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Isao Okada  
Stephen A. Greyser

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Isao Okada

Osaka Seikei University

Stephen A. Greyser

Harvard Business School

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## **Abstract**

In recent years, the total spending on hosting the Olympic Games has snowballed. The 2008 Beijing Olympic Games spent \$40 billion on infrastructure development, and the 2014 Sochi Winter Olympics reached \$50 billion. Even when the glorious but costly Olympic Games come to an end, significant maintenance and operating costs for publicly-owned large Olympic venues, which were constructed or renovated for the Games, continue to burden host cities and states for a long time afterward. Unless Olympic venues are used effectively after the Games, and can earn enough revenue to cover large on-going costs, their owners — local governments and taxpayers — must pay off the deficits. Summer Olympics stadiums, normally built to seat over 70,000 people, are particularly at risk of becoming white elephants.

This field-work based research and analysis revealed eight key factors to prevent Olympic sites from becoming white elephants from the viewpoints of venue sustainability and Olympic legacy: removal of specific equipment like a track after the Olympic Games; reducing capacity after the Olympic Games; continuous selective meaningful re-investment after the Olympic Games; access to mass transit; the existence of no nearby competing venues with a large capacity; no financial burden of past debt or its accompanying psychological burden; the positive legacy from a venue's unique design and its global recognition; and an Olympics' legacy from successful redevelopment of the surrounding area. Further, we have created a chart which we think can be used to evaluate the level of risk of Olympic sites becoming white elephants in the near future following its Games.

**Key Words:** Olympic venue; Effective reuse; White elephant; Sustainability; Olympic legacy; Sports business.

## **Introduction**

Are Olympic sites enduring legacies or white elephants?

For the Athens 2004 Olympic Games, in the vast 2,509-hectare (6,200 acres) land of the former international airport in south Athens, called the Hellinikon Area, the Greek government constructed the sports complex, which consisted of six sports grounds including baseball stadiums and a canoe/kayak slalom, and two training facilities. After the

Games, Hellenic Olympic Properties (HOP), the government-controlled management authority for the post-Olympic use of each venue, was established and started to shape a plan for the utilization of the Olympic venues. At that time, the sports complex was unused and abandoned as were almost all of the other venues (Kasimati, 2015).<sup>1</sup> During the extremely slow and inefficient process by HOP, the economic crisis hit Greece. Now, 14 years on from the Olympic Games, the abandoned rusty sports complex in the Hellinikon Area has turned into refugee camps pitching white tents for mostly Syrians and Afghans who ran away from civil war (Pantelia, 2016).<sup>2</sup> Because of the inefficient bureaucracy and the lack of long term planning, most of the Olympic venues in Athens are still abandoned and decayed because of rain and wind damage.

The Bird's Nest, constructed for the 2008 Beijing Olympic Games with a globally-recognized iconic design of intricate latticed steel frames,<sup>3</sup> is also struggling to host events filling the full capacity of 80,000 seats. Despite the fact that the Bird's Nest had become a national symbol, the group controlling its post-Olympics development rights had to abandon its efforts to sell naming rights to the venue (Fowler, 2008) as well as to create a shopping and entertainment complex anchored by the Bird's Nest (The Associated Press, 2009). As a result, a consortium led by a China International Trust and Investment Corporation (CITIC) Group, the state-owned company, transferred the 30-year concession back to the Beijing Municipal government only one year after the closure of the Olympic Games (Liang, Song and Wang, 2011). Reminding Chinese people of the uplifting feeling at the 2008 Beijing Olympic Games, the Bird's Nest still attracts hundreds of thousands of domestic tourists. However, it is true that the Bird's Nest suffers under an estimated annual \$11 million operating costs (Gibson, 2015). Relying heavily on ticket revenues from stadium tours, the operator of the Bird's Nest works very hard to attract tourists: for example, during winter, the Bird's Nest is transformed into a snow theme park which is covered by thick snow on the field, and during summer, it hosts a night-time sound and light show.<sup>4</sup>

In the bid process for the Olympic Games, candidate cities have emphasized mostly the aspects of the economic benefits. However, in reality, hosting the Olympic Games very often has led to large overruns in operating costs and infrastructure investment (Preuss, 2004). According to Flyvbjerg and Stewart (2012), an average of sports-related cost overruns<sup>5</sup> — differences between the costs in the Games bid and final reported costs — was 179% in real terms and 324% in nominal terms between the 1968 Grenoble (France)

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<sup>1</sup> Hellenic Olympic Properties stopped their operation in 2009.

<sup>2</sup> The Greek government announced an agreement to sell the Hellinikon Area to an international investor group of Fosun Group, one of the largest multinational groups in China, Al Maabar, one of the largest real estate companies in the Middle east, and Lamda Development, a Greek investor, in 2014. The investor group undertook the blueprint of creation of green and recreation park, residential development, a shopping center, hotels, and a new golf course (<http://www.thehellinikon.com/en/press-announcements/47-signing-of-agreement.html?new=1>, <http://www.thehellinikon.com/en/press-announcements/63-memorandum-of-understanding-mou-for-hellinikon.html?new=1>). However, there has been no progress.

<sup>3</sup> The Bird's Nest will also host the opening and closing ceremonies of the 2022 Winter Olympic Games.

<sup>4</sup> Retrieved on June 10, 2017 from <http://www.n-s.cn/>

<sup>5</sup> Sports-related costs exclude infrastructure investment such as roads, rail and airports as well as private costs such as hotel upgrades or business investment.

Winter Games and the 2012 London Games, and the maximum cost overrun percentage was 796% for the 1976 Montreal Games. Further, the (anticipated) final actual sports-related costs of the 2012 London Games was supposed to be the highest at \$14.8 billion (in 2009 dollars).

Despite overruns, especially in construction and infrastructure costs, host Organizing Committees of the Olympic Games since the 1984 Los Angeles Olympics state that they had broken even financially, according to their official reports (Zimbalist, 2011). These reports included only operating costs and venue constructing costs, although some included infrastructure costs.

Because of the growing criticism among taxpayers worried about the enormous expenditures, many cities, such as Oslo, Stockholm, Lviv (Ukraine) and Krakow (Poland), had dropped out of the race for the 2022 Winter Olympics, and Boston, Budapest, Hamburg and Rome also withdrew their efforts to stage the 2024 Summer Olympic Games (Maese, 2017).

Previous studies have shown that the auction system by which several candidate cities compete with their plans in the bidding for the Olympic Games is the principal cause for overestimating the economic effect and underestimating the costs — Andreff called it “the winner’s curse” (2012). In recent decades, only the 1984 Los Angeles Olympic Games were approved without a formal vote at an International Olympic Committee (IOC) Session. Another study explained the four main reasons for overestimating the effect and underestimating the costs. First, purchasing tickets for an Olympic event takes away from spending on other entertainment such as theaters, amusement parks or concert halls because most consumers have relatively inflexible leisure budgets. Second, if a business traveler watches an Olympic event one night after work, his net expenditure would be the cost of the ticket only, but an economic impact study includes the expenditures for hotels and restaurants. Third, the impact study does not consider loss of income caused by residents leaving the host city and regular tourists crowded out to another destination to avoid congestion and the rising price of accommodations and restaurants. Finally, the costs of maintenance and operation of gigantic venues like Olympic stadiums after the Games are not considered at all (Barclay, 2009).

Further, many studies have contradicted the economic effect itself of mega-events such as the Olympic Games and the FIFA World Cup Games. Porter and Fletcher (2002) reported little or no increase in hotel occupancy rates, retail sales, or airport traffic in cities that hosted Olympic Games in the U.S. in the previous ten years. Also, Zimbalist (2015) concluded that host cities of the Olympic Games and the FIFA World Cup Games in most cases have reaped no economic benefits from accommodating those events.

In recent years, it has principally been community advocates and journalists who have criticized the post-Olympic use of venues because many host cities and countries constructed or renovated their Olympic stadiums with an optimistic but sometimes unrealistic prospect. In particular, the operation and maintenance of Olympic stadiums for the Summer Games, whose capacities are normally over 70,000 seats and are likely to become white elephants, is the biggest headache for most host cities and countries after the Games.

Baade and Matheson (2002) indicated that in the absence of careful planning, cities

that succeed in hosting the Olympics may well find only fools' gold for their efforts. However, there are no studies that treat both what "careful planning" actually is, as well as how to prevent the Olympic stadiums from becoming white elephants after the Games. Only Searle (2002), citing Sydney's experience, pointed out the risk of competition between Olympic stadiums and pre-existing, though smaller, nearby stadiums, caused by insufficient potential major sporting and other events.

On the other hand, it is true that eye-catching and attractive Olympic stadiums, although costly, become an ace in the hole in the bidding to earn the position of host city (Matheson, 2006). However, they are often criticized as a negative legacy in terms of cost and infrequent post-Olympics usage. Thus, the worries of host cities and countries run very deep.

Trying to ease the financial burden, in 2014 the IOC unveiled a strategic plan for the future of the Olympic Movement, "Olympic Agenda 2020" (<http://www.olympic.org>). Even though it encouraged the reuse of existing venues, including those outside the host cities, it seems Agenda 2020 has not yet established an effective road map for the construction and post-games use of Olympic venues, which have sought both a role and value as a legacy and have historically swallowed a large amount of money.

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The major purpose of this study is to address several key questions:

- How can Olympic venues be prevented from becoming white elephants?
- What are the principal factors in doing so?
- Even after a major venue becomes a white elephant, is it too late to recover?

Our research focused on the main Olympic stadiums — which are vulnerable to becoming white elephants because of their huge capacity — for ten of the twelve Summer Olympics in nine countries since the 1972 Munich Games (except the 1980 Moscow and 2016 Rio Games). The research was carried out by extensive fieldwork and semi-structured interviews with the stadiums' owners, operators, and anchor tenants. The 2016 Rio Games was excluded from this research because it is too early to evaluate the post-Games use of the venues.

For this project, field-work based research was desirable because the crucial data of attendance figures of concerts or other events, the details of lease contracts, and revenues and expenses of Olympic stadiums are not normally disclosed. Therefore, it is necessary to access the involved persons or organizations directly. This involved travel to 10 site locations, and over 30 interviews. From analysis of our findings, we created a chart that we think enables the evaluation of how likely an existing Olympic venue is to become a white elephant in the near future following its Games.

