected hotel performance and discusses the seasonal behavior of hotel development during specific economic events.

Previous scholars also study the relationship between hotel performance and KPIs (RevPAR, ADR and Occupancy levels) and other variables such as social media and word-of-mouth. Anderson (2012) examines the impact of social media upon buying decisions and hotel performance. The study provides a numerical validation of the impact of social media and user content on hotel performance. Similarly, Kim *et al.* (2015a, 2015b) examine how the effective management of user generated content impacts hotel performance. In a similar study, Viglia *et al.* (2016) examine the effects of consumer reviews on hotel occupancy levels. The authors suggest the utilization of adequate reputational management systems to influence occupancy levels and consequently hotel performance.

No known research was located which attempted to examine variances of KPIs such as RevPAR, ADR, Occupancy levels and Revenue during a mega-sporting event at the country level. Therefore, as mentioned in the previous section, the study attempts to reduce the gap in the literature by investigating country-level hotel performance during a mega-sporting event, considering revenues, rooms available and rooms sold the most common hotel KPIs including RevPAR, ADR, rooms supply, rooms demand and occupancy level during the FIFA (2014) WC.

## **2.3 Large-scale international tourism sporting events**

Large-scale tourism events, according to Knott *et al.* (2015), are large-scale cultural events, that have a spectacular character, mass popular appeal and international implication. Specifically, sporting events such as the FIFA WC and the Summer/Winter Olympic Games, not only attract huge numbers of international travelers with thick wallets and promising spending habits (Peeters *et al.*, 2014) but also seem to influence tourism patterns and tourism growth of developing countries (Lepp and Gibson, 2011), emphasizing new tourism destinations and generating a strong lasting reputation in the host communities (Walker *et al.*, 2013).

Sport mega-events frequently result in the development of tourism-specific infrastructure that creates long-term growth in the tourism and hospitality industry. The events offer the host destination the possibility to market itself internationally, allowing the destination to

leverage a strong awareness and positive image to different markets (Grix, 2012). These markets include sport fans, international travelers, global businesses and television viewers (Li *et al.*, 2015; Matheson, 2012).

In recent years, the interest of hosting a large-scale sport event has grown significantly. The event is perceived as a reason for economic benefits, tourism growth and progressive results in a destination that present fertile field for such progressions. Alternatively, a large-scale event is associated with the construction and development of infrastructure and event amenities regularly carrying long-term debts and continually effective management (Greene, 2014). Despite the positive and negative effects, more government and tourism officials are ferociously competing to host international sporting events, particularly the WC, the Winter/Summer Olympic Games and other large-scale cultural events like expositions, cultural festivals and trade fairs (Martins and Serra, 2011). The importance of the FIFA WC and people's attention in the event are increasing and expanding. For example, comparing the FIFA WC South Africa with the FIFA WC Brazil, the growth of attendees is noteworthy. There were 3.1 million visitors attending the FIFA WC South Africa, and in the FIFA WC Brazil, the number of attendees grew to 3.3 million visitors. These notable statistics alone reveal how rapidly the FIFA WC has matured and expanded.

#### *2.4 The impact of the FIFA World Cup*

Major sporting destinations such as Brazil, South Africa and South Korea host large-scale tourism sporting events with expectations to bring advantages such as economic leverage, new job opportunities, awareness development, image enhancement, promotion of domestic services and products, attraction of foreign investment, improvement in success in international competition, positive shifts in tourism demand, acceleration of urban growth, infrastructure development, upgrade of venues, motivation of sports involvement, enrichment in national satisfaction and assurance of sustainable growth (Grix and Houlihan, 2014; Matheson, 2012). Among these benefits, it is essential for the host community to acknowledge the impact of hosting a mega-event such as the FIFA WC because it has a significant role in the comprehensive development of the community and local businesses. For instance, these large-scale tourism sporting events interrelate significantly with the economy of a destination. The FIFA WC produces net economic benefits in the form of Keynesian injections and multiplier effects (Kavetsos and Szymanski, 2010). Additionally, the host destination receives augmented publicity (Lee, 2014) and improved destination awareness (Fourie and Santana-Gallego, 2011).

Inherently, the significant volume of travelers during large-scale tourism events might motivate investors who are fascinated in developing new hospitality amenities and event venues for visitors and the local community (Davies *et al.*, 2013). According to de Almeida *et al.* (2015), Brazil effectively won the hosting rights for the FIFA (2014) WC and met the challenge of major destination as a completing sporting infrastructure. The infrastructure includes the development and renovation of the local infrastructure, tourist accommodations, amenities, dining facilities and a developed transportation system.

The economic impact of hosting the FIFA WC has been essentially observed in Brazil. As the first destination in South America to host this mega-event, Brazil has generated significant profits from the FIFA WC (Manfred, 2015). The 2014 WC generated almost \$5 billion in revenue for FIFA compared to \$2.2 billion in expenses. In recent years, several studies have studied the potential impact economically and socially that a host community might attain from hosting the FIFA WC (White, 2014; Walker *et al.*, 2013). Alternatively, mega-events may also generate negative effects on the host destination in a relatively short time (Kim *et al.*, 2006). Recent tourism literature focuses on some negative aspects of hosting a mega-event. Positive impacts of a large-scale event might be counteracted by negative sociocultural, economic and ecological effects, causing the disapproval of local communities (Fourie and Santana-Gallego, 2011). The undesirable aspects of large-scale

sporting events tend to generate price inflation and an increase in local tax to develop venues required to host the activities of the event, affecting residents financially as well (Kim *et al.*, 2015a, 2015b). To make matters worse, large-scale sporting events might also result in considerable negative socio-psychological impacts such as disorganization, law enforcement strain, increased crime, safety and security concerns and vehicle traffic (Kaplanidou *et al.*, 2013; Giampiccoli *et al.*, 2015). Even though the latent undesirable and adverse consequences are ever-present, a remarkable level of need for hosting sporting mega-event remains (Kim *et al.*, 2015a, 2015b; Kaplanski and Levy, 2014; Tilcsik and Marquis, 2013; Fourie and Santana-Gallego, 2011).

### ***2.5 Sport events as demand generators***

Sporting events attract international and domestic spectators from different parts of the world. The FIFA (2014) WC attracted more than one million international travelers and more than three million national spectators (Armstrong, 2014; Wilson *et al.*, 2014). Noteworthy figures included the 3.2 million tickets available for the 64 matches of the tournament held from June 12 through July 14, 2014. Five point one million visitors attended FIFA Fan Fests in Brazil during the WC, with Rio de Janeiro's impressive Copacabana site attracting 937,330 visitors – the highest number in any other venue (FIFA, 2014).

Although the sports matches were held at certain venues, tourists also visited other venues of Brazil (Armstrong, 2014). Numerous worldwide enterprises of real state, resorts, hotels, restaurants, banks and other service-oriented brands started to demonstrate interest in investing Brazil (Jensen, 2014; Zimbalist, 2011). Therefore, Brazil attracted international attention and grew as an attractive and powerful destination. With its remarkable development, Brazil was chosen to host another mega-sporting event, the Olympic Games (Almeida *et al.*, 2014). The FIFA (2014) WC achieved extraordinary achievements and inevitably conveyed advantages to several sectors, particularly the hospitality and travel industry. The event was documented as the first in which a host destination set a goal to appeal more attendees and obtained a strong and favorable tourism growth from hosting this mega-event (Jensen, 2014). The remarkable growth in demand from international travelers created opportunities for the hospitality and travel industry as to its upcoming destination performance. Based on Ernst and Young Terco (2014), tourist arrivals caused a substantial influx of revenues, mainly from the hospitality, transportation, communications, culture, entertainment and retail industries. This inflow of tourists directly and indirectly provoked by the event was projected to account for additional profits up to R\$ 5.94 billion for different Brazilian enterprises.

### ***2.6 Revenue management strategies and price elasticity of demand***

Hotel revenue managers are increasingly applying more revenue management and strategic pricing strategies in the management of hotels to optimize and maximize financial performance. The field of revenue management has been conceptualized by Ferguson and Smith (2014) as the process of setting the price for tangible products, commodities or services. While the prospective advantages of utilizing revenue management concepts in the lodging industry are well accepted (Ivanov, 2014, p. 8), the revenue management process is not an easy job. Therefore, the intense implementation of revenue management pricing strategies requires more prepared and educated revenue managers who understand the sensitivity of demand before and during market dynamics.

Research suggests that pricing strategies and the desire for goods and services (commonly named as demand) are directly associated (Granados *et al.*, 2012). In the hotel sector, demand is the level of interest that travelers shown to purchase various hotel products and services at distinct prices and times. Based on economic theories (e.g. the law of demand), when the price of a service/product augments, the quantity desired of that product decreases (Grandmont, 1987). This law does not provide information about how

quantity desired varies when price changes. Therefore, economic theories suggest the application of price elasticity of demand. Price elasticity of demand calculates the sensitivity of the quantity demanded, Q, to variations in prices, P. It is the ratio of per cent change in Q for a 1 per cent variation in price. Mega-events, such as the FIFA WC, are short-term and one-time events (every four years) that typically are expected to produce long-term intense impact (favorable and unfavorable) on hosting destinations (Ferreira and Boshoff, 2014). Soccer fans and other international travelers understand that there are limited alternatives of hotel accommodations during the FIFA WC. Specifically, in Brazil, the demand for hotel accommodations during this mega-event might be believed to be price insensitive (travelers willing to pay higher room rates). In the present study, instead of business demand to show more sensitive demand, the authors expect FIFA WC travel demand to be insensitive to price changes. To explore how hoteliers and revenue managers behave proactively or reactively to this large-scale sport event, ADR, hotel room demand and revenue are investigated in nine of the cities that host the event during the period of the event and compared to the performance in other periods of the year.

### 3. Methodology

Our research followed a methodology applied in previous studies. This methodology has been used in different investigations considering the analysis of the percentage changes and variations in KPIs. For instance, our methodology is in line with Taylor and Young's (2005) methodology and Dermody *et al.* (2003). The authors obtaining data from STR examined the thesis that the presence of the NFL team in a market area affects the hotel sector. They examine the impact of an NFL team's play dates on hotel sector KPIs. Another similar methodology was considered in the Ferreira and Boshoff' study (2014) in which the authors examine the global and local connection of luxury hotel supply in South Africa in the context of a specific market and the international economic downturn event. In their study, Ferreira and Boshoff (2014) analyzed the per cent variances in occupancy levels, room supply, tourist arrivals, rooms supply and other hotel key indicators.