## **Evaluation of Post-Olympic Usage**

"Why do we spend the £9.3 billion (\$12.3 billion)<sup>6</sup> in the case of London on only the

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<sup>6</sup> The £9.3 billion was the initial British government's budget for the 2012 London Games, including the operating costs, venue constructing costs, and regeneration of the surrounding area.

two weeks [actually 17 days] of the Olympic Games — not only just the game (operation) but infrastructure? Very difficult to justify to the world in times of fiscal austerity, without legacy development for the Olympics and the effective use of all facilities.” Richard Caborn, former British Minister for Sports, responded firmly in his interview.<sup>7</sup>

First of all, why is the effective reuse of Olympic venues desirable and necessary?

That is because the venues cannot be free from huge amounts of maintenance costs unless the owner gives up the operations and abandons a venue as the Greek government did after the 2004 Games.

The Major League Baseball (MLB) Atlanta Braves played for 20 years at Turner Field (ballpark), converted from the Centennial Olympic Stadium after the 1996 Atlanta Games. Mike Plant, President, Development, explained in his interview: “If a single person walks in the stadium through an entire year, you’ll have to keep the lights on. You’ll spend between 5 to 10 million dollars depending on the market. It means you have to keep the systems all running: fire safety system, insurance, water (supply), electricity and so on. This is the basic cost because of the size of the venues.” The costs of keeping the lawn green and paying the salary of facility keepers are also necessary. Unless the venues can earn enough money from the operation, local governments (the venue’s owners in most cases) have to cover the costs, and in the end taxpayers must pay for it.

What situations can we call “efficient reuse” of Olympic venues? Are there any measures to evaluate the efficient reuse of venues?

Only Alm (2012) published a report on visualizing the utilization of stadiums constructed for mega-events, with his own “The World Stadium Index (WSI)”. This index is calculated by the annual attendance figures of events divided by the stadium’s capacity. Alm developed “Stadium Utilisation Index (SUI),” based on the WSI, with Solberg, Storm and Jakobsen in their paper (2014). The SUI is calculated by taking the total annual/seasonal demand and dividing it by the capacity. In his paper, attendance figures were divided into three types of demands: demand for sports events, demand for non-sports activities such as concerts, and demand for sightseeing attracted by an iconic stadium. Focused on the first two types of demands, he calculated the SUI.

Both reports praised Turner Field as the most efficient reuse of Olympic stadiums in recent years. The Main Olympic Stadium in Athens, which the professional soccer club AEK Athens F.C. used as its home ground, also received high marks. Alm concluded anchor tenants are essential for the effective reuse of large scale stadiums.

Ironically, in 2013, the Braves refused to extend their original 20-year lease contract — from 1997 to 2016 — with the city of Atlanta and Atlanta Fulton County Recreation Authority (AFCRA) beyond the 2016 season. The club built a new 41,500-seat ballpark located about 10 miles north of downtown Atlanta.<sup>8</sup> The city of Atlanta was unable to find new anchor tenants and sold Turner Field for \$30 million in 2016 to Georgia State University; the university had a plan to convert Turner Field into a college football stadium,

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<sup>7</sup> Richard Caborn served as the Minister for Sports in the Tony Blair administration from 2001 to 2007, and played a primary role for the bid and the early planning of the 2012 London Olympic Games.

<sup>8</sup> SunTrust Park, the Braves’ new ballpark, has 9,000 fewer regular seats in total but 3,650 more premium seats, compared to Turner Field. The construction cost is estimated at \$672 million. Some 400,000 square feet of retail shops, five company offices, 7,000 residential units and three new hotels are part of the ballpark development.



with a capacity of 23,000 seats.<sup>9</sup> The decrease in usage is extremely steep from the MLB ballpark which had attracted at least 2 million spectators annually in 81 home games, to a college football stadium which will attract less than one-tenth the spectators in six home games annually.

Also in 2013, the AEK Athens (football club) made public their plans for relocation from the Main Olympic Stadium in Athens (Ekathimerini, 2013).<sup>10</sup> In response to our inquiry, the AEK Athens revealed the prospect [at that time] that the construction permit of a new stadium would hopefully be issued by the government in summer, 2017. (As of summer 2018, this had not happened.) The Main Olympic Stadium in Athens has already started its countdown to becoming a white elephant.

Researchers who study the baseball or football [soccer] businesses could have easily predicted this outcome. In the MLB, many clubs have constructed new ballparks since the 1990's to increase revenues.<sup>11</sup> If a club has limited revenue sources — for example, the Braves did not have the contract to sell the naming rights of Turner Field — the ballpark is likely to become a target of relocation (Okada 2010). Also, in professional football leagues in Europe, construction of exclusive football grounds shaped like rectangles has gone mainstream.

Both the WSI and SUI do not reflect at all the qualitative elements of stadium sustainability, such as a tenant's capability in finance, an anchor club's performance, and the user-friendliness of the stadiums or the existence of competing venues. Therefore, these indices, which will fluctuate broadly year by year, have limited value in our view.

As an index to evaluate the effective reuse of Olympic venues, we first examined annual attendance figures and number of operating days — the number of days that sports or entertainment events are held or sightseeing tours are operated. We assume that there are three types of demands on gigantic sports venues like Olympic stadiums: usage for sports and entertainment events (*Type 1*), usage via facility rental for conferences and meetings (*Type 2*), and usage for sightseeing tours (*Type 3*). When we analyze attendance figures and number of operating days for each type of demand, we can better understand how the venues are utilized in daily life.

Specifically, we evaluated the post-Games usage of Olympic venues in terms of attendance figures and number of operating days in four grade categories, which we termed: efficiently used, well used, fairly well used, and poorly used.

Usage for sports and entertainment events is a basic demand for gigantic sports venues. Therefore, if annual attendance of the *Type 1 demand* is beyond “24 times of venues' capacity,” we defined it as “efficiently used.” That is, on average, the venue hosts sports or entertainment events with capacity crowds every two weeks. If “6 times of capacity or less,” we define the venues as “poorly used.” Also, if “over 6 times and up to 16 times of capacity” or “over 16 times and up to 24 times of capacity,” we define it as “fairly well used” and “well used,” respectively. Taking into account the attendance of the *Type 2*

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<sup>9</sup> Retrieved from <http://stadium.gsu.edu/>

<sup>10</sup> Main Olympic Stadium in Athens also played host to Panathinaikos F.C. as an anchor tenant in 2005-2007 and 2008-2013, but the club subsequently relocated to a new stadium (<http://www.pao.gr/en/club/stadium>).

<sup>11</sup> In the MLB, 21 new ballparks have been constructed in the 25 years since 1992.

and *Type 3 demand*, we then performed a comprehensive evaluation of Olympic venues in terms of attendance.

Also, the number of operating days is likely to show the efforts of the venue operator. In a parallel manner to our categorization of attendance, if the number of operating days of the *Type 1 demand* is “41 days or more” annually — that is to host events on average three or four times a month — we define it as “efficiently used.” This is because, except for MLB clubs playing 81 home games annually, it is impossible for only one or two anchor tenants of football or rugby clubs to achieve this number. If “6 days or less,” we consider it “poorly used.” If “40 to 24 days” and “23 to 7 days,” we define it as “well used” and “fairly well used,” respectively. After we incorporated the *Type 2* and *Type 3 demand*, we were able to perform a comprehensive evaluation of Olympic venues in terms of number of operating days.

**Table 1** shows attendance figures and number of operating days of Olympic stadiums as well as the comprehensive evaluation of post-Games usage in each type of demand from the 1972 Munich Games to the 2012 London Games (except the 1980 Moscow Games).

However, these indices by themselves are insufficient, as we stated before. The venue’s status in terms of the qualitative elements of a successful facility (as described above), as well as its potential for post-Olympics legacy, must be taken into account. Many interviewees, including Caborn, emphasized these as important. Without considering these factors, it will be difficult to keep Olympic venues from becoming white elephants, or to recognize the danger of it.

## **Key Factors Preventing White Elephants**

From our research and analysis, we identified eight principal factors (noted in the abstract above) that we believe are associated with successful prevention of Olympic sites from becoming white elephants. These encompass both venue sustainability and creating a positive post-Olympics legacy. The factors are described below; some are combined for ease of understanding connected initiatives.

### **Sustainability — Renovation After the Olympic Games (Removal of Track and Reducing Capacity)**

On Barcelona’s Montjuic Hill, *Estadi Olímpic Lluís Companys* (Olympic Stadium) is located in the center of the city. Constructed for the 1929 Barcelona International Exposition, this stadium was refurbished for the 1992 Barcelona Olympic Games for 7,000 million pesetas (\$70 million in 1992 dollars).<sup>12</sup> Three years later, in 1995, the existing Olympic stadium, owned by the Barcelona City Council, started to host the National Football League (NFL) Europe club Barcelona Dragons and in 1997 the professional soccer club RCD Espanyol of Liga Espanola as anchor tenants. Unfortunately, the Dragons

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<sup>12</sup> To extend the capacity from 50,000 to 60,000 was achieved by lowering the arena level by 11 meters and building a lower bank of seating. One of the most significant aspects of the rebuilding was the roof of the covered stand, 150 meters long and 30 meters deep, supported by a metal structure (COOB’92, 1992).

disbanded in 2003,<sup>13</sup> and Espanyol moved out in 2009.<sup>14</sup> After the 20th European Athletics [track and field] Championships was held in 2010, the Olympic stadium had rarely been used until a new anchor tenant, Open Camp, which is a sports theme park, came

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<sup>13</sup> Retrieved from <http://www.nfl.com/news/story/09000d5d801308ec/article/nfl-europa-closes>

<sup>14</sup> RCDE Stadium, the new football stadium with 40,500 seats, was constructed through the financing of RCD Espanyol in the southwest of Barcelona. According to the club, the construction cost was 82 million Euros (\$95 million). They announced the stadium construction in 2002, five years after they started to play at the Olympic stadium as their home ground.