Similarly, Morse and Smith (2015) used a similar methodology to study how fall foliage tourism demand impacts hotel pricing strategies. The authors used data from Smith Travel Research to examine the demand for hotel rooms, the ADRs charged by each area and the revenues obtained. This information allowed them to investigate whether hotel managers applied seasonal hotel revenue management practices and strategies. Another critical source for the methodology used in the present study is the Enz and Canina's (2002) study in which the authors attempted to make comparisons of different regions. In their study, the authors estimated the percentage change in RevPAR by US regions. The contribution of their approach was that the author examined average hotel RevPAR performance at the country-level and not overall industry performance. Their results suggest that the regions with prosperous economies and the strongest RevPARs also showed the extreme decreases in performance. In prosperous times, their results showed strong positive percentage variations in RevPAR, and during declining periods, their results showed strong negative percentage change in performance. Another study by Mount *et al.* (2014) used a similar methodology to examine the total revenue performance of the Marcellus Shale regions in Pennsylvania. Their research methodology quantified the revenue performance in dollars for each market under studied. Like the present study, their study compared actual performance data and percentage changes RevPAR, ADR and Occupancy levels in five regions. They concluded that the event of Marcellus Shale drilling has a significant impact on hotel performance in the studied markets.

#### 3.1 The data

The methodology in the present study is utilized to ascertain the influence of the 2014 FIFA WC on Brazil's hotel performance. To establish the dynamism of the hotel performance, data and results of the six most relevant lodging indexes that express performance is

examined. Data for this analysis were obtained from STR. STR gathers hotel performance information from reporting hotels characterizing more than 100,000 rooms in nine cities of Brazil (Table I). The STR data entailed monthly hotel-level performance information, rooms revenue and rooms sold (demand) for the period 2011-2015 for a broad sample of Brazilian hotels. The authors eliminated properties with less than 12 months of hotel performance data in any of the years under assessment. This results in a sample size of 101,424 hotel rooms (totaling 590 hotel properties) in nine of the WC hosting cities. Other cities did not submit hotel information to STR. The number of hotel rooms, including independent and chain, differed by the hosting city (Rio de Janeiro, Brasilia, São Paulo, Fortaleza [Ceara], Belo Horizonte [Minas Gerais], Salvador [Bahia], Manaus [Amazonas], Curitiba [Parana] and Porto Alegre [Rio Grande de Sul]). Cuiaba (Mato Grosso), Natal (Rio Grande do Norte) and Recife (Pernambuco) did not provide complete data; therefore, the performance of these cities was not included in the analysis.

The data are prepared and submitted by hotel chain headquarters, management companies and from independent hotels that consequently utilize STR reports to compare their hotel performance with the performance of their competitive set on a daily, weekly and monthly basis (Ritchie *et al.*, 2013). It is the hotel performance information that allows analyzing the variation in each of the indexes from different time periods. The analysis was done by comparing hotel performance during the period of the FIFA WC compared to the monthly periods three years prior and one year subsequent the event. This detailed comparison of hotel performance is based on 101,424 hotel rooms across nine Brazilian WC hosting venues.

The data sets that define hotel performance include the supply, demand, occupancy percentage (Occ %), ADR, total room revenue and RevPAR. Furthermore, to assess how the FIFA (2014) WC impacted Brazilian's hotel performance across the participating hosting cities, it is indispensable to examine the variation of supply, demand, Occ %, ADR, total revenue and RevPAR three years before the event, the year of the sporting event and one year after the event. The level of variation appropriately illustrates the effect that each hosting venue's hotel market underwent because of the FIFA WC. Consequently, describing the dynamism of the most common hotel KPIs is important (Li, 2014).

### 3.2 Supply of hotel rooms (supply)

The term supply is a central concept in economics. Supply mainly explains the total amount of a product or service that is accessible to buyers. Supply also refers to the quantity of a good accessible at a specific price. Likewise, in the lodging sector, supply refers to the sum of available hotel rooms that are offered to consumers in a specific location at a specific time. The quantity of available hotel rooms fluctuates by distinct time periods and market dynamic. Hotel developers augment their hotel investments and expand the total rooms available before a mega-sport event is hosted in the area, such as the FIFA WC (Baumann and Matheson, 2013). Brazil has engaged in substantial investment spending in its run up to the 2014 WC and 2016 Summer Olympics. On the other hand, it is irrefutable that large-scale sporting events require substantial tourism expenditures (increase rooms supply) by the hosting destination. For instance, Brazil's financial plans for FIFA (2014) WC and 2016 Olympics are \$13.3 billion and \$18 billion, respectively. As is regular in sporting events, expenses have increased significantly in just a few short years (Zimbalist, 2011), but in previous events, the observed increases in economic activity during the sporting event fall well short of the economic influence projected by event organizers.

**Table I** Room counts – nine cities

City	Belo Horizonte	Sao Paulo	Salvador	Porto Alegre	Manaus	Fortaleza	Curitiba	Brasilia	Rio de Janeiro	Total
Rooms	4,296	37,339	8,389	4,800	4,094	7,505	7,092	6,760	21,149	101,424



### 3.3 Demand for hotel rooms

Demand is the quantity of a specific product or service that an individual or segment of individuals buy at a specific time and at specific price. Demand is established by several distinct elements, such as the price of alternative and complementary products and services. Demand is normally associated with the concept of supply, discussed previously. The hotel sector, the demand refers to the sum of hotel rooms which travelers and community residents in a location essentially consume and buy during a time. When a large-scale tourism event is hosted in a community, the need (demand) for hotel rooms is intensified because of the rise of event attendees and tourists. Specifically, it is approximated that more than 3.7 million international and domestic travelers visited Brazil to attend the FIFA (2014) WC (da Cunha *et al.*, 2014).

### 3.4 Occupancy percentage

In real estate, occupancy percentage (OCC %) is the number of units that are leased as compared to the total number of units in the building, city and state. In the hotel sector, occupancy percentage is one of the most relevant property-level hotel performance indexes. This central index is built by taking the ratio of total rooms supply and total rooms sold (demand). This ratio is interpreted as the relationship between demand and supply of total hotel rooms in a specific period times 100, to be represented as a per cent. Occupancy is utilized extensively because hotel operators can effortlessly examine what per cent of total hotel rooms is sold in a period of time (Jeffrey *et al.*, 2002).

$$\text{OCC \%} = \frac{\text{Demand}}{\text{Supply}}$$

### 3.5 Average daily rate

ADR which stands for average daily rate is another important concept of the conventional top-line revenue measures (Singh *et al.*, 2014). As hoteliers and hotels know, it is ADR growth that influences and controls profits. Thus, projections of slow-moving rate growth are a major concern to operators, owners and managers who depend on bottom line profitability (Mandelbaum, 2011). ADR is associated with the total revenue obtained from room sales in a specific point in time and the rooms required (demand) in the point in time. ADR is a measure of the average rate paid for rooms sold, estimated by dividing room revenue and demand (rooms sold).

$$\text{ADR} = \frac{\text{Room Revenue}}{\text{Demand}}$$

The ADR fluctuates based on various elements, for instance, the quality of the room, the location of the room, the booking time of the rooms and hotel promotions.

### 3.6 Revenue per available room

Both the capital market (Wall Street) and the lodging sector consider RevPAR as one of the central property-level hotel performance indexes (Ismail *et al.*, 2002a, 2002b) and a value for fluctuations in lodging companies' stock prices (Elgonemy, 2000). In the past decades, the hotel sector has assessed the market performance by comparing historical RevPAR data. RevPAR is the most commonly employed, internally and externally, by lodging enterprise as a benchmark index (Chen *et al.*, 2011). Additionally, RevPAR, admitted and implemented by the whole lodging sector, offers significant material that permits hoteliers to evaluate their performances in relation to their competitive set (Peiró-Signes *et al.*, 2015). Some discuss the relevance and predominant application of RevPAR by analysts as a financial performance statistic. In their study, Chen *et al.* (2011) used RevPAR as a proxy to compare the explanatory power of RevPAR with conventional financial ratios.

RevPAR assesses how hoteliers fill up hotel rooms while maintaining the ADR at profitable levels, a business practice considered to be the most competent approach to estimate the

financial position of a hotel enterprise (Bloom and Zheng, 2013). To obtain a competitive RevPAR, hotel operators always attempt to attain the highest occupied rate percentage and the highest ADR. RevPAR is a precise index that symbolizes whether a hotel operator has effectively occupied its room inventory. Therefore, RevPAR, Occ % and ADR are well accepted operating ratios to examine the performance of lodging properties in the market (Li, 2014).

To compute the RevPAR, rooms' revenue, supply, ADR and Occ % are needed. There are two ways to compute RevPAR, the first way to compute is by multiplying the Occ percentage by the obtained ADR. The second way to compute is by dividing the total room revenue in a specific time by the rooms supply (available rooms) in a specific time.

$$\text{RevPAR} = \frac{\text{Room Revenue}}{\text{Supply}}$$
$$\text{RevPAR} = \text{Occ \%} * \text{ADR}$$

### 3.7 Room revenue

Room revenue in the lodging sector denotes the total sales produced by selling the room inventory in a specific time. Room revenue is calculated by multiplying room rates by the amount of rooms sold in a specific time. There are some elements that influence the total revenue. Increasing total revenue is a common concern and objective for every business, especially hotel businesses.