**Table 1. Attendance Figures and Number of Operating Days**

Stadium name/events/capacity	Attendance figures / year or season		Number of operating days / year or season				Evaluation of post-Games usage	
	Usage for sports and entertainment events ( <i>Type 1 demand</i> )	Usage via facility rental for conferences and meetings ( <i>Type 2 demand</i> )	Usage for tours ( <i>Type 3 demand</i> )	Usage for sports and entertainment events ( <i>Type 1 demand</i> )	Usage via facility rental for conferences and meetings ( <i>Type 2 demand</i> )	Usage for tours ( <i>Type 3 demand</i> )	Attendance figures (All Types)	Number of operating days (All Types)
Olympiastadion, 1972 Munich Summer Olympics (69,250)	511,000 (2016)	7,000 (2016)	107,000 (2016)	about 30 (2016)	about 70 (2016)	every day	fair	well used
The Olympic Stadium, 1976 Montreal Summer Olympics (56,040)	331,466 (2016) <sup>1</sup>		17,742 (2016) <sup>2</sup>	about 30 (2016)	about 150 (2016)	very often (2016) <sup>2</sup>	poorly used	well used
Los Angeles Memorial Coliseum, 1984 Los Angeles Summer Olympics (83,607)	624,236 (2015)	27,214 (2015)	1,586 (2015)	14 (2015)	76 (2015)	102 (2015)	fair	fair
Seoul Olympic Stadium, 1988 Seoul Summer Olympics (69,950)	725,683 (2016) <sup>1,3</sup>		few	182 (2016) <sup>1,3</sup> , 31 for <i>Type 1 demand</i> and very often for <i>Type 2 demand</i> (2017) [estimated]		rare	fair	well used
Estadi Olímpic de Montjuïc Lluís Companys, 1992 Barcelona Summer Olympics (60,000)	767,607 (2016) <sup>4</sup>	rare	none	132 (2016) <sup>4</sup>	few	none	fair	well used
Turner Field (until 2016), 1996 Atlanta Summer Olympics (50,000)	2,020,914 (2016) <sup>5</sup>	many	some	81 (2016)	250 (2016)	often	efficiently used	efficiently used
Georgia State Stadium (2017-present), 1996 Atlanta Summer Olympics (23,000)	at maximum 138,000 for six events (2017) [estimated]	none	none	6 (2017) [estimated]	none	none	poorly used	poorly used
ANZ Stadium, 2000 Sydney Summer Olympics (83,000)	1.6 million (2017) <sup>1</sup> [estimated]	[estimated]	none	53 + 3 TBD (2017) [estimated]	very often	none	well used	efficiently used
Main Olympic Stadium, 2004 Athens Summer Olympics (69,618)	189,548 (2015)	3,300 (2015)	none	15 (2015)	1 (2015)	none	poorly used	poorly used
Beijing National Stadium (Bird's Nest), 2008 Beijing Summer Olympics (80,000)	less than 400,000 (2016) [estimated]	rare	720,000 in the first half of 2011 — though visitors were about 50% of those in the same period of 2010 (Branigan, 2012); several hundreds of thousands of people (2016) [estimated] <sup>6</sup>	about 25 (2016)	few	almost every day	fair	well used
London Stadium, 2012 London Summer Olympics (67,000)	more than 2.3 million (2017) [estimated]	N/A <sup>7</sup>	many <sup>7</sup> [estimated]	48 (2017) [estimated]	N/A <sup>7</sup>	237 + 2 TBD (2017) [estimated]	efficiently used	efficiently used

Source: author research

1. This number includes visitors for usage via facility rental for conferences and meetings.
2. The Olympic Park operates a guided tour including "Since 1976 exhibition"; this is separate from more than 240,000 visitors per year to the Montreal Tower attached to the Olympic Stadium.
3. From the official website (retrieved from <http://stadium.seoul.go.kr/reserve/jamsil/mainstadium>)
4. Includes 611,000 visitors to Open Camp, a sports theme park; however, only 12 % of participants purchased the €20 general ticket. By the end of July 2017, Open Camp was temporarily closed because of financial problems, after 236 days of operation.
5. From ESPN.com
6. This number includes visitors to attraction events like a snow theme park and art exhibitions, which were organized by the stadium operator, Beijing Municipal government, for more than 200 days.
7. London Stadium was re-opened in 2016 after the renovation. Therefore, the attendance and frequency of usage for conferences and meetings are not yet available.

Note: All figures for 2017 are estimated.

in 2016.<sup>15</sup>

As the highly motivated host of the 1992 Olympic Games, the city of Barcelona successfully attracted tourists from all over the world and redeveloped the waterfront area. Thus, many research papers praised the legacy of this economic effect as the “Barcelona Model” (Gold and Gold, 2016) (Brunet, 1995). However, an eventually-empty Olympic stadium had been a stain in the success story.

Why did the anchor tenant (Espanyol) move out from the Olympic stadium significantly early?

Josep Toldra, Director of RCDE Stadium of the RCD Espanyol, explained: “The Olympic Stadium has a different concept from modernized soccer stadiums and other sports activities. It is a track and field stadium. Also, a 55,000 capacity is oversized (for us). The years (when we were) in the Olympic Stadium were difficult for us — Espanyol rented the lobby for our office throughout the year but the field for playing a match only every two weeks because the stadium had different competitions like rugby and soccer. Our supporters felt ‘this is not our home’.”

Also, the AEK Athens plans to move out of the Main Olympic Stadium in Athens to a new football stadium in the near future; they cited the same reason. Dimitris Andriopoulos, Project Manager for New Stadium, said, “The Olympic Stadium is basically a track and field stadium lacking the specifications of a modern soccer stadium, which is rectangular and has steeper spectators’ stands.” The AEK Athens also plans to reduce the capacity from the 69,618 of the current Main Olympic Stadium to 32,000 to 34,000 in the new stadium.

Retaining a track and keeping a huge capacity are obvious reasons why Olympic stadiums face difficulties in retaining anchor tenants. An unsatisfactory fan experience occurs, not only from a large space between spectators and the playing field but also from the eye-grabbing number of empty seats.

Also, in Beijing, a professional football club, Beijing Sinobo Guoan F.C., shied away from making the Bird’s Nest their home because of wariness about the costs and over-sized capacity (Lim, 2012).

At the London Stadium (Olympic Stadium) for the 2012 Games, a 20,000 additional temporary-seat architecture was adopted, in consideration of reduced future demand after the Olympic Games.<sup>16</sup> After the Olympic flame was extinguished, the London Stadium was refurbished for 18 months at £323 million (\$414.5 million) and also reduced its capacity from 80,000 to 57,000.<sup>17</sup> Playing host to two different kinds of sports organizations — British Athletics [track and field] and West Ham United F.C. of the Premier League — the London Stadium keeps a track, but retractable seats cover up the track at the football matches.

According to Richard Caborn, former British Minister for Sports, when the design of

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<sup>15</sup> Open Camp temporarily closed by the end of July 2017 after 236 days operation because of a financial problem (Lavanguardia, 2017).

<sup>16</sup> The 2012 London Olympic Games delivered almost 300,000 temporary seats in total — a level without precedent in any previous Games — and separated permanent venues, which would have a long-term sustainable legacy, from temporary venues, which would not, in the planning phase (Nimmo, Wright & Coulson, 2011)

<sup>17</sup> The London Stadium can hold concerts with up to 80,000 spectators.

the Olympic stadium for the 2012 London Games was determined in 2007, it was decided to accommodate British Athletics plus another sports club as anchor tenants, but the Premier League clubs were not included. As a result of growing fears about whether the post-Olympic use of the gigantic sports venue would be successful without a Premier League club, however, the decision was overturned in 2012. Then, the stadium owner “E20 Stadium LLP” — a joint organization run by the London Legacy Development Corporation (LLDC) and Newham Council — made a 99-year tenancy contract with West Ham United.

The annual cost of moving rows of seats to football mode and back again is estimated at a maximum £8 million (\$10.2 million). This estimate was far beyond the annual rent fee at £2.5 million (\$3.2 million) paid by West Ham United (Gibson, 2016). Therefore, it is premature to evaluate whether this approach works well or not.

Also, ANZ Stadium (the Olympic stadium in Sydney) adopted the use of temporary seats for the 2000 Sydney Olympics, and reduced the capacity from 115,600 to 80,000 after the Games.<sup>18</sup> **Table 2** shows major renovations in each Olympic stadium and the anchor tenants after the Olympic Games.

We can conclude that renovations after the Olympic Games are very important in

**Table 2. Major Renovations After the Olympic Games and Anchor Tenants**

Stadium name/events	Renovation after the Olympic Games		Major anchor tenants after the Olympic Games
	Removal of specific equipment like a track	Reducing capacity after the Olympic Games	
Olympiastadion, 1972 Munich Summer Olympics	No	No <sup>1</sup> 83,000 → 69,250	Bayern München F.C. (1972-2005); TSV 1860 München F.C. (1972-2005)
The Olympic Stadium, 1976 Montreal Summer Olympics	Yes	No	Major League Baseball Montreal Expos (1977-2004); Montreal Alouettes (football, 1976-86, 1996-97); Montreal Manic (soccer, 1981-83); Montreal Machine (football, 1991-92)
Los Angeles Memorial Coliseum, 1984 Los Angeles Summer Olympics	Yes	No	USC Trojans (college football, 1923-present); National Football League Raiders (1982-1994); XFL Los Angeles Xtreme (football, 2001); NFL Rams (2016-2018 scheduled)
Seoul Olympic Stadium, 1988 Seoul Summer Olympics	No	No	Seoul United F.C. (2007-2009, 2012); Seoul E-Land F.C. (2015-present)
Estadi Olímpic de Montjuïc Lluís Companys, 1992 Barcelona Summer Olympics	No	No	RCD Espanyol (soccer, 1997-2009); Barcelona Dragons (American football, 1995-2002), Open Camp (theme park, 2016-present)
Turner Field (until 2016), 1996 Atlanta Summer Olympics	Yes	Yes: 85,000 → 50,000	MLB Atlanta Braves (1997-2016)
ANZ Stadium, 2000 Sydney Summer Olympics	No	Yes: 115,600 → 80,000 → 83,000 (now)	Eight sporting teams in 2017: Wallabies (national rugby team), Socceroos (national soccer team), Rugby League Blues (the New South Wales league), 5 National Rugby League clubs=Bulldogs, Rabbitohs, Eels, West Tigers, Dragons
Main Olympic Stadium, 2004 Athens Summer Olympics	No	No	AEK Athens F.C. (2004-present); Panathinaikos F.C. (2005-2007, 2008-2013)
Beijing National Stadium (Bird's Nest), 2008 Beijing Summer Olympics	No	Yes: 91,000 → 80,000	None
London Stadium, 2012 London Summer Olympics	No <sup>2</sup>	Yes: 80,000 → 57,000 (at football match)	West Ham United F.C. (2016-present); British Athletics (2015-present)

Source: author research

1. Olympiastadion reduced the capacity by closing off the standing places; no structural renovation.

2. Instead of removing the track, the London Stadium uses a retractable seating system that covers the track area for football matches.