### 3.8 Indexes percent difference

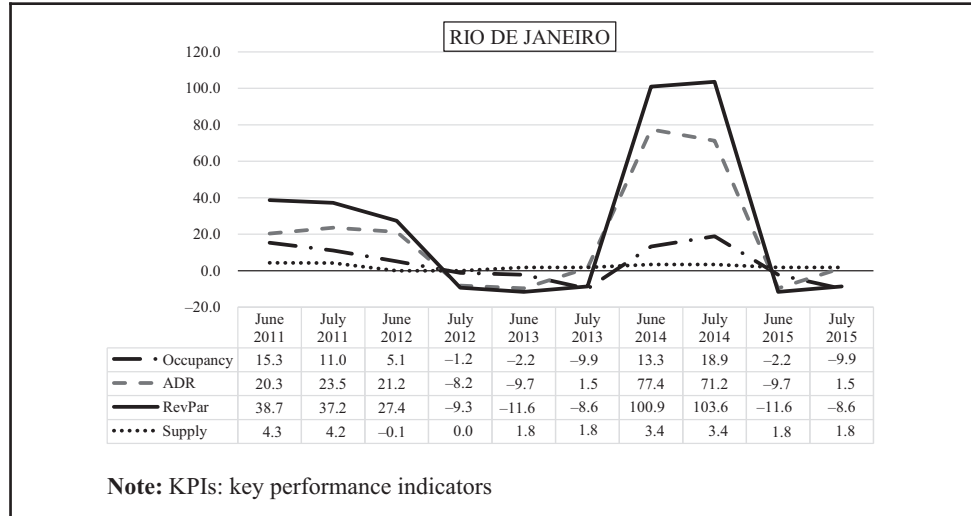
The central variables of analysis in this investigation are the percentage differences among the indexes. To distinguish the variance in the six metrics (ADR, Occ %, RevPAR, Room Revenue, Supply and Demand), displaying the result as percentage is the most applicable technique (Li, 2014). In this project, the authors explain the variance between indexes from year to year in the month when the FIFA WC took place (June 12 to July 13). For instance, to compute the per cent difference in ADR, the average ADR of the period when the WC took place was subtracted from the average ADR of the previous year in the comparable period of time. If a specific region (Region A) had an average ADR of \$50.00 in the year of the event, and the average ADR of the previous year was \$40.00, the percentage difference would be -25 per cent ( $[\$50.00 - \$40.00/\$40.00] \times 100$ ). As rates charged by the average ADR in Region A, in this example, are higher than those of its previous year, we would say that the percentage difference in ADR is positive, and the hotel's \$50.00 price represents a difference of 25 per cent above the ADR charged in the previous year. The percentage differences in the other indexes were also calculated and graphed to show the impact of the FIFA WC on hotel performance. The per cent difference is interpreted as what per cent an index of the date of the WC has increased or decreased compared to the three previous years (2011 and 2013) and one subsequent year (2015).

## 4. Results and discussions

Observing at June-July variations from three years of data before the WC and one year after the event helps us understand the reaction of hospitality managers and the hotel's sector seasonality dynamics during the sporting event. Figure 1 displays June-July monthly ADR, supply, occupancy and RevPAR indexes for the three years before the WC, during the WC and one year after the event in Rio de Janeiro.

Figure 1 suggests that supply volumes stay consistent before, during and after the sporting event. The graph suggests that ADR and RevPAR were quite related, with notable inclines and declines before the event and after the event during the comparable months in previous years. The ADR and RevPAR generally move together from 2011 to 2015 in Rio de Janeiro. The magnitude of the occupancy percentage generally does not change drastically, but it is clear the increase in occupancy percentage of the WC. We note that the

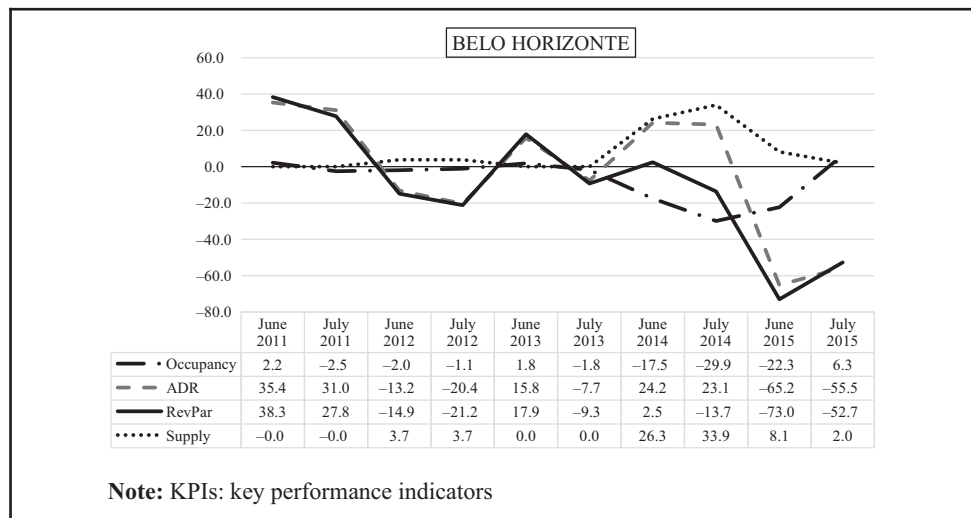
**Figure 1** June-July monthly KPIs for 2011-2015 in Rio de Janeiro



strength of the RevPAR impact of the WC in Rio de Janeiro is because of the pricing power and the insensitivity of travelers to have an accommodation during the event. The results also suggest that hotel operators experience a dramatic revenue performance during the WC and a substantial decrease in all hotel indicators in 2015, suggesting that ADR, demand and room revenue return to normal levels. A close examination of the chart indicates that one year after the WC, hotel indexes were down 9.9 per cent for hotel occupancy and 8.6 per cent for RevPAR.

Belo Horizonte (Figure 2) experienced a dramatic growth in hotel rooms from a growth of 0 to 26.3 per cent in June 2014 and 33.9 per cent in July 2014. The dramatic decrease in occupancy in Belo Horizonte leading up the 2014 WC did not support the significant increase in hotel development for the hotel developers and city investors. In this figure, unfavorable unexpected changes in RevPAR were not directly related to increases in ADR. A detailed examination of the graph suggests that occupancy per cent was down more during the event than before and after the event. Hotel RevPAR in this region was

**Figure 2** June-July monthly KPIs for 2011-2015 in Belo Horizonte



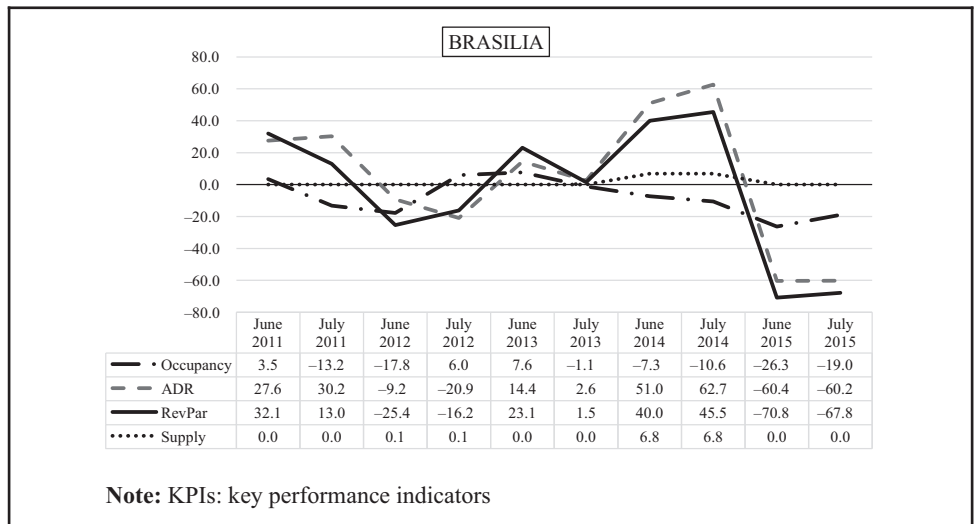
remarkably down for this city in July 2014 (-13.7 per cent) and in June 2015 (-73 per cent) compared to other regions which does not support the idea that a mega-sporting event does impact significantly demand and revenue performance. The improvement of pricing power after the WC started indicates that unfavorable RevPAR was because of a sudden drop in occupancy caused by a high increase in supply and relatively high prices. We consider that the results also suggest that hotel operators were not projecting the impact of new inventory in hotel performance (Figure 3).

Looking at the total hotel performance in Brasilia before, during and after the WC, we notice that room supply increase by 6.8 per cent during the event. For the months of the WC in June-July 2014, the occupancy per cent in Brasilia decreased even when previous years did not have a mega-event, suggesting the little effect of a mega-sporting event as a demand generator for this region. After the WC, occupancy in Brasilia city continued to have normal levels similar to previous years (2012-2013), during which the demand growth for rooms was positive. Although hotel demand during the WC did not show a positive impact during the event (June-July), the ADR growth increased significantly during the event, from a positive 2.6 per cent in July 2013 to a substantial 62.7 per cent in July 2014. The strong pricing power during the WC and relatively drop in occupancy per cent balanced each other so that RevPAR of hotels in Brasilia generated a significant growth of 40 per cent in June and 45.5 per cent in July, respectively.

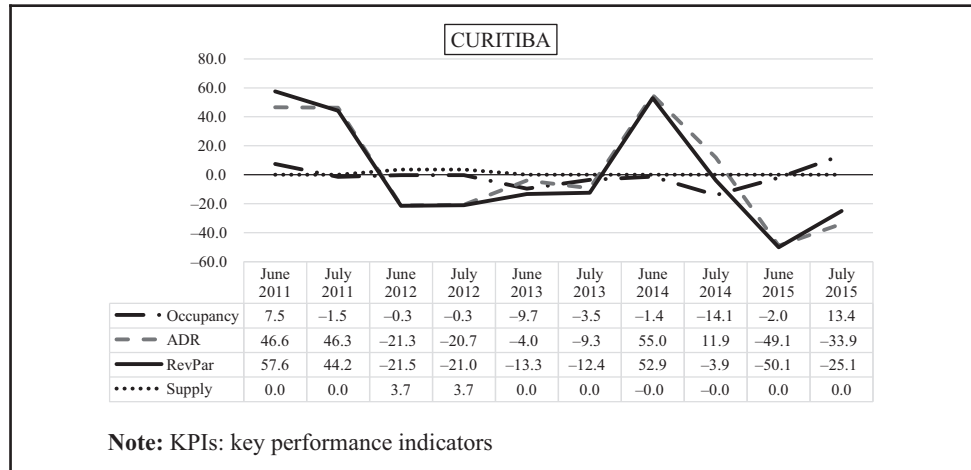
Looking at the KPIs in the Curitiba region, Figure 4 suggests that with almost zero new development of supply during the WC, occupancy rather ADR did not increase drastically because of the sporting event. Furthermore, the positive and significant growth in revenue performance appears to be influenced by a significant growth in ADR during the period of the event.

Overall, regardless of whether operators experience no additional demand in the city because of the event, travelers with a non-sensitive behavior were willing and able to pay substantial higher prices to ensure their accommodation. We noted that the significant pricing power and RevPAR growth significantly decreased one year later after the event, returning to even lower levels of growth for these two decisive indicators of hotel performance. This shows the importance of maintaining competitive prices that cause favorable revenue performance. A close examination of Figure 4 suggests that Curitiba showed a drop in all KPIs after the WC, suggesting that a mega-event such as the FIFA (2014) WC positively impact the performance of the hotel industry. Also, note that a

**Figure 3** June-July monthly KPIs for 2011-2015 in Brasilia



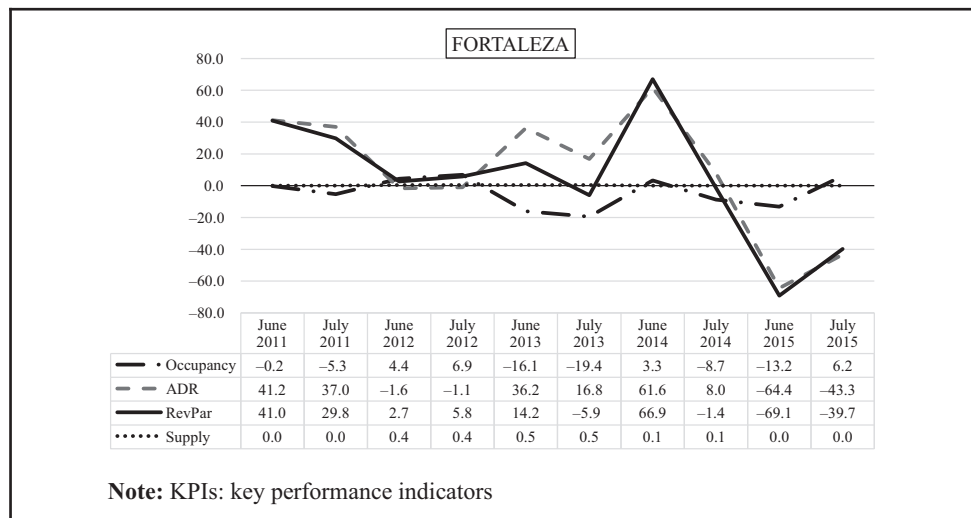
**Figure 4** June-July monthly KPIs for 2011-2015 in Curitiba



consistent level of demand in previous years to the event did not guarantee a growth in RevPAR. Finally, we note that the magnitude of the RevPAR growth during special events depends on the capacity of hotel operators to charge premium prices to travelers with no sensitive price elasticity behavior.

Figure 5 suggests that the hotel room supply of Fortaleza increased by 0.1 per cent during the WC. Occupancy, ADR and RevPAR increased because of the mega-sporting event. The graph suggests that ADR and RevPAR were quite related, with notable increases during the event and declines after the event. RevPAR increased by 66.9 per cent in June 2014, while ADR increased by 61.6 per cent in the same month. In July 2014, RevPAR decreased by 1.4 per cent, while ADR increased only by 8 per cent. As for the occupancy, it increased during the WC by 3.3 per cent in June 2014 and decreased immediately by 8.7 per cent in July 2014. The positive and significant growth in RevPAR performance in June 2014 appears to be influenced mainly by the significant growth in ADR during the period of the event. Meanwhile, the increase of occupancy during the event again suggests the lack of elasticity of price. However, the significant decline of ADR, RevPAR and occupancy

**Figure 5** June-July monthly KPIs for 2011-2015 in Fortaleza



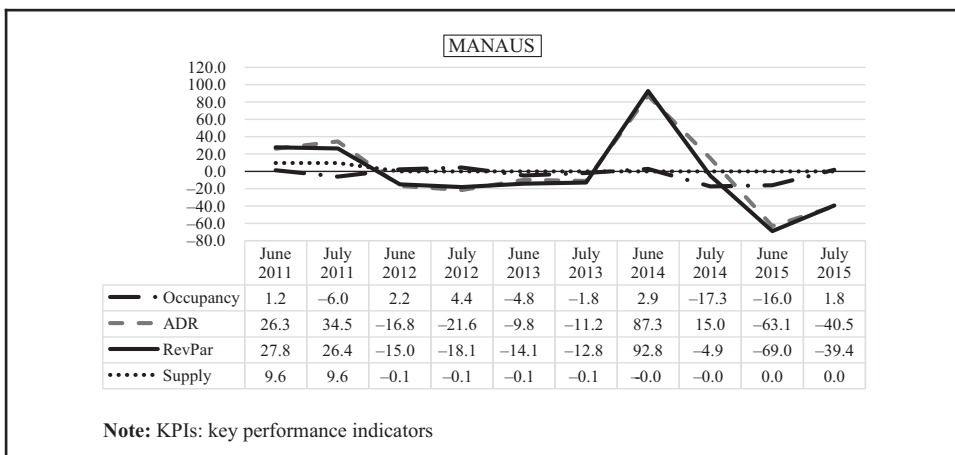
one year after the event suggests the critical role mega-events play in hotel room demand and the important function that ADR has in maintaining a satisfying hotel revenue performance.

Figure 6 depicts the percentage changes of Manaus hotel industry's KPI. The figure indicates almost zero new development of supply during the WC. Occupancy increased slightly during the event while ADR and RevPAR increased drastically because of the influence of the mega-sport event. This again reflects hotel customers' lack of elasticity of price during the event that travelers were willing and able to pay substantial higher prices to ensure their accommodation. In June 2014, ADR increased by 87.3 per cent and RevPAR increased by 92.8 per cent. The positive and significant growth in RevPAR seems to be mainly influenced by the growth in ADR during the period of the event. However, a close examination of Figure 6 suggests that Manaus experience significant drop in ADR, RevPAR and occupancy one year after the WC, suggesting that a mega-event such as the FIFA (2014) WC impacts positively the performance of the hotel industry. Also note that a consistent level of demand in previous years to the event did not guarantee a positive growth in RevPAR. Finally, we note that the magnitude of the RevPAR growth during special events depends on the capacity of hotel operators to charge premium prices to travelers with no sensitive price elasticity behavior.

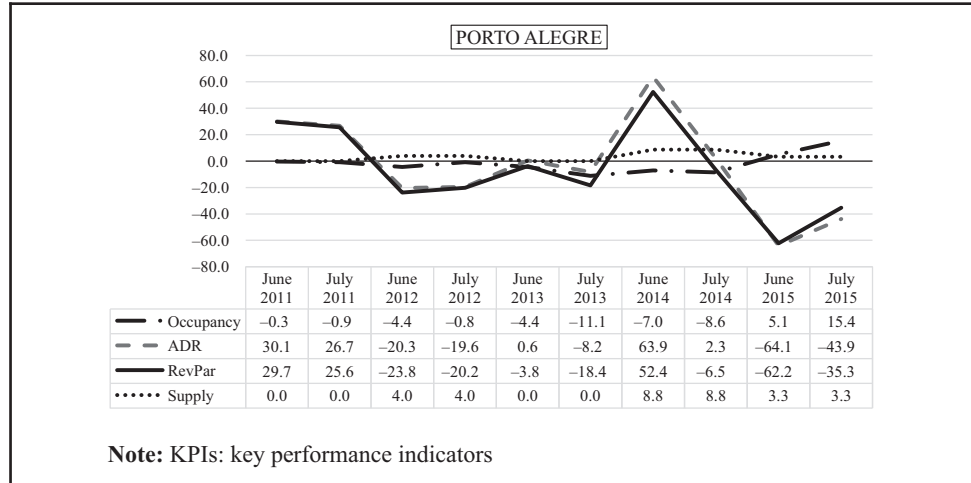
For the case of Porto Alegre, Figure 7 indicates that hotel room supply grew by 8.8 during the 2014 WC. However, occupancy decreased by 7 per cent in June 2014 and 8.6 per cent in July 2014, which might be caused by the growth of supply level. In June 2014, ADR increased by 63.9 per cent and RevPAR increased by 52.4 per cent. This drastic increase of ADR in June 2014 led to the dramatic growth of RevPAR in the same month. Both ADR and RevPAR decrease sharply one year after the event. The ADR decreased by 64.1 in June 2015 and 43.9 in July 2015, while RevPAR for Porto Alegre declined by 62.2 per cent in June 2015 and 35.3 in July 2015. The occupancy rate in 2015 went up with an increase of 5.1 per cent in June and 15.4 per cent in July, which shows the elasticity of price. Hotel customers are sensitive of the hotel price after the 2014 WC. At the same time, this shows the importance of maintaining competitive prices is a good way to generate favorable hotel revenue performance.