<sup>18</sup> The current capacity of ANZ Stadium is 83,000.

terms of stadium sustainability. In particular, removal of specific equipment like a track and reducing the capacity are both important factors in keeping the venues from becoming white elephants.

## **Sustainability — Continuous Re-investments and Access to Mass Transportation Services**

Conversion from the elliptical Centennial Olympic Stadium with 85,600 seats into the fan-shaped Turner Field with 50,000 seats was prepared efficiently from the original stadium design, which anticipated the conversion. The renovation period was only seven months. The conversion cost was \$200 million, which was almost the same amount as the original construction cost. Both were financed by only private money (French and Disher, 1997). William Porter Payne, former CEO of Atlanta Committee for the Olympic Games, looked back on 25 years before and said, “In previous cities, there were many Olympic venues built, and then not adequately utilized after the Games; in other words, they became white elephants. We, strategically at the very beginning, made a decision that in every possible case where we would build Olympic venues, they must have after-Games use by somebody else.” Payne talked about the initial reason that the Olympic stadium should be converted into a ballpark after the Atlanta Games, “The fields of play between baseball and athletics are so dramatically different that there seemed to be no way do it effectively. Originally, they (the IOC and the United States Olympic Committee) had an opinion that, ‘a bunch of architects told us originally, you could not do it.’ However, we kept working, working, and working, and finally came up with the design. The IOC and USOC became great fans of it because they did not want to see 80,000 seats have no subsequent use, and simply be left over after the Games.”

Despite the careful plans, Turner Field could not retain the Braves after the initial 20-year lease. Why?

“We had discussions (with the city of Atlanta) about renewing the lease contract — from 2017 to 2022 — since 2011.” Mike Plant, President, Development, of the Braves, revealed in his interview. “It was necessary to improve aging facilities; we showed them a list of \$150 million infrastructure work projects: replacement of seats for \$15 million, new lights for \$5 million, painting the exterior for \$5 million, and so on.” Plant also claimed an additional \$100 million was needed for improving the fan experience in next 20 years, such as advanced technology. [Over the previous 20 years, baseball’s economics also had changed, calling for more premium seating in ballparks, enhanced food and beverage services, added in-park fan information, more comfortable seats, etc.] However, he said the answer of the city of Atlanta was “we do not have any money to contribute to renovating the venue [they owned]”. For the 20 years until 2016, the Braves reported that they had invested \$125 million in Turner Field for upgrading the ballpark, but the city of Atlanta and AFCRA (owners) have only paid a small amount of money for some improvements from 2010 to 2014. Further, the Braves offered to purchase the land used for parking lots of Turner Field to build a mixed-use development. However, the city refused the offer: “We cannot just sell to you. If you win the bid competition process, then you can build.”

In addition, Turner Field has poor access to public transportation. For more than 20

years, only a game-day shuttle bus service starting 1 1/2 hours before the first pitch has been available to take fans from the public transit station to Turner Field. Most of the spectators in Atlanta drive their cars to Turner Field; however, the city of Atlanta also neglected efforts on road improvement. Thus, chronic traffic jams occur in downtown Atlanta and Braves' fans have complained about the situation. Without a good prospect for future investment in Turner Field and in infrastructure by the city, the Braves at last decided to relocate their home grounds.

Separately, the Athens' lesson also indicates that Olympic venues would lose their value easily if continuous investment and maintenance in venues is stopped, as we stated earlier.

Sydney's experience underscores the point. For the 2000 Sydney Games, the New South Wales (NSW) government established the Olympic Park, which consists of ANZ Stadium (Olympic stadium), the Aquatic Center, and an indoor stadium, in the west Sydney suburb. Located next to the Olympic Park, the former Olympic Village was converted and sold as 900 townhouses, 700 apartments and 300 modular homes by 2010. A new railway, which can take people from the city center of Sydney to the Olympic Park in 20 minutes, was also constructed. Whenever sports or entertainment events are held in the Olympic park, there is a convenient transportation service for ticket holders because the train fare becomes free, since the fare is included in the ticket price of events. ANZ Stadium has been a busy stadium — it was the home of eight football and rugby teams in 2016.

More than 15 years after the Sydney Olympic Games, the NSW government is shooting at its next ambitious goal: creating the “2030 Master Plan,”<sup>19</sup> and planning to construct or renovate six stadiums in total in the State for 1.6 billion Australian dollars (\$1.22 billion) by 2030. ANZ Stadium will be converted to a modern rectangular stadium, after removal of a track, for 750 million Australian dollars (\$570 million). A retractable roof will be also installed. In addition, the construction of a new railway line between ANZ Stadium and a new stadium with 30,000 seats in neighboring Parramatta has been announced.

Why is it necessary to upgrade ANZ Stadium now?

Stuart Ayres, Minister for Sports of the NSW government, provided an answer to the question. “It’s fundamentally important to recognize that sports consumers act very similar to the way other consumers do. The less a product is relevant to modern life, people will drop off. The design of the Olympic stadium created a very large bowl, and that was good for track and field, but spectators are quite a long way away from the grounds [playing field]. Modernized stadiums, which have a much steeper angle (of stands), brings fans the closest to the action on the ground. Also, we can create an intimate environment and a fantastic atmosphere.”

**Table 3** provides information on major re-investment in Olympic stadiums both in the past and currently scheduled, and in mass transportation services.

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<sup>19</sup> According to the 2030 Master Plan, the Olympic Park will play host to a daily population of 62,000 workers, students, and residents by 2030, though the current daily population is just under 22,000.



**Table 3. Major Re-investment in Olympic Stadiums After the Games and in Mass Transportation**

Stadium name/events	Major re-investments after the Olympic Games	Mass transportation
Olympiastadion, 1972 Munich Summer Olympics	None	subway, local bus
The Olympic Stadium, 1976 Montreal Summer Olympics	C\$175 million (\$132 million US at the 1987 value) for installing a new roof and completing the observatory tower attached to the Olympic Stadium in 1987.	metro, local bus
Los Angeles Memorial Coliseum, 1984 Los Angeles Summer Olympics	A \$93 million repair carried out because of Southern California's 1994 earthquake; another \$6 million for a construction of a new press box in 1995; University of Southern California (operator) is proceeding with a renovation project for \$270 million in total by 2020.	metro (light rail) <sup>1</sup> , local bus
Seoul Olympic Stadium, 1988 Seoul Summer Olympics	None. However, the Seoul Metropolitan government plans to modernize the Olympic Stadium for international games and also to reduce the seating capacity from 69,950 to 60,000 until 2023. <sup>2</sup>	metro, local bus
Estadi Olímpic de Montjuïc Lluís Companys, 1992 Barcelona Summer Olympics	None	local bus
Turner Field (until 2016), 1996 Atlanta Summer Olympics	MLB Atlanta Braves (operator) had invested \$125 million in the ballpark, including repair works.	game-day shuttle bus
ANZ Stadium, 2000 Sydney Summer Olympics	A \$750 million refurbishment plan is scheduled for the near future: conversion to a modern rectangular stadium, installation of a retractable roof, and removal of the track.	train, local bus
Main Olympic Stadium, 2004 Athens Summer Olympics	None	metro, local bus
Beijing National Stadium (Bird's Nest), 2008 Beijing Summer Olympics	None	subway, local bus
London Stadium, 2012 London Summer Olympics	None	train, metro, local bus

Source: author research

1. Metro Expo Line to access Los Angeles Memorial Coliseum is a light rail service. Transportation capacity is restricted.

2. Retrieved from <http://english.seoul.go.kr/policy-information/policy-focus-for-2016/seoul-international-complex/development-seoul-international-complex/>

## **Sustainability — Negative Effect of Existing Competing Venues with Large Capacity**

When the NSW government plans investment in new stadiums and in renovating existing ones, the decisions are affected by the recent situations of other domestic and international competing venues. In Brisbane, according to Minister Ayres, Suncorp Stadium, a multipurpose stadium with 55,000 seats, was renovated to a modern rectangular stadium in 2003. A new rectangular stadium with 30,000 seats, known as AAMI Park, was built in Melbourne in 2010. The New Perth Stadium with 60,000 seats will open in Perth in 2018. In neighboring countries, Eden Park Stadium in Auckland, New Zealand, with 50,000 seats, was renovated for the 2011 Rugby World Cup. Also, a world-class sport and entertainment complex, “Singapore Sports Hub,” made its debut in Singapore in 2014. ANZ Stadium might be affected negatively in terms of hosting sports and entertainment events if the stadium had kept its outdated design and facilities.

Thus, if there are no competing sites with large capacity nearby, it is a big advantage for Olympic venues in attracting events. The case of Munich proved it, too.

*Olympiastadion* (Olympic Stadium) for the 1972 Munich Games, with a transparent roof shaped like a spider’s web, is situated in the beautiful green Olympic Park in north

Munich.<sup>20</sup> The *Olympiastadion* accommodated two anchor tenants — Bayern München F.C. of the Bundesliga and TSV 1860 München F.C. — for 33 years until 2005. However, both tenants left at the same time after the Allianz Arena with 75,000 seats was constructed nearby.<sup>21</sup> Further, the *Olympiastadion* has a big disadvantage in that renovation to attract tenants is not allowed by German law because of heritage protection. However, “we have a special contract with the Allianz Arena to protect the Olympic Stadium,” Marion Schöne, General Manager of Olympiapark München GmbH, a city-owned management company, said. “The Allianz Arena is allowed to host only football (soccer) matches. Instead, the Olympic Stadium can host every type of event except professional football matches.” According to Schöne, there was a background story that the architects of the Olympic Stadium had refused to undertake a rebuilding plan in time for the 2006 FIFA World Cup in Germany. This was said to have led to the construction of the Allianz Arena, used in the World Cup competition.