Like Porto Alegre, the hotel room supply of Salvador also grew by 5.8 per cent during the 2014 WC. The occupancy, ADR and RevPAR all increased drastically during the 2014 WC. In June 2014, ADR increased by 46 per cent, occupancy increased by 54.8 per cent and RevPAR grew by 126 per cent. The significant increase in ADR did not cause the drop of occupancy rate, which again indicates the lack of price sensitivity which was caused by the

**Figure 6** June-July monthly KPIs for 2011-2015 in Manaus



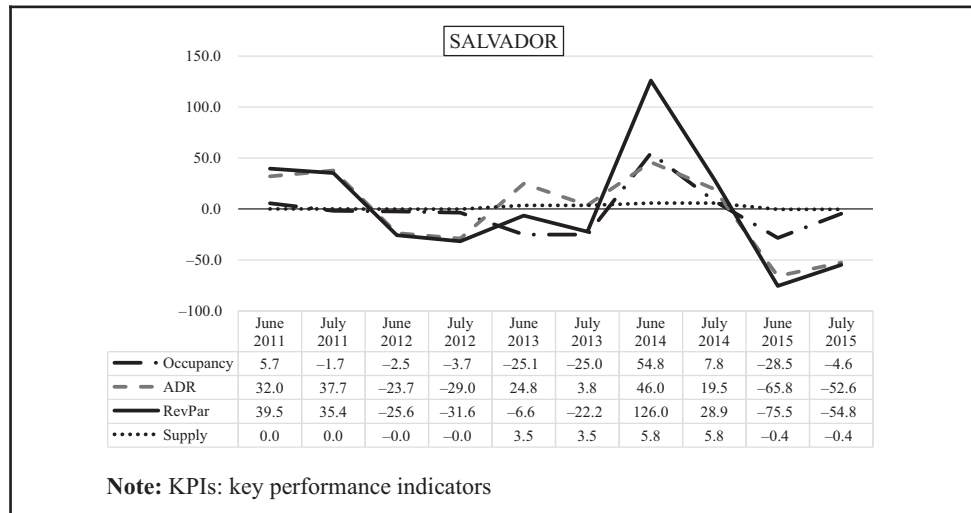
**Figure 7** June-July monthly KPIs for 2011-2015 in Porto Alegre



sporting event. The tremendous growth of ADR and occupancy together explained the surprising increase in RevPAR. All KPI decreased after the event including the supply level, which may suggest some hotel close because of the decrease of demand after the event, which can be seen from the decrease of occupancy in June and July 2015. Occupancy of Salvador decreased by 28.5 per cent in June 2015, although the ADR decreased by 65.8 per cent. The combined effect of the two major indicators caused the huge drop of RevPAR by 75.5 per cent in June 2015 and 54.8 in July 2015. This indicates that Salvador benefited from the positive influence of the 2014 WC and made the right pricing strategy of increasing the ADR, while hotel guests showed less sensitivity to hotel price (Figure 8).

The supply level of Sao Paulo did not increase too much during the mega-sport event with a growth per cent of 0.4 in both June and July 2014. However, the ADR increased drastically during the event. The ADR grew by 45.9 per cent in June 2014 and 30.2 in July 2014, which might be the cause of the drop of occupancy rate in the same period. The occupancy rate decreased by 11.7 in June 2014 and 0.2 per cent in July 2014. The changes in occupancy in 2014 echoes with the changes in ADR in the same time, which

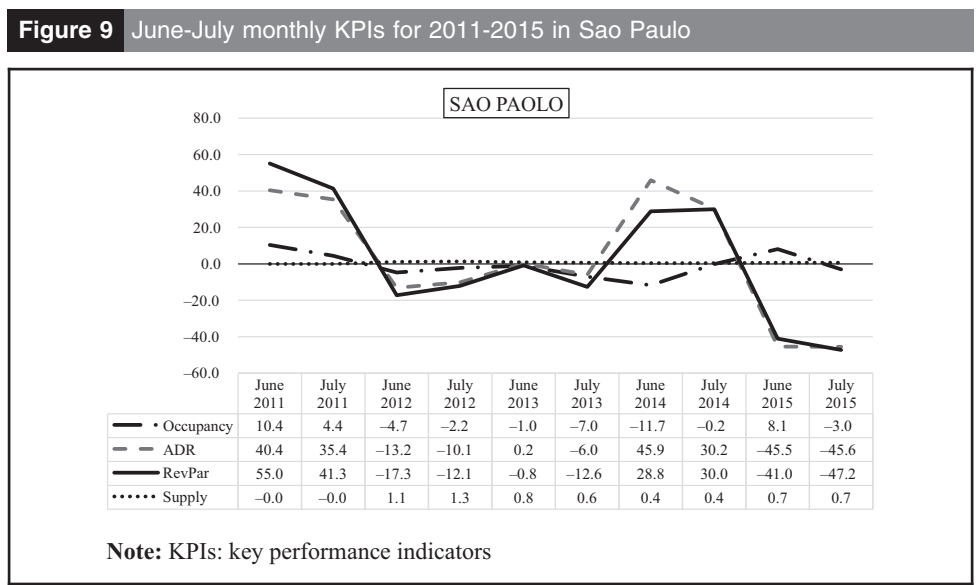
**Figure 8** June-July monthly KPIs for 2011-2015 in Salvador



shows the elasticity of demand responding to the change of price. As the hotel room price increases, the demand of guests decreases. When the price drops, the demand grows again. Since ADR increased drastically during the event, the occupancy dropped, while RevPAR still increased significantly compared to the years before the mega-event, with a percentage growth of 28.8 in June 2014 and 30 per cent in July the same year. This shows the important role of ADR in deciding the hotel revenue performance. One year after the event, the supply kept growing but the ADR dropped drastically. The occupancy rate went up by 8.1 per cent in June 2015 because of the decrease of hotel ADR in the same month, which again shows the strong effect of hotel price on change of demand. However, RevPAR still decreased in 2015 because of the crucial influence of ADR on hotel revenue performance (Figure 9).

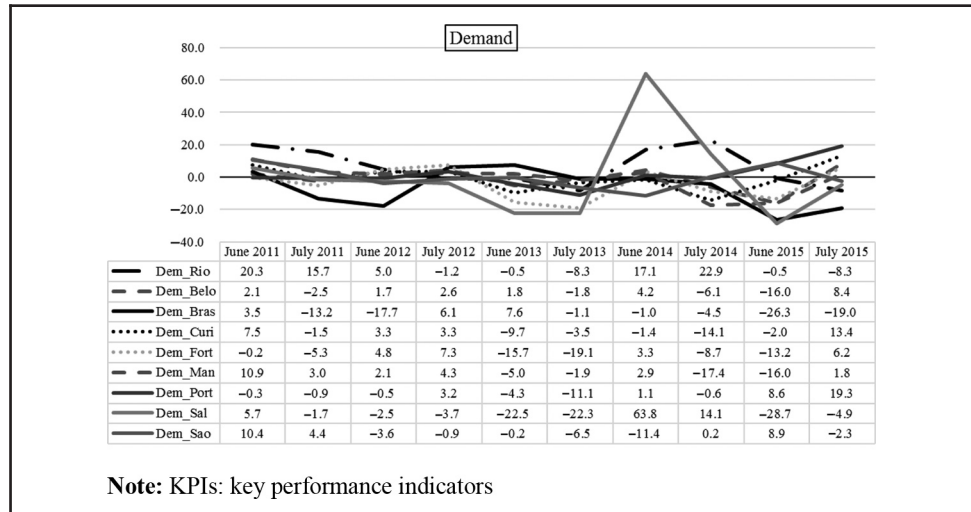
During the three years (2011-2013) prior to the WC, demand dynamics was consistently showing a negative growth in the month of June-July. Demand growth was high for Rio de Janeiro and Salvador. Other cities showed a negative growth during the time of the event. Figure 10 provides a five-year demand dynamic for all cities during June and July. As suggested in the literature review section, we expected to see a significant effect on hotel demand during the WC and from each of the cities. We anticipated a substantial increase in occupancy from the WC, the largest of the mega-sporting events. Surprisingly, the event demand increased dramatically just for two of the nine cities examined. We also noted that the magnitude of the WC effect on demand for most of the cities was negative. This decreased on demand does not depend on the extent to which supply increased in just as three of the cities (Belo Horizonte, Brasilia and Porto Alegre).

Figure 11 graphs the Revenue growth for all nine Brazilian cities over our sample period, 2011-2015 in percentage difference. The revenue growth of the Brazilian cities under examination generally move together from 2011 to 2013, then begin to significantly increase in most of the cities in June 2014. This increase is consistent with almost all the cities except for Salvador, Rio de Janeiro, Manaus, Porto Alegre and Fortaleza. During June when revenue increased because of the price insensitivity of demand, revenue showed a sudden decline for the cities. Brasilia and Rio de Janeiro showed a steady growth on revenues during June and July with a dramatic decrease in revenues as is the case with the remaining cities. Conversely, with the start of the upcoming sporting event, Olympics 2016, the revenues Brazilian cities start to show similar performance as the 2011-2013 periods.

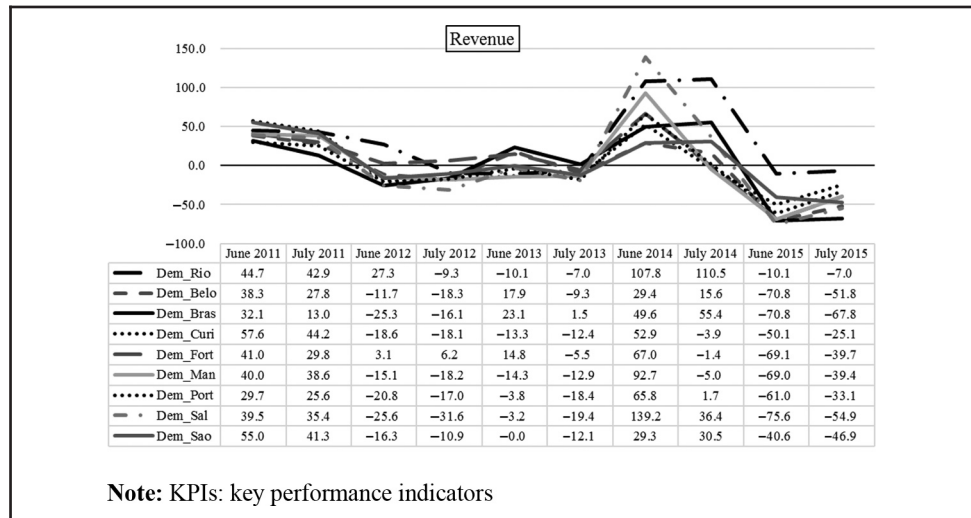




**Figure 10** June-July demand for 2011-2015 in all cities



**Figure 11** June-July revenue for 2011-2015 in all cities



Several of the unique patterns in revenue growth observed in Figure 11 may be explained by the popularity of the city and the specific tournaments schedule in a city. For example, this may be the case of Rio de Janeiro that is a very popular destination for travelers. We believe that the surprising slow growth in demand and the significant increase in revenue performance experienced in all the cities participating the WC was triggered by the insensitive price behavior for travelers attending the WC. These travelers mainly are willing to pay higher prices during the first month of the event even when demand in the country stay at comparable levels before the mega-sporting event. In other words, the significant increase in hotel revenue for the sample used in the study was affected by the premium prices charged during the event. During June and July 2014, hoteliers in Brazil showed a solid pricing power while WC sport fans showed an inelastic pricing behavior, causing Brazilian hosting cities to have an excellent revenue performance. It is important to note that this insensitive behavior to price was not obvious in all the cities. For example, Sao Paolo, an important destination for travelers, and Brasilia, the capital of Brazil, did not show a

drastic growth neither in demand nor in revenue. They did show a steady growth in revenue months before the WC. However, this trend did not continue after the WC in 2014.