Schöne continued, “We lost a lot of revenues after we lost (powerful) anchor tenants. But we can profitably host four to six concerts a year, and more than 40 (small and big) events, too — thanks to the special contract. And fortunately, there are no competitors for us within 200 kilometers (124 miles).”

Existing nearby competitive venues with large capacities obviously constitute a negative factor in preventing Olympic venues from becoming white elephants. Only in Munich and Montreal do the Olympic stadiums have the good fortune of no large competitive sites nearby (See Table 4 about the competitive situations for each Olympic stadium).

## **Sustainability — Financial Burden of Past Debt or Accompanying Psychological Burden**

The big “legacy” of the 1976 Montreal Olympic Games was the 1.46 billion Canadian dollars debt (\$1.46 billion at the 1976 value). The 1973 oil crisis hit the economy during construction of the Olympic venues, and the price of steel rose dramatically. According to the Montreal Olympic Park, the 1.46 billion dollars (Canadian) construction costs of Olympic venues were about six times the original budget of 250 million Canadian dollars (\$250 million at the 1976 value). As a result, the Province of Quebec government had to repay the 1.5 billion Canadian dollars debt with a 30-year mortgage, extending until 2006. “Big O” (the nickname of the Olympic Stadium) was cynically mocked as “Big Owe.” After the MLB Montreal Expos (the anchor tenant) left Montreal for Washington DC in 2004, people in Montreal no longer visited the site of the Olympic Stadium and also lost interest in the Olympic Park. The latter consists of Olympic Stadium, Montreal Tower (observation tower), Aquatic Center (now the Sports Center), velodrome (now Bio-Dome, a

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<sup>20</sup> Capacity of the Olympic Stadium is 69,000, but was 83,000 at the 1972 Munich Olympic Games.

<sup>21</sup> After the TSV 1860 was downgraded from Bundesliga 2 to a level 4 amateur league because of their poor performance in the 2016-17 season and financial trouble ([https://www.dfb.de/news/detail/teilnehmerfeld-der-3-liga-fuer-saison-20172018-komplett-168841/?no\\_cache=1](https://www.dfb.de/news/detail/teilnehmerfeld-der-3-liga-fuer-saison-20172018-komplett-168841/?no_cache=1)), the lease contract between TSV 1860 and the Allianz Arena was cancelled in July 2017 (<https://fcbayern.com/jp/news/2017/07/presseerklarung-mietvertrag-mit-tsv-1860-munchen-aufgelost>).

**Table 4. Presence of Competitors with Large Capacity**

Stadium name/events/capacity	Competitors with large capacity
Olympiastadion, 1972 Munich Summer Olympics (69,250)	None <sup>1</sup>
The Olympic Stadium, 1976 Montreal Summer Olympics (56,040)	None
Los Angeles Memorial Coliseum, 1984 Los Angeles Summer Olympics (93,607)	Rose Bowl with about 100,000 seats; Dodger Stadium with 56,000 seats
Seoul Olympic Stadium, 1988 Seoul Summer Olympics (69,950)	Seoul World Cup Stadium (football) with 66,704 seats; Incheon Munhak Stadium (football) with 52,179 seats; Suwon World Cup Stadium (football) with 43,959 seats; Goyang Stadium (football) with 41,311 seats and other football venues
Estadi Olímpic de Montjuïc Lluís Companys, 1992 Barcelona Summer Olympics (60,000)	RCDE (football) Stadium with 40,500 seats; Camp Nou (football) with 99,354 seats
Turner Field (until 2016), 1996 Atlanta Summer Olympics (50,000)	SunTrust Park (MLB Braves) with 41,500 seats; Mercedes-Benz Stadium (NFL Falcons) with 71,000 seats
ANZ Stadium, 2000 Sydney Summer Olympics (83,000)	Allianz Stadium with 45,400 seats; Suncorp Stadium in Brisbane with 55,000 seats
Main Olympic Stadium, 2004 Athens Summer Olympics (69,618)	Panathinaiko Stadium with 45,000 seats; Agia Sophia with 32,000 or 34,000 seats (scheduled to be built in near future)
Beijing National Stadium (Bird's Nest), 2008 Beijing Summer Olympics (80,000)	Workers' Stadium with 66,161 seats
London Stadium, 2012 London Summer Olympics (57,000)	Wembley Stadium with 90,000 seats; Emirates Stadium with 60,361 seats; Stamford Bridge with 41,837 seats and other football venues

Source: author research

1. Olympiastadion has a special contract with the nearby Allianz Arena (football stadium) with 70,000 seats. Olympiastadion has exclusive rights to compete to host non-football events, but does not compete for football matches.

natural science museum), and other structures. These Olympic venues had been rarely crowded with people. In our view, the financial burden of past debt or the companion psychological burden of lack of success keeps people away from the venues, and accelerates turning Olympic venues into white elephants.

However, now the site is making a comeback. Suffering under the past 1.5 billion Canadian dollars debt and later loss of visitors, the Montreal Olympic Park has been revitalized since 2012 because the Quebec government started to invest strategically and positively in the park, intending for it to be the “beloved park” of Montreal citizens and to attract visitors. At the same time, the Olympic Park carried out intensive marketing: how can we motivate you to visit the park, and what points should we improve?

In the *Esplanade Financière Sun Life*, a promenade with naming rights in front of the Olympic Stadium, many free events are presented like the “Food Truck Festival.” The Aquatics Center (now Sports Center) had a major renovation to update facilities at a cost of 29 million Canadian dollars (\$23.2 million) in 2015. Inside the observatory Montreal Tower attached to the Olympic Stadium, another renovation, which plans to create the office of the financial institution “Desjardins” for 1,000 employees as a tenant, is ongoing. Montreal Tower is the tallest inclined tower in the world at 165-meters height and leaning at a 45-degree angle. According to the Olympic Park, the average recent investment is around 20 million Canadian dollars (\$16 million) per year. The efforts have now revived the Olympic Park, attracting 1.2 million visitors annually. In other words, Olympic venues

in Montreal overcame the weak factors — the financial burden of past debt and its psychological burden — by continuous re-investment in the venues.

In our view, the huge original debt burden of the Montreal Games and the recent restoration of Olympic Park are lessons in creating a white elephant and in reviving a white elephant much later through planned investment in the site.

On the other hand, the case of Athens is instructive. The combination of costs and schedule delays created an early financial burden. Although hosting the Games did not trigger the effects on Greece of the subsequent global financial crisis, those effects included aggregating the country's inability to invest in the Olympic site. The site became and remained a white elephant. Most of its Olympic venues have been abandoned because of financial disaster. The Olympic Park accommodating the Main Olympic Stadium, Indoor halls, aquatics center and other structures, might have become a public gathering place (as elsewhere) but has gone to ruin. Only empty space occupies the park instead of trees, and a dried-up fountain also has been abandoned. Influenced by the stark landscape, the average of attendance of the AEK Athens F.C., which is the only anchor tenant of the Main Olympic Stadium, shrunk from 27,000 at its peak in 2004-2005 season (right after the Games) to 8,500 in the 2016-2017 season.

### **Positive Legacies — Venues Become Iconic and Successful Redevelopment of Surrounding Area**

Having twice experienced holding the opening and closing ceremonies as the Olympic stadium in 1932 and 1984, the Los Angeles Memorial Coliseum is also scheduled to accommodate the Olympic Games in 2028.<sup>22</sup> Constructed in 1923 and named a National Historical Landmark in 1984,<sup>23</sup> the Coliseum, owned by the Coliseum Commission, a government agency consisting of State of California, City of Los Angeles and County of Los Angeles, had minimized its maintenance costs in recent decades because the Commission had little money to upgrade the stadium. When the University of Southern California (USC) took a 98-year management lease right in 2013, the university stadium operations group needed to perform a lot of repair work at the beginning. Joseph Furin, General Manager of the Los Angeles Memorial Coliseum, said, “We have 50-, 60-, 70-, 80-, and 90-years old plumbing pipes and walls, and need a lot of repairs and maintenance. Our challenge with the 95-year-old building is to generate the revenue streams enough to continue the operation. To improve the facilities and make revenues, we promised to invest \$70 million by 2023 (which will be the centennial anniversary of the Coliseum). New construction is expected to begin in early 2018 with completion by August 2019.<sup>24</sup> The final renovation project costs are estimated to be \$270 million.”

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<sup>22</sup> The IOC agreed in July 2017 that Paris and Los Angeles would be the host cities for the future games in 2024 and 2028. Then, Los Angeles reached an agreement with the IOC in the same month to host the 2028 Olympic Games, while ceding the 2024 Games to rival Paris (Rosenblatt, 2017).

<sup>23</sup> Retrieved from <http://www.lacoliseum.com/index.php/coliseum-history/>

<sup>24</sup> The renovation plan of the Los Angeles Memorial Coliseum by 2023 is as follows: reducing the seating capacity from 93,607 to 77,500; replacing every seat; building a new structure that includes suites, club seats, a new concourse, and a new press box; restoring the iconic peristyle more closely resembling the stadium's original design; improving audio and video, including two large screens; installing new lighting; replacing the electrical and plumbing systems.

As a *white knight*, the reason that USC tried to manage the Coliseum, which lost anchor tenants in the 1990's except for the university's own college football team (USC Trojans), is not only because the Trojans have played at the Coliseum since 1923. Furin noted: "The Coliseum is recognizable around the world. We are part of exclusive club of venues to host the Olympics. The global recognition and prestige comes with the association of the Olympics. We try to maintain the legacy; for example, the Olympic Cauldron is used for signature moments like USC (American) football games and other special occasions even now." Furin implied sufficient likelihood of success. Inside the Coliseum, there are the symbolic Olympic rings placed over the main center entrance, and monumental stones on the wall, in which are carved the names of medalists of the 1932 and 1984 Los Angeles Olympic Games. We think the unique design and global recognition reminding visitors of the Olympic Games are strong weapons in preventing the Olympic venues from becoming white elephants.

In Beijing, the Bird's Nest still attracts a lot of tourists, because the stadium has the highest recognition as an Olympic stadium in the world, via architects' recognition and awards. Situated opposite the stadium is the "Water Cube" (Beijing National Aquatics Center), whose exterior looks like a bunch of large bubbles and is illuminated in blue at night. The twin structures symbolizing the 2008 Beijing Olympic Games combine as major attractions. The surrounding area of 11.59 square kilometers (7.2 square miles) was developed as the Beijing Olympic Park, including the Beijing National Indoor Stadium, the Olympic Green Convention Center, the Olympic Green Tennis Center, the Olympic Green Hockey Field, and other structures. The Beijing Municipal government has been building a new National Art Museum of China and the China National Arts and Crafts Museum to create a new cultural district in the Olympic Park (Winston, 2014). The purpose of the regeneration of this area is not only to strengthen the Olympic legacy but also to attract more people, although the Olympic Park already has huge crowds from morning to night.

Separately, Sydney Olympic Park, spread out over 640 hectares (1,581 acres), is also one of the most successful regenerations through the Olympic Games. Homebush Area, a suburb of west Sydney, which was polluted and neglected in 1970's, was totally transformed into a high-class residential district after the conversion of the Olympic Village and the development of the Olympic Park. These enhance the attraction to people of the Olympic venues.

The creation of this new precinct, comprising sporting, retail, commercial, residential, and recreational infrastructure and development, was always part of the legacy planning for the post-Games period. David Richmond, the former Director General of the Olympic Co-ordination Authority (OCA), which had the responsibilities for planning, building, and managing all the Olympic venues and villages for the 2000 Sydney Games, proudly stated, "Sydney's legacy is very powerful. We strongly focused on the legacy use and we worked to find operators and sporting society users for every venue from the beginning of the bid process."

When Thomas Bach, President of the IOC, visited ANZ Stadium (Olympic stadium) in April 2015, he said, "I would like to congratulate you on the wonderful legacy these Games are living. Sydney should be proud of this, and be aware that this Olympic Park and

the Sydney Olympic Games are still today setting a benchmark for organizers.”<sup>25</sup>

In our view, renewing the Olympic legacy year after year is very important. Following the example of Sydney’s experience, London also placed the Queen Elizabeth Olympic Park as the core of the urban regeneration of east London by utilizing the Olympic legacy. LLDC, a Mayoral development corporation formed in 2012, plays a central role. David Goldstone, CEO of LLDC stated, “Now the Olympic Park attracts nearly 6 million visitors per year. We are creating 14,000 new jobs in the next 15 years in this area, and 24,000 new homes, too. To bring a major university and cultural institutions in this area is the next stage of development. University College London and University of the Arts London are building a new campus here. We are trying to transform the unevenly developed east London area and to make a new opportunity for a major regeneration by using the Olympic Games.”

**Table 5** is the redevelopment situation surrounding Olympic stadiums. We believe that continuous and successful redevelopment of surrounding areas is an important factor in making Olympic venues more attractive over time.

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<sup>25</sup> Retrieved from [http://www.sopa.nsw.gov.au/resource\\_centre/park\\_news/2015\\_park\\_news2/president\\_of\\_international\\_olympic\\_committee\\_thomas\\_bach\\_visits\\_sydney\\_olympic\\_park\\_the\\_greatest\\_example\\_of\\_olympic\\_legacy](http://www.sopa.nsw.gov.au/resource_centre/park_news/2015_park_news2/president_of_international_olympic_committee_thomas_bach_visits_sydney_olympic_park_the_greatest_example_of_olympic_legacy)

**Table 5. Successful Redevelopment of Surrounding Area**

Stadium name/events	Situation of development in surrounding area
Olympiastadion, 1972 Munich Summer Olympics	Situated with indoor halls, swimming pool, observatory tower, tennis courts, lake etc. in the 300-hectares spacious Olympic Park. The former Olympic Village with high-rise apartments is now a residential area, adjoined to the Olympic Park. Four million registered visitors, who paid for events, tours or admissions fee for the tower, visit the park yearly.
The Olympic Stadium, 1976 Montreal Summer Olympics	Situated in the Olympic Park with sports center (swimming pool), observatory tower, tennis courts, etc. The former Olympic Village near the park became a residential area. The park attracts 1.2 million visitors a year because it hosts many kinds of free events in a promenade in front of the Olympic Stadium.
Los Angeles Memorial Coliseum, 1984 Los Angeles Summer Olympics	Situated in the Exposition Park with California Science Center, Natural History Museum, Rose Garden, etc. in downtown south of Los Angeles.
Seoul Olympic Stadium, 1988 Seoul Summer Olympics	Situated in Seoul Sports Complex with baseball stadium, indoor swimming pools, indoor gymnasiums, etc. in downtown southeast of Seoul. The Seoul Metropolitan government has an improvement plan of the sports complex and its facilities from 2019 to 2025.
Estadi Olímpic de Montjuïc Lluís Companys, 1992 Barcelona Summer Olympics	Situated with an indoor arena, swimming pool, the Olympic and Sports Museum, etc. in a historical but small area. Because of lack of mass transit services (only local bus is available, otherwise a 15 minutes hill-walking is necessary from metro station), a limited number of visitors come to the complex except event days.
Turner Field (until 2016), 1996 Atlanta Summer Olympics	Built alone in a deserted area of downtown Atlanta.
ANZ Stadium, 2000 Sydney Summer Olympics	Situated in the Sydney Olympic Park with indoor halls, swimming pool, tennis center, golf course, etc. Newington, the former Olympic Village about two kilometers from the park, became high-class residential area from the polluted land in 1970's. The park now plays host to a daily population of 22,000 workers, students, and residents.
Main Olympic Stadium, 2004 Athens Summer Olympics	Situated with indoor halls, aquatics center, velodrome, etc. in the Athens Olympic Sports Complex. However, many venues were abandoned right after the Olympic Games concluded. Few visitors drop by except to see the football matches held in the Main Olympic Stadium and to participate in the swimming classes after school at the aquatics center.
Beijing National Stadium (Bird's Nest), 2008 Beijing Summer Olympics	Situated with indoor arena, aquatics center "Water Cube," tennis center, convention center, etc. in the Beijing Olympic Park. The park is still one of the most popular tourist attractions in Beijing, and tens of thousands of tourists visit there every day. Beijing Municipal government plans to create a new cultural district in the park to attract more tourists.
London Stadium, 2012 London Summer Olympics	Situated with indoor arena, aquatics center, tennis center, velodrome, etc. in the Queen Elizabeth Olympic Park, which hosts 6 million visitors annually. East Village, the former Olympic Village next to the park, is being developing to host about 24,000 new homes. The park also plans to accommodate some future university campuses and cultural institutions in the near future.

Source: author research

## Okada-Greyser Model (Chart)

How likely are large Olympic venues like Olympic stadiums to become white elephants in the near future? We created a chart called the Okada-Greyser Model, to evaluate and assess the question, based on our findings (**See Table 6**). The chart comprises three parts: Effective reuse, Sustainability, and Legacy. We assigned 10 to 5 points to each category. Some are split into subcategories.

First, in the section on “Effective reuse,” we evaluate “attendance figures” and “number of operating days,” as we stated before, in terms of three types of demand: usage for sports and entertainment events (*Type 1*), usage via facility rental for conferences and meetings (*Type 2*), and usage for tours by visitors (*Type 3*). In terms of scoring, for the case of “over 24 times of capacity” in attendance and “over 41 days or more” in number of operating days, the full 10 points are given, but adjusted points are distributed in other

**Table 6. Okada-Greyser Model: An Approach for Evaluating Post-Games Use of Large Olympic Venues**

Scoring system									
Effective reuse	Attendance figures / year	Usage for sports and entertainment events	over 24 times of capacity	10 points	over 16 times and up to 24 times of capacity	3 points	over 6 times and up to 16 times of capacity	1 point	6 times of capacity or less
		Usage via facility rental for conferences and meetings			many	plus 3 points	some	plus 1 point	few or none
Number of operating days / year		Usage for tours			many	plus 3 points	some	plus 1 point	few or none
		Usage for sports and entertainment events	41 days or more	10 points	40 to 24 days	3 points	23 to 7 days	1 point	6 days or less
Usage for tours		Usage via facility rental for conferences and meetings			very often	plus 3 points	often	plus 1 point	rare or none
		Usage for tours			very often	plus 3 points	often	plus 1 point	rare or none
Renovation after the Olympic Games		Removal of specific equipment like a track	Yes	5 points	adoption of retractable seats	3 points			None
		Reducing capacity after the Olympic Games	Yes	5 points					No
Continuous re-investments after the Olympic Games			strategic and sufficient	10 points					minimum maintenance
		Mass transit	Metro/Subway/T rain	10 points	game-day shuttle bus	3 points			only local bus
Existing competitive venues with large capacity			Yes	minus 10 points					None
		Financial burden of past debt or psychological burden of lack of success	Yes	minus 10 points					No
Venue's unique design and global recognition			Yes	10 points					No
		Successful redevelopment of surrounding area	Yes	10 points					No
Scoring system: Points awarded based on performance on dimension									



cases according to frequency of utilization. If frequent usage of other types of demand (*Type 2* and *Type 3*) exists, 3 or 1 bonus points are given.

Second, in the section on “Sustainability,” we established three positive factors — refurbishment after the Olympic Games, continuous re-investment after the Olympic Games, and mass transit; and two negative factors — existing competitive venues with large capacity and a financial burden of past debt or its psychological burden. Here, 10 points and minus 10 points are given for positive and negative factors, respectively.

In terms of mass transit, we give “metro, subway or train” 10 points, but “game-day shuttle bus” service only 3 points because of its inconvenience of frequency and amount of transportation. “Local bus only” did not gain any points at all because we judged local bus service as not useful for mass transportation. “Refurbishment after the Olympic Games” consists of two subcategories — removal of specific equipment like a track and reducing seating capacity after the Olympic Games. Instead of the removal of a track, “adoption of retractable seats” as in the case of London Stadium is a positive initiative, but we provide an intermediate 3 points because of its high cost.

Finally, in the section on “Legacy,” there are two factors — a venue's unique design and global recognition and the successful redevelopment of the surrounding area.