## 5. Conclusions

The KPI of Brazil's lodging sector reacted differently to the WC. Although all hosting cities experienced significant RevPAR growth because of the increase of hotel room rates during the event, the supply and occupancy performed variously from city to city. Rio de Janeiro, Belo Horizonte, Brasilia, Porto Alegre and Salvador all experienced growth of hotel room supply during the mega-event. However, for Rio de Janeiro and Salvador, the drastic increase of ADR and supply did not result in a sharp decrease of their hotel occupancy rate. The occupancy rate of these two cities increased unexpectedly, which indicated the lack of elasticity of hotel pricing. On the other hand, with the growth of ADR and supply level, Belo Horizonte, Brasilia and Porto Alegre experienced a decrease of occupancy rate. It seems that holding WC did not attract too much demand for the hotel industry of Belo Horizonte, Brasilia and Porto Alegre. However, the dramatic increase of ADR balanced the decrease of occupancy, which resulted in an increase in RevPAR.

Curitiba, Fortaleza, Manaus and São Paulo did not experience any changes in their hotel room supply level during the event. However, the performance of the occupancy rate still shows differences. For Curitiba and São Paulo, although there is no supply increase of the hotel industry, the occupancy rate still dropped during the mega-event. However, for both cities, the significant growth of ADR balanced the drop in occupancy and resulted in a significant increase in RevPAR during the event. For Fortaleza and Manaus, the supply of hotel rooms did not increase during the WC, the occupancy rate of both cities increased because of the mega-event, which again shows visitors were insensitive to hotel pricing in these two host cities. With the significant growth in hotel ADR in Fortaleza and Manaus, the RevPAR also experienced huge increase as well.

From the perspective of supply and demand, both Rio de Janeiro and Salvador increased their supply level, while there was a significant growth on demand during the mega-event. For Belo Horizonte and Porto Alegre, the hotel supply increased during the event, while demand from the customer's side increased slightly. Brasilia increased their supply level but experienced decrease on demand, which indicates that operators in the city overestimated the influence of WC on their hotel room demand. Curitiba and Sao Paolo did not only invest on increasing hotel supplies but also experience decreases in their customer demand. For Fortaleza and Manaus, the supply level stayed constant during the event, but the demand from the customer experience slightly increased, which again shows the lack of elasticity of hotel pricing.

In conclusion, during the mega-sport event, all host cities' hotel ADR increased. However, the occupancy rate performed variously because of the change of supply level and change of customer demand to that city. For all host cities but Brasilia, Curitiba and Sao Paolo, guests seem to be less sensitive to hotel price increases, which indicates the lack of elasticity of hotel price. Visitors just want to be there for the mega-sport event regardless of how expensive the hotel room rate will be. The hotels in these two cities should take advantage of the characteristics of visitors and set their hotel room rates high and may also increase hotel room supply to generate the maximum revenue possible. For Brasilia, Curitiba and Sao Paolo, where the hotel industry experienced decrease on demand because of the drastic growth of ADR, investment in developing new hotel rooms for the mega-event is not suggested because it will influence the future performance of the hotel industry after the event.

Pricing theories suggest that hotel room rates must be increased during phases of tourist inelastic demand. In this study, FIFA WC tourist travel during a mega-sporting event suggests that WC attendees have limited hotel alternatives during the event and have a

higher desire to secure accommodations; therefore, they present a more inelastic demand (they are less sensitive to high rates) for travel and hotel products and they are willing to pay superior rates during the sporting event.

Specifically, hotel supply in the city is mainly composed of economy to luxury scale hotels, and only around 10 per cent are affiliated with an international hotel brand; most hotels are part of local hotel chains and specialized staff in the industry is not a key competitive factor. International brands are expected to enter the market in the next years, focusing on upper mid-scale and upscale brands as a response to the increasing rise of the middle class in the country, demanding more services and higher quality products. International branded hotel chains possess established standards, specifically in regards to service offerings and sales techniques and revenue management practices are well managed by these companies.

In a discussion among practitioners, Rio de Janeiro noted the highest average occupancy rates during the period among all host cities (87 per cent), according to BHOF, and when the city hosted two matches, occupancy rates rose up to 92 per cent. But Rio de Janeiro is also a very large market for MICE segments, which consistently generates peaks of demand and can impact industry indexes such as ADR and RevPAR, when proper revenue management practices are implemented. As reported by STR, hotels in Brazil showed a drop in RevPAR in months prior to the event, as well as a drop in ADR. The participating cities demand curve also shows an increase in demand in the months of September, October and November of the same year, whereas RevPAR and ADR remain stable. It is important to note that WC tourists' behavior during a mega-sporting event suggests that WC attendees have limited lodging alternatives during the WC period and, therefore, present more insensitive demand (they are less sensitive to high rates) for travel and hotel accommodations and are willing to pay higher room rates during a sporting event.

## 6. Implications

This research lends support to the theory of price inelasticity of demand with the case of mega-sporting event 2014 WC that was held in various cities of Brazil. During the WC, which had no other competing events and only lasted for a limited time, the demand for hotel rooms of most the host cities generally became inelastic if the room rate was within the customer's budget. When the price changes went beyond the budget of consumers or the supply level of the hotel industry increased more than the demand, the price elasticity of demand still applies.

This study describes that travelers tend to not be sensitive to pay price premiums when they desire to obtain accommodation during mega-sporting events. The study demonstrates the revenue impact of an inelastic demand for hotel rooms during mega-events. The impact of a strong revenue performance during sporting events depends on the ability of hotel operators to charge hotel premium prices at which travelers exhibit price responsiveness and price inelasticity of demand during these large-scale events.

The research findings also provide practical implications to hotel companies and investors. For popular tourist destinations (such as Rio de Janeiro and Salvador), the demand of hotel rooms tends to be inelastic because of the increased travelers during the mega-sporting event. Hotels in these hosting cities should take aggressive pricing strategies to increase their hotel room rates to the maximum that customers could afford to optimize their profit. Meanwhile, it is also suggested to open new hotels or expand the current hotel size to accommodate more tourists because the demand will be driven high by the mega-event. Thus, investors can invest in new hotels in these host cities to experience revenue growth during the mega-event.

For host cities that are not as popular to international tourists (such as Belo Horizonte and Fortaleza etc.), the demand of hotel will increase because of the impact of the mega-sporting event as well. However, the price inelasticity of the hotel demand functions only in the case when the hotel room rate ranges within an acceptable limit. Any hotel pricing over that limit would cause the drop on demand. Therefore, hotel companies in these host cities can increase their hotel room rates conservatively to increase the revenue during the mega-sporting event. Given the fact that the demand for hotel rooms would not experience a significant growth in cities such as Rio de Janeiro or Salvador, it is not suggested for hotel companies to expand their hotel size or open new properties. The current supply level should be maintained during the mega-event to maximize the profit of the hotel industry.

Another interesting implication is that Brazilian operators cannot gain revenue performance by reducing room rates to improve occupancy, according to our analysis. Irrespective of whether operators experienced increases or decreases in occupancy percentage, operators that show an aggressive pricing power in specific cities of the FIFA WC obtained a significant growth in RevPAR. In contrast, operators in host cities who decreased room rates while travelers were not sensitive to hotel price fluctuations experienced a negative growth in RevPAR. Practitioners must first understand the dynamics of the market and whether demand is elastic or not before setting room rates during events that tend to affect positively the performance of hospitality and tourism businesses. In addition, it is our belief that hotel operators could significantly reduce room rates in areas where soccer tournaments and destination products are not as attractive as the first and the last set of tournaments. While other soccer fans are willing to pay higher rates to secure hotel accommodation for critical tournaments and attractive destinations. Some travelers may show a higher elasticity when traveling just to observe the tournaments of their preferred team. We expect to examine this behavior more precisely in the next study.

Clearly, our findings offer more practical implications for hotel managers. The findings suggest that during the June-July period of the FIFA WC, the hotel sector in the nine Brazilian cities experience different dynamics on performance indices including RevPAR, ADR, Occupancy, demand, revenue and supply during the sporting event. Moreover, for most of hosting cities, a growth in total room revenue was exhibited during the month of June with a negative growth during the last week of the event in July. There are some reasons to describe this positive impact of the WC on revenues of the hotel sector. One explanation is the continuous growth in sport tourism (Kim *et al.*, 2015a, 2015b). Mega-sporting events take place in different international destinations (e.g. South Africa, Brazil, Canada and Australia). These destinations offered sport fans with numerous alternatives for tourism and experiences. These sport enthusiasts possess high discretionary budgets that allow them to visit and travel to international destinations. Consequently, the hotel sector might take advantage of extra income prospects. These fans are willing and able to pay higher prices during the mega-event, depending on the nature of the specific destination. In our study, São Paulo experienced the strongest demand of tourist visitors during the event. Therefore, it is advisable for hoteliers with unique demand for their tourist products to conduct segmentation analysis at the destination and property level to establish the visitors profile and the projected impact of mega-sporting events on their operations. This analysis may consider the demographic, lifestyle profile of future tourists and a calculation of elasticity of demand for the event and destination (Taylor and Young, 2005). If hoteliers understand what triggers sport fans during sporting events, they will be able to propose pricing strategies that might maximize hotel profitability.

Each hosting city is competing with other cities for the sport fans' discretionary income; thus, it is advisable that each city centers its attention on understanding the upcoming demand to propose pricing strategies during the period of the WC that may optimize the

maximum possible revenue. This may require a detailed understanding of the games during the event and what games will attract more demand. Since sport fans tend to participate during specific periods of the mega-event, a detailed segmentation might help to determine visitors who may be receptive to hotel and travel packages offered around the WC times. Evidently some visitors will be more attracted and persuaded than other sport fans. Additionally, hoteliers will have the opportunity to experience more demand and revenue by offering hotel and travel packages in shoulders periods (before and after) of the sporting event. With a realistic segmentation analysis, hoteliers could aggressively promote attractive hotel and travel bundles before and after the WC to sport fans classified as target segments.