This chart was created not to compare the calculated number with other venues, but to self-diagnose how likely a venue is to become a white elephant as time goes on. We think comparisons are inappropriate because host cities and countries of the Olympic Games are different in terms of population, culture, weather, history, economic scale, infrastructure development, and the business environments surrounding the stadiums, including demand for concerts and the competitive power of nearby venues. Moreover, each individual Olympic venue plan is tailor-made. Also, some venues and Games were more politically important to the host country/city, affecting initial (and sometimes subsequent) investment.

**Table 7** describes the results reflecting the data collected from each Olympic stadium from the 1972 Munich Games to the 2012 London Games (except the 1980 Moscow Games).

## Discussion

We assessed other possible factors affecting venue sustainability that could account for successful avoidance of potential white elephant status — presence of anchor tenants, population or economic scale in host cities or countries, and adoption of a private company as a venue operator or handover of ownership to a private company. However, we did not think these were dominant explanations across the spectrum of Olympic sites, even though they are meaningful in some instances. Let us explain.

Is the presence of anchor tenants a key factor in preventing Olympic venues from becoming white elephants? If so, the Western countries' venues, whose anchor tenants (typically clubs in football leagues) potentially draw huge numbers of spectators and have large economic scale, would have a big advantage of efficient post-Olympic use. On the other hand, the venues in Korea and China find it more difficult to attract major anchor tenants, because of a dearth of leagues with popular clubs drawing large crowds. Consequently the venues are more likely to become white elephants. However, the reality is

Stadium name/events	Attendance figures	Number of operating days	Removal of specific equipment like a track	Reducing capacity after the Olympic Games	Continuous re-investments after the Olympic Games	Mass transit	Existing competitive venues with large capacity	Financial burden of past debt or psychological burden of lack of success	Venue's unique design and global recognition	Successful redevelopment of surrounding area	Total
Olympiastadion, 1972 Munich Summer Olympics	5	7	0	0	0	10	0	0	0	10	32
The Olympic Stadium, 1976 Montreal Summer Olympics	2	9	5	0	0	10	0	0	0	10	36
Los Angeles Memorial Coliseum, 1984 Los Angeles Summer Olympics	5	3	5	0	10	3※1	-10	0	10	0	26
Seoul Olympic Stadium, 1988 Seoul Summer Olympics	2	6	0	0	0	10	-10	0	0	0	8
Estadi Olímpic de Montjuïc Lluís Companys, 1992 Barcelona Summer Olympics	1	10	0	0	0	0	-10	0	0	0	1
Turner Field (until 2016), 1996 Atlanta Summer Olympics	14	14	5	5	10	3	-10	0	0	0	41
ANZ Stadium, 2000 Sydney Summer Olympics	6	13	0	5	10	10	-10	0	0	10	44
Main Olympic Stadium, 2004 Athens Summer Olympics	1	1	0	0	0	10	-10	-10	0	0	-8
Beijing National Stadium (Bird's Nest), 2008 Beijing Summer Olympics	3	6	0	5	0	10	-10	0	10	10	34
London Stadium, 2012 London Summer Olympics	at least 13	at least 13	0	5	0	10	-10	0	0	10	at least 41

※ 1. Mass transportation service access to Los Angeles Memorial Coliseum is a light rail service, so the transportation capacity is restricted. We awarded 3 points, the same as for a game-day shuttle bus.

different from the assumption. In Barcelona and Athens, the Olympic stadiums lost or are scheduled to lose anchor tenants at a comparatively early time, accelerating their becoming white elephants. In Atlanta, Turner Field (former Olympic Stadium) could not retain the MLB Atlanta Braves after the initial lease of 20 years (**See Table 2 again**). According to the study by Siegfried and Zimbalist (2000), the effective useful economic life of a sports stadium appears to be about 30 years, a figure consistent with the average age of all U.S. stadiums in principal leagues that were replaced in the previous six years. Compared to normal sports venues, the economic life of Olympic stadiums is short.

However, with no anchor tenants, the Munich Olympic Stadium still attracted 625,000 people in 2016. The Bird's Nest and Water Cube in Beijing are struggling to find profitable events to fill them to their respective capacities of 80,000 and 6,000, but hundreds of thousands of visitors still pay for the sightseeing tour.

Some might say that the contract term with anchor tenants is decisive. However, professional sports clubs are private companies, which could possibly be unsuccessful in the future and could change ownership. Therefore, a long-term contract beyond 20 to 25 years is not common.<sup>26</sup>

Regarding population or economic scale in host cities or countries, why does Beijing, with more than 20 million population and being in the second largest economy in the world, have to struggle to draw big crowds to Bird's Nest with 80,000 seats? Why do such big cities like Los Angeles and London pay attention to the post-Games use of their Olympic stadiums carefully? No obvious (to us) correlations exist.

In terms of adoption of a private company as a venue operator or ownership handover to a private company, effective operation of venues certainly is expected everywhere. However, daily operation by an independent entity is unrelated to continuous investment in the venue, which is one of the key factors in venue sustainability.

Recall the main reason the Braves moved out of Turner Field (the former Olympic Stadium) to a new ballpark. It was because the Braves, as a venue operator (but not owner), no longer thought it made sense to invest in aging Turner Field with millions of dollars of their own, in a changed environment of sports economics and fan satisfaction.

Another example of ownership transfer took place in Sydney. The NSW government bought back the ownership of ANZ Stadium (the Olympic stadium) from Stadium Australia Group (SAG), a private company, to make it into a public facility, for 150 million Australian dollars (\$120 million) in 2016, 15 years ahead of the original schedule.<sup>27</sup> Stuart Ayres, Minister for Sports of the NSW government, explained: "No one wants to run a risk after entering the final 10 years of the lease. There is legal incentive for the owner that leases the facility. They don't have any long-term reasons to invest. They don't have any long-term reasons to continue to maintain the facility because it will be handed back to taxpayers (in the end). So, we made a decision to take the risk." In essence, the reason for ownership transfer was to protect ANZ Stadium from value deterioration. SAG had offered the return since 2013 after they made a contract with the new Perth Stadium in Perth for its

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<sup>26</sup> In London, E20 Stadium LLP, the owner of the London Stadium, made a 99-year contract with West Ham United F.C. Such lengthy contracts are not unusual in the U.K.

<sup>27</sup> In the original contract between the NSW government and Stadium Australia Group, the return of the ownership of ANZ Stadium was scheduled for 2031.

operation from 2018.

**Table 8** describes the public/private status of the ownership and operation for each Olympic stadium. Privatization is not always a preferred approach.

<b>Table 8. Current Status of Public/Private Ownership and Operation of Olympic Stadiums</b>		
<b>Stadium name/events</b>	<b>Ownership</b>	<b>Operator</b>
Olympiastadion, 1972 Munich Summer Olympics	public	public
The Olympic Stadium, 1976 Montreal Summer Olympics	public	public
Los Angeles Memorial Coliseum, 1984 Los Angeles Summer Olympics	public	public→private
Seoul Olympic Stadium, 1988 Seoul Summer Olympics	public	public
Estadi Olímpic de Montjuïc Lluís Companys, 1992 Barcelona Summer Olympics	public	public
Turner Field (until 2016), 1996 Atlanta Summer Olympics	public	private
ANZ Stadium, 2000 Sydney Summer Olympics	private→public	private
Main Olympic Stadium, 2004 Athens Summer Olympics	public	public
Beijing National Stadium (Bird's Nest), 2008 Beijing Summer Olympics	public	private <sup>1</sup> →public
London Stadium, 2012 London Summer Olympics	public	private
Source: author research		
1. State owned company, CITIC Group, transferred the concession right back to the Beijing Municipal government in 2009.		
<b>Note:</b> "Public" includes private companies which are owned by local governments.		

## Conclusion

The focus of this study is the question of how to prevent Olympic venues from becoming white elephants. From the research, it seems clear that for the sustainability of Olympic venues, it is necessary to maintain sufficient revenue streams to cover continuing large maintenance and operating costs as well as major renovation costs in the future. In particular, this is crucial for Olympic stadiums because the maintenance costs are dependent to some extent on capacity. The key to success is whether or not Olympic stadiums are more attractive and superior to existing or planned nearby competitive venues with a similar large capacity from the viewpoints of users — spectators, anchor tenants, and event promoters. The existence of nearby competing venues, which force the sharing of potential demand in hosting sports events and concerts, is obviously a negative factor. Olympic stadiums with a track left in place after the Olympic Games are inferior to competing stadiums in terms of fans watching rugby or football matches closer to the field

of play. Also, excessive capacity would definitely harm the atmosphere because of the conspicuous empty seats, and also lead to a boost in maintenance costs. Mass transit accessibility is an essential factor, too. Through our fieldwork, we found that with the exception of small VIP lounges, many Olympic stadiums have poor facilities for entertaining spectators, including video boards, extensive food services, advanced technology, etc. They are inferior to other modernized stadiums in terms of fan services. Thus, continuous re-investment in Olympic venues is very important.

Also, we learned that the lease contract between Olympic venues and anchor tenants made before or after the Games only occasionally played an important role in preventing them from becoming white elephants in the long term. We also found that both privatization of the ownership or operation of Olympic venues, and the population or economic scale in host cities or countries, are also not related to the sustainability of Olympic venues.

On the other hand, if Olympic stadiums have any advantage, it is based on the Olympic legacy. **Table 6** facilitates evaluation of how likely the venues are to become white elephants in the near future. It showed the advantages of being an Olympic stadium, for some stadiums at any rate, are the venue's unique design and global recognition along with the effect of successful redevelopment of the surrounding area.

In conclusion, we see eight key factors that prevent Olympic venues from becoming white elephants: removal of specific equipment like a track after the Olympic Games; reducing capacity after the Olympic Games; continuous selective meaningful re-investment after the Olympic Games; access to mass transit; the existence of no nearby competing venues with a large capacity; no financial burden of past debt or its accompanying psychological burden; the positive legacy from a venue's unique design and its global recognition; and an Olympics legacy from successful redevelopment of the surrounding area.

According to our findings, the Olympic Agenda through which the IOC has encouraged the reuse of pre-existing venues, even those outside the host cities, might affect the reduction of construction or refitting costs and total expenditures. Obviously, this is not a solution to prevent purpose-built Olympic venues from becoming white elephants. That is because the Agenda does not have a direct impact on the key factors for sustainability of Olympic venues. On the contrary, in terms of legacy, it might have negative effects. First, Olympic venues are more likely to be built in a relatively isolated area, and lose the effect of the redevelopment of the surrounding area; this was the case for Turner Field in Atlanta. Second, worldwide budget constraints provide little hope for the future construction of expensive Olympic venues with a unique design and eventual global recognition, like the Bird's Nest.

Further, if modified, we believe our chart to be applicable to other medium-sized Olympic venues like aquatics centers. In the case of medium-sized venues, there may be limited demand for facility rental for conferences and meetings or tours (*Type 2 & 3 demand*). Therefore, the ratings in these subcategories in two indices of the "effective reuse" part of the chart must be carefully considered. Medium-sized Olympic venues also might need renovation to reduce capacity after the Games because these venues are still large for post-Games purposes. In addition, the subcategories of "removal of specific equipment like a track" should be deleted.

Furthermore, we think this chart holds significant potential in being applicable for sports venues other than Olympic venues such as football stadiums, ballparks, and American football stadiums. Of course, in those cases, the scale of attendance figures and number of operating days in the category of “effective use” would be changed, depending on the kinds of sports and leagues involved.

## **Commentary on the 2016 Rio Olympics**

One year before the Olympic torch was lit, the organizers of the 2016 Rio Olympics promised that there would be “no white elephants” after the Games (Tovar, 2015). However, the promise had already been broken as early as 2017, and the city of Rio is rushing headlong toward becoming the “second Athens.” A year after the start of the Games, a lengthy review article by Kunti (2016) in *Firstpost*, an Indian newspaper, appeared with the title “One year on, the only legacy of Rio Olympics 2016 is abject dysfunction, not prosperity.”

During the period of the 2016 Olympic Games, the Maracanã Stadium was not only surrounded by people with joyous faces when Brazil’s national football team won a gold medal for the first time, but also when it hosted the memorable opening and closing ceremonies. The stadium had been opened in 1950 in order to host the 1950 FIFA World Cup, and was partially rebuilt at a cost of \$500 million in preparation for the 2014 World Cup, for which it hosted several matches including the final. However, as recently as spring 2017, it was impossible to imagine the glorious atmosphere from that time anymore. The playing field has been damaged by worms, the turf was partially missing, the wall and doors were smashed, 10% of the 78,000 seats have been torn out, and expensive equipment and precious memorabilia were looted because of unpaid 3 million reais (\$US 940,000) in utility bills. Since January 2017, the electric power has been shut off (Charner and Darlington, 2017).

Four venues in the Olympic Park in the west part of Rio — two arenas, the tennis center and the velodrome — have failed to attract new operators after the Olympic Games, and have been completely closed down on weekdays. The park has become a ghost town. Constructed as a temporary structure in the park with plans to be converted into two schools after the Games, the Olympic Aquatics Stadium with 14,997 seats was also ruined. The pool has been drained but smelled nasty, and the tapestries fixed to the outside fell down. Further, a \$20 million golf course constructed for the Rio Olympics has struggled to attract players. The 800,000 square meter (861,112 square foot) Olympic Village was scheduled to sell units as luxury housing, but few locals bought them (Burke, 2017). There appears to be no meaningful legacy so far.

Thanks to the 20-year lease contract with an anchor tenant, Botafogo F.C., in 2007 before the city of Rio won the bidding for the 2016 Olympic Games, the Olympic Stadium is still in active use for football. It has avoided becoming a white elephant despite a one-and-a-half year closure of the stadium because of a faulty roof (AP, 2013)<sup>28</sup> and the cutoff of water and electricity caused by \$225,000 of unpaid utility bills (Grenoble, 2016). Located in a suburb of Rio, the Olympic Stadium retained the track after the Games and is

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<sup>28</sup> The faulty roof was repaired for the 2016 Rio Olympic Games.

still isolated from other venue development. Getting continuous investment in the stadium from the owner, the city council of Rio, which has suffered from chronic budget deficits, has been hopeless. It is too early to evaluate the effective post-Games use of the Olympic Stadium. However, the prospect of future renewal of the contract with Botafogo — scheduled in 2027 — is murky.

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## About the Authors

### ISAO OKADA

**Isao Okada** is Professor at Osaka Seikei University (Japan), where he specializes in Sport Sociology and Business of Sports. Until March, 2018, he had worked for the Mainichi Newspapers since 1988. In his 30-year career at Mainichi, he served as a member of the editorial committee of the Economic Division in the Osaka Headquarters, the Sports editorial committee, and the deputy director of the arts and cultural division. His education includes a B.A. in law from Soka University (Japan) and a M.A. in International Economics and Finance from Chulalongkorn University (Thailand).

He received a Fulbright Journalist fellowship in the academic year of 2007-2008, spending time at the Reischauer Institute of Japanese Studies at Harvard University. While at Harvard, he worked with the Lee and Juliet Folger Fund Professor of History, Andrew Gordon, and Richard P. Chapman Professor (Marketing/Communications) Emeritus, of the Harvard Business School, Stephen Greyser. He also became an Abe Fellow in 2016-2017, whose program is provided by the Social Science Research Council (SSRC) and the Japan Foundation Center for Global Partnership (CGP). During his Abe Fellowship period, he was a visiting scholar at the Reischauer Institute of Japanese Studies at Harvard University again, and at Saïd Business School at University of Oxford. He visited ten of the twelve host cities of Summer Olympic Games since the 1972 Munich Games (with the exception of the 1980 Moscow Games and the 2016 Rio Games), and has researched how each city dealt with the problems of maintaining and utilizing facilities built for the Olympics.

He is a member of both the Japanese Association for Sports Management and the American Marketing Association. He has published, in Japanese, a book on “*Meja-rigu Naze Moukaru (Why Is the Major League Baseball So Profitable?)*” in 2010. He has collaborated with HBS Professor Stephen Greyser on several publications, including the HBS Working Paper “How Major League Baseball Clubs Have Commercialized Their Investment in Japanese Top Stars.”

## STEPHEN A. GREYSER

**Stephen A. Greyser** is Richard P. Chapman Professor (Marketing/Communications) Emeritus, of the Harvard Business School, where he specializes in corporate brand management, corporate communications, the business of sports, and nonprofit management. A graduate of Harvard College and Harvard Business School, he has been active in research and teaching at HBS since 1958. He was also an editor at the *Harvard Business Review* and later its Editorial Board Secretary and Board Chairman. He is responsible for 16 books, numerous journal articles, several special editions of journals, and over 300 published HBS case studies. Recent publications are *Revealing the Corporation* with John Balmer (on identity, reputation, corporate branding, etc.) and co-authored articles on “Monarchies as Corporate Brands,” Heritage Brands (a concept he co-created), “Aligning Identity and Strategy” (*CMR* lead article 2009), “Building and Maintaining Reputation Through Communications”, and book chapters on “Corporate Communication and the Corporate Persona” (2013) and the co-authored “The Trust Imperative” for the Page book *The New Era of the CCO* (2018). He wrote the award-winning “Corporate Brand Reputation and Brand Crisis Management” in his co-edited “Corporate Marketing and Identity,” a special 2009 issue of *Management Decision*. At HBS, he developed the Corporate Communications elective, creating over 40 cases and articles on issues management, corporate sponsorship, relations among business-media-publics, etc. His current research (co-authored) and most recent published articles are on the branding and identity of the Nobel Prize, including “The Identity of a Heritage Brand” (2015) and integrating the Nobel Prize’s identity and reputation (2016).

He created and teaches Harvard’s sports business course, is a member of the University’s Faculty Standing Committee on Athletics, has served on the Selection Committee for the Boston Red Sox Hall of Fame, and is on the board of The Sports Museum. He has authored numerous Business of Sports cases and articles. Among the latter are “Winners and Losers in the Olympics” (2006) and several on sponsorship, including (2012) on Sponsorship-Linked Internal Marketing (co-author) and (2016) on integrating event and sponsor resources (co-author). He also wrote an HBS case on Bank of America’s Sports Sponsorship and (2018) on combining sports brand-building with community philanthropy (co-author). He also published HBS faculty commentaries on the Sochi Olympics. Two co-authored HBS working papers (2013) examined NBC and the 2012 London Olympics and

how MLB clubs have commercialized their Japanese top stars. He has organized seminars on Fifty Years of Change in Intercollegiate Athletics, the Business of the Olympics, Sports in China, and “Fenway Park Comes to HBS,” on the business of Fenway Park for its 2012 Centennial. He co-led an NFL pre-Super Bowl 50 sponsorship event at Levi’s Stadium. His comments on the meaning of the Olympics for China were seen by tens of millions in China on CCTV after the 2008 Opening Ceremonies. At Doha GOALS 2012 he moderated a private conference session of global sports leaders (including Lord Coe) on improving the Olympics. He has recently written an analysis of “Nation-Branding via Big Sports.” He received the American Marketing Association’s 2010 Sports Marketing lifetime achievement award for “distinguished career contributions to the scientific understanding of sports business.”

In addition, he is co-author of a book on arts administration and editor of one on cultural policy. A 2015 HBS Working Paper examined business sponsorship of museums, a topic of his HBS case on MFA Boston.

He is past executive director of the Marketing Science Institute and the charter member of its Hall of Fame, and also an elected Fellow of the American Academy of Advertising for career contributions to the field. He received the Institute for Public Relations 2009 special award for “lifetime contributions to public relations education and research.” He twice was a public member of the National Advertising Review Board for U.S. advertising self-regulation. He has served on numerous corporate and nonprofit boards. He is a trustee of the Arthur W. Page Society, and he was the first academic trustee of the Advertising Research Foundation and of the Advertising Educational Foundation. He is a past national vice chairman of PBS and an overseer at WGBH and at the Museum of Fine Arts (Boston), where he was the founding chair of its Trustees Marketing Committee. He served as Alumni Association president of Boston Latin School, America’s oldest school (1635), and conducted its 350<sup>th</sup> and 375<sup>th</sup> Founder’s Day ceremonies as *magister eventuum*; he received its 2005 Distinguished Graduate Award. He is an Honorary Fellow (2012) of Brunel University. He is a member of the HBS Marketing and Social Enterprise faculties. In 2017, he served as Visiting Distinguished Professor at Boston University’s College of Communication.

Known as “the Cal Ripken of HBS,” in almost 50 years of teaching at Harvard he has never missed a class.