The results of this study also assist managers to consider not to solely focus on occupancy in driving a growth on RevPAR. Hoteliers should consider the impact of pricing power as a key driver to maximize hotel performance, especially for a group of travelers who are not price sensitive during sporting events. For instance, if a 5 per cent positive variance of RevPAR is desired during the event, then this desired performance must be determined by a 3 per cent variance in ADR and 2 per cent variance in occupancy. [Taylor and Young \(2005\)](#) noted that in most of the NFL team cities, hotel managers achieved strong RevPAR growth through pricing power. We also note that because KPIs variances are not constant over the five years (2011-2015) of analysis in the Brazilian hotel sector, hoteliers must keep track of the new room supply (new properties, renovations, conversions, etc.) over time to evaluate the impact of new supply on RevPAR and occupancy levels.

Further industry and theoretical investigations are needed in this area analyzing the impact of mega-sporting events (Olympic games, winter games and WC) on the lodging industry in other international destinations to assess the applied pricing strategies before, during and after the events sporting. Such new investigations would also require detailed hotel KPIs data over multiple years that would allow a more extensive analysis of sporting events in the lodging industry.

## 7. Limitations and future research

The results of this study are useful and caution must be considered. The context of this study is in South America; other contexts may influence the behavior of travelers. Even when we use reliable data, the context and the level of knowledge in terms of pricing strategies may influence the reaction of hotelier during mega-events. The results are mainly based on a generalization of Latin American market that must be considered as a unique case. Additional investigations must analyze the reaction and pricing strategies of revenue managers during sporting mega-events. Future research may analyze pricing strategies during another sporting events such as the Olympic games. Additionally, future research must focus on exploring pricing strategies in the coming 2018 FIFA WC in Russia. Furthermore, researchers can estimate hotel price with econometrical techniques by looking at the influences of disaggregate determinants such as consumer price index, unemployment rate and personal consumption expenditure.

## References

- Almeida, B.S.D., Marchi Júnior, W. and Pike, E. (2014), "The 2016 Olympic and Paralympic Games and Brazil's soft power", *Contemporary Social Science*, Vol. 9 No. 2, pp. 271-283.
- Almeida, B.S.D., Bolsmann, C., Júnior, W.M. and de Souza, J. (2015), "Rationales, rhetoric and realities: FIFA's World Cup in South Africa 2010 and Brazil 2014", *International Review for the Sociology of Sport*, Vol. 50 No. 3, pp. 265-282.
- Anderson, C. (2012), "The impact of social media on lodging performance", *Cornell Center for Hospitality Research Report*, Vol. 12 No. 15.

- Armstrong, J. (2014), "Brazil World Cup tourism triumph as 95% of fans say they will return to samba nation for a holiday", available at: [www.mirror.co.uk/lifestyle/travel/usa-long-haul/brazil-world-cup-tourism-triumph-4126879](http://www.mirror.co.uk/lifestyle/travel/usa-long-haul/brazil-world-cup-tourism-triumph-4126879), (accessed 2015).
- Baumann, R. and Matheson, V. (2013), "Infrastructure investments and mega-sports events: comparing the experience of developing and industrialized countries", available at: [http://college.holycross.edu/RePEc/hcx/Baumann-Matheson\\_MegaEventsDeveloping.pdf](http://college.holycross.edu/RePEc/hcx/Baumann-Matheson_MegaEventsDeveloping.pdf) (accessed 12 December 2016).
- Bloom, B.A. and Zheng, T. (2013), "Examining the impact of STR weekly RevPAR announcements on lodging stock returns", *The Journal of Hospitality Financial Management*, Vol. 21 No. 1, pp. 61-70.
- Brown, J.R. and Dev, C.S. (1999), "Looking beyond RevPAR: productivity consequences of hotel strategies", *The Cornell Hotel and Restaurant Administration Quarterly*, Vol. 40 No. 2, pp. 23-33.
- Caiazza, R. and Audretsch, D. (2015), "Can a sport mega-event support hosting city's economic, socio-cultural and political development?", *Tourism Management Perspectives*, Vol. 14, pp. 1-2.
- Chao, L. (2014), "The World Cup, Brazil welcomes one million World Cup tourists", available at: <http://blogs.wsj.com/dailyfix/2014/07/15/brazil-welcomes-one-million-world-cup-tourists/>, (accessed 2015).
- Chen, J., Koh, Y. and Lee, S. (2011), "Does the market care about RevPAR? A case study of five large US lodging chains", *Journal of Hospitality & Tourism Research*, Vol. 35 No. 2, pp. 258-273.
- Cross, R.G., Higbie, J.A. and Cross, D.Q.D. (2009), "Revenue management's renaissance: a rebirth of the art and science of profitable revenue generation", *Cornell Hospitality Quarterly*, Vol. 50 No. 1, pp. 56-81.
- da Cunha, D.T., de Oliveira, A.B.A., de Freitas Saccol, A.L., Tondo, E.C., Silva, E.A., Ginani, V.C., Montesano, F.T., de Castro, A.K.F. and Stedefeldt, E. (2014), "Food safety of food services within the destinations of the 2014 FIFA World Cup in Brazil: development and reliability assessment of the official evaluation instrument", *Food Research International*, Vol. 57, pp. 95-103.
- Davies, K., Carson, C. and Shahwe, T. (2013), "The impact of mega events on construction planning, processes and performance—Auckland's experience of the Rugby World Cup 2011", available at: <http://unitec.researchbank.ac.nz/bitstream/handle/10652/2779/Carson.pdf?sequence=1.pdf>, (accessed 12 December 2016).
- Dermody, M.B., Taylor, S.L. and Lomanno, M.V. (2003), "The impact of NFL games on lodging industry revenue", *Journal of Travel & Tourism Marketing*, Vol. 14 No. 1, pp. 21-36.
- Elgonemy, A.R. (2000), "The pricing of lodging stocks: reality check", *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 41 No. 6, pp. 18-28.
- Enz, C.A. and Canina, L. (2002), "The best of times, the worst of times: differences in hotel performance following 9/11", *The Cornell Hotel and Restaurant Administration Quarterly*, Vol. 43 No. 5, pp. 41-52.
- Ernst and Young Terco (2014), "Sustainable Brazil: social and economic impacts of the 2014 World Cup", available at: [www.ey.com/Publication/vwLUAssets/Sustainable\\_Brazil\\_-\\_World\\_Cup/\\$FILE/copa\\_2014.pdf](http://www.ey.com/Publication/vwLUAssets/Sustainable_Brazil_-_World_Cup/$FILE/copa_2014.pdf) (accessed 12 December 2016).
- Ferguson, M. and Smith, S. (2014), "The changing landscape of hotel revenue management and the role of the hotel revenue manager", *Journal of Revenue and Pricing Management*, Vol. 13 No. 3, pp. 224-232.
- Ferreira, S.L. and Boshoff, A. (2014), "Post-2010 FIFA Soccer World Cup: oversupply and location of luxury hotel rooms in Cape Town", *Current Issues in Tourism*, Vol. 17 No. 2, pp. 180-198.
- FIFA (2014), "2014 FIFA World Cup Brazil in numbers", available at: [www.fifa.com/worldcup/news/y=2014/m=9/news=2014-fifa-world-cup-braziltm-in-numbers-2443025.html](http://www.fifa.com/worldcup/news/y=2014/m=9/news=2014-fifa-world-cup-braziltm-in-numbers-2443025.html) (accessed 12 December 2016).
- Fourie, J. and Santana-Gallego, M. (2011), "The impact of mega-sport events on tourist arrivals", *Tourism Management*, Vol. 32 No. 6, pp. 1364-1370.
- Garcia, F., Pereira, G., Araújo, J.D. and Halmenschlager, V. (2015), "Economic impact assessment of the World Cup on the cups of France (1998), Japan/South Korea (2002) and Germany (2006)", *Estudios y Perspectivas en Turismo*, Vol. 24 No. 3, pp. 628-644.

- Giampiccoli, A., Lee, S.S. and Nauright, J. (2015), "Destination South Africa: comparing global sports mega-events and recurring localised sports events in South Africa for tourism and economic development", *Current Issues in Tourism*, Vol. 18 No. 3, pp. 229-248.
- Gordon, P.J. and Vidal Barbosa, F. (2014), "Impact of the Summer Olympics and FIFA World Cup on micro and small enterprises in Brazil", *AMK-lehti/Journal of Finnish Universities of Applied Sciences*, Vol. 3.
- Granados, N., Kauffman, R.J., Lai, H. and Lin, H.C. (2012), "À la carte pricing and price elasticity of demand in air travel", *Decision Support Systems*, Vol. 53 No. 2, pp. 381-394.
- Grandmont, J.M. (1987), "Distributions of preferences and the 'Law of Demand'", *Econometrica: Journal of the Econometric Society*, pp. 155-161.
- Greene, S.J. (2014), "Staged cities: mega-events, slum clearance, and global capital", *Yale Human Rights and Development Journal*, Vol. 6 No. 1, p. 6.
- Grix, J. (2012), "Image leveraging and sports mega-events: Germany and the 2006 FIFA World Cup", *Journal of Sport & Tourism*, Vol. 17 No. 4, pp. 289-312.
- Grix, J. and Houlihan, B. (2014), "Sports mega-events as part of a nation's soft power strategy: the cases of Germany (2006) and the UK (2012)", *The British Journal of Politics & International Relations*, Vol. 16 No. 4, pp. 572-596.
- Ismail, J.A., Dalbor, M.C. and Mills, J.E. (2002a), "Using RevPAR to analyze lodging-segment variability", *The Cornell Hotel and Restaurant Administration Quarterly*, Vol. 43 No. 6, pp. 73-80.
- Ismail, J.A., Dalbor, M.C. and Mills, J.E. (2002b), "Lodging-segment variability", *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 43 No. 6, pp. 73-80.
- Ivanov, S. (2014), "Hotel revenue management: from theory to practice", Zangador.
- Jacobs, C.A. (1997), "The truth about RevPAR", *Lodging Hospitality*, Vol. 53 No. 4, p. 11.
- Jeffrey, D., Barden, R.R., Buckley, P.J., and Hubbard, N.J. (2002), "What makes for a successful hotel? Insights on hotel management following 15 years of hotel occupancy analysis in England", *Service Industries Journal*, Vol. 22 No. 2, pp. 73-88.
- Jelmayer, R. (2014), "Brazil tourists seen spending \$2.97 Billion during World Cup", available at: [www.wsj.com/articles/brazil-tourists-seen-spending-2-97-billion-during-world-cup-1403010185](http://www.wsj.com/articles/brazil-tourists-seen-spending-2-97-billion-during-world-cup-1403010185) (accessed 2015).
- Jensen, S. (2014), "Mr. Sloan AP English and composition 2, 18 March The World Cup Brazil 2014: success or failure?", available at: [http://128.32.186.213/sites/default/files/files/25955/apr/world\\_cup.pdf](http://128.32.186.213/sites/default/files/files/25955/apr/world_cup.pdf) (accessed 12 December 2016).
- Kaplanidou, K.K., Karadakis, K., Gibson, H., Thapa, B., Walker, M., Geldenhuys, S. and Coetzee, W. (2013), "Quality of life, event impacts, and mega-event support among South African residents before and after the 2010 FIFA World Cup", *Journal of Travel Research*, Vol. 52 No. 5, pp. 631-645.
- Kaplanski, G. and Levy, H. (2014), "Sentiment, irrationality and market efficiency: the case of the 2010 FIFA World Cup", *Journal of Behavioral and Experimental Economics*, Vol. 49, pp. 35-43.
- Kavetsos, G. and Szymanski, S. (2010), "National well-being and international sports events", *Journal of Economic Psychology*, Vol. 31 No. 2, pp. 158-171.
- Késenne, S. (2012), "The economic impact, costs and benefits of the FIFA World Cup and the Olympic Games: who wins, who loses?", in Maennig, W. and Zimbalist, A. (Eds), *International Handbook on the Economics of Mega Sporting Events*, Edward Elgar, Cheltenham, pp. 270-278.
- Kim, H.J., Gursoy, D. and Lee, S.B. (2006), "The impact of the 2002 World Cup on South Korea: comparisons of pre-and post-games", *Tourism Management*, Vol. 27 No. 1, pp. 86-96.
- Kim, W.G., Lim, H. and Brymer, R.A. (2015b), "The effectiveness of managing social media on hotel performance", *International Journal of Hospitality Management*, Vol. 44, pp. 165-171.
- Kim, W., Jun, H.M., Walker, M. and Drane, D. (2015a), "Evaluating the perceived social impacts of hosting large-scale sport tourism events: Scale development and validation", *Tourism Management*, Vol. 48, pp. 21-32.
- Knott, B., Swart, K. and Visser, S. (2015), "The impact of sport mega-events on the quality of life for host city residents: reflections on the 2010 FIFA World Cup", *African Journal of Hospitality, Tourism and Leisure*, Vol. 4.

- Lamla, M.J., Straub, M. and Girsberger, E.M. (2014), "On the economic impact of international sport events: microevidence from survey data at the EURO 2008", *Applied Economics*, Vol. 46 No. 15, pp. 1693-1703.
- Lee, C.J. (2014), "Effects of sport mega-events on city brand awareness and image: using the 2009 world games in Kaohsiung as an example", *Quality & Quantity*, Vol. 48 No. 3, pp. 1243-1256.
- Lepp, A. and Gibson, H. (2011), "Tourism and World Cup football amidst perceptions of risk: the case of South Africa", *Scandinavian Journal of Hospitality and Tourism*, Vol. 11 No. 3, pp. 286-305.
- Li, Y. (2014), "Impact of the Olympic Games on the host city's lodging market", *Master thesis*, University of Delaware, Newark, DE.
- Li, X.R., Hsu, C.H. and Lawton, L.J. (2015), "Understanding residents' perception changes toward a mega-event through a dual-theory lens", *Journal of Travel Research*, Vol. 54 No. 3, pp. 396-410.
- Lopes, L.A., de Oliveira, M.M. and Soares, C.A. (2014), "The effects of the 2014 World Cup in Real Estate Market in Rio de Janeiro and São Paulo", *International Proceedings of Economics Development and Research*, Vol. 69, p. 12.
- Mandelbaum, R. (2011), "US hotel demand powers ahead: impact on ADR and NOI", *Cornell Hospitality Quarterly*, Vol. 52 No. 4, pp. 374-376.
- Manfred, T. (2015), "FIFA made an insane amount of money off of Brazil's \$15 billion World Cup", available at: [www.businessinsider.com/fifa-brazil-world-cup-revenue-2015-3](http://www.businessinsider.com/fifa-brazil-world-cup-revenue-2015-3) (accessed November 2015).
- Martins, A.M. and Serra, A.P. (2011), "Market impact of international sporting and cultural events", *Journal of Economics and Finance*, Vol. 35 No. 4, pp. 382-416.
- Matheson, V. (2012), "Assessing the infrastructure impact of mega-events in emerging economies", available at: [http://crossworks.holycross.edu/cgi/viewcontent.cgi?article=1007&context=econ\\_working\\_papers](http://crossworks.holycross.edu/cgi/viewcontent.cgi?article=1007&context=econ_working_papers). pdf, (accessed 12 December 2016).
- Morse, S.C. and Smith, E.M. (2015), "Hotel revenue management strategies during fall foliage travel season", *Journal of Hotel and Business Management*, Vol. 4 No. 1, pp. 1-4.
- Mount, D., Kelsey, T. and Brasier, K. (2014), "The impact of marcellus shale development on hotel revenues in Pennsylvania", ICHRIE Penn State Research Report.
- Peeters, T., Matheson, V. and Szymanski, S. (2014), "Tourism and the 2010 World Cup: lessons for developing countries", *Journal of African Economies*, Vol. 23 No. 2.
- Peiró-Signes, A., Miret-Pastor, L. and Verma, R. (2015), "The effect of tourism clusters on US hotel performance", *Cornell Hospitality Quarterly*, Vol. 56 No. 2, pp. 155-167.
- Ritchie, J.B. (1984), "Assessing the impact of hallmark events: conceptual and research issues", *Journal of travel research*, Vol. 23 No. 1, pp. 2-11.
- Ritchie, B.W., Crotts, J.C., Zehrer, A. and Volsky, G.T. (2013), "Understanding the effects of a tourism crisis: the impact of the BP oil spill on regional lodging demand", *Journal of Travel Research*, Vol. 53 No. 1, pp. 12-25.
- Schwambach, K.F. (2012), "Mega events in Rio de Janeiro and their influence on the city planning", *15 th International Planning History Society Conference, São Paulo, Cities, Nations & Regions in Planning History, Bureau Brasileiro, Impresso por Gráfica da USP, São Paulo*, p. 278.
- Singh, A.S., Dev, C. and Mandelbaum, R. (2014), "A flow-through analysis of the US lodging industry during the great recession", *International Journal of Contemporary Hospitality Management*, Vol. 26 No. 2, pp. 205-224.
- Slattery, P. (2002), "Reported RevPAR: unreliable measures, flawed interpretations and the remedy", *International Journal of Hospitality Management*, Vol. 21 No. 2, pp. 135-149.
- Solberg, H.A. and Preuss, H. (2007), "Major sport events and long-term tourism impacts", *Journal of sport Management*, Vol. 21 No. 2, p. 213.
- Sun, Y.Y., Rodriguez, A., Wu, J.H. and Chuang, S.T. (2013), "Why hotel rooms were not full during a hallmark sporting event: the 2009 world games experience", *Tourism Management*, Vol. 36, pp. 469-479.



Taylor, S.L. and Young, M. (2005), "A preliminary investigation of NFL games and self-drive tourism: marketing opportunities for accommodation providers", *International Journal of Hospitality & Tourism Administration*, Vol. 6 No. 3, pp. 47-63.

Tilcsik, A. and Marquis, C. (2013), "Punctuated generosity how mega-events and natural disasters affect corporate philanthropy in US communities", *Administrative Science Quarterly*, Vol. 58 No. 1, pp. 111-148.

Viglia, G., Minazzi, R. and Buhalis, D. (2016), "The influence of e-word-of-mouth on hotel occupancy rate", *International Journal of Contemporary Hospitality Management*, Vol. 28 No. 9, pp. 2035-2051.

Walker, M., Kaplanidou, K., Gibson, H., Thapa, B., Geldenhuys, S. and Coetzee, W. (2013), "Win in Africa, With Africa": social responsibility, event image, and destination benefits: the case of the 2010 FIFA World Cup in South Africa", *Tourism Management*, Vol. 34, pp. 80-90.

White, S. (2014), "Bidding for Fool's Gold? The uncertain benefits of hosting the World Cup", Chicago Policy Review (Online).

Wiener-Bronner, D. (2014), "These industries are booming, Thanks to the World Cup", available at: [www.thewire.com/global/2014/06/these-industries-are-booming-thanks-to-the-world-cup-tk/372307/](http://www.thewire.com/global/2014/06/these-industries-are-booming-thanks-to-the-world-cup-tk/372307/) (accessed 2015).

Wilson, M.E., Chen, L.H., Han, P.V., Keystone, J.S., Cramer, J.P., Segurado, A. and Haulman, N.J. (2014), "Illness in travelers returned from Brazil: the GeoSentinel experience and implications for the 2014 FIFA World Cup and the 2016 summer Olympics", *Clinical Infectious Diseases*, Vol. 58 No. 10, pp. 1347-1356.

Zheng, T. (2014), "What caused the decrease in RevPAR during the recession? An ARIMA with intervention analysis of room supply and market demand", *International Journal of Contemporary Hospitality Management*, Vol. 26 No. 8, pp. 1225-1242.

Zimbalist, A. (2011), "Can Brazil build the massive infrastructure it needs to host the Olympics and the World Cup?", available at: [www.americasquarterly.org/zimbalist](http://www.americasquarterly.org/zimbalist) (accessed 12 December 2016).

### Corresponding author

Albert A. Barreda can be contacted at: [albertbarreda@missouristate.edu](mailto:albertbarreda@missouristate.edu)

---

For instructions on how to order reprints of this article, please visit our website:

[www.emeraldgrouppublishing.com/licensing/reprints.htm](http://www.emeraldgrouppublishing.com/licensing/reprints.htm)

Or contact us for further details: [permissions@emeraldinsight.com](mailto:permissions@emeraldinsight.com)

Reproduced with permission of copyright owner.  
Further reproduction prohibited without permission.