Legacy Creation Strategy in Olympic Cities
The path towards sustainable development?

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Abstract: Mega-event strategies and their impact on the development of host cities have drawn increasing interest as they have become part of wider city development strategies. However, many city leaders are challenged by a gigantic and complex task after the events: how to deal with the post-use of large event venues and facilities, and how to use the events as a catalyst to facilitate urban development. Mega-event strategies may provide a stimulus for wider urban investments and change. They help to provide host cities an engine for economic growth, facilitating city revitalisation and even urban physical restructuring, enhancing city image, and transforming a city into a globally competitive city. Where every host city expects to experience some form of short and long term impacts, the so-called 'legacy', it is, however, difficult for most host city organisers to think beyond the Games in any systematic fashion due to the pressing nature and planning complexities involved. Therefore, although the post-Games period is by far the longest period that stretches for decades after the Games to affect a host city, it is "clearly the least-planned for period". Due to time pressure, poor consideration of the long-term impact may make Olympic venues 'white elephants' after the Games have taken place, isolated in their city landscapes. These possible negative impacts raise the following questions: 1) What strategies can help a host city improve post-event usage of event-related facilities? 2) What strategies should a host city follow to facilitate post-event development in a more sustainable way? Based on the examination of legacy creation strategies of a number of Olympic host cities, with Beijing and London in particular, the research aims to identify what urban strategies lead to the improvement of the post-event usage of event-related facilities and long-term benefits for the city development of host cities.

1.   INTRODUCTION

The role of the Olympic Games as a catalyst for urban development and regeneration has been recognized in recent years (Chalkley and Essex, 1999; Gold and Gold, 2008). The mega event triggers the erection of landmarks and the development of infrastructure, and urban renewal processes frequently transform an urban space (Chalkley and Essex, 1999; Roche, 2000; Gold and Gold, 2008). The use of mega events, such as the Olympic Games, to reinvigorate sluggish or declining urban economies, arose from the late 1970s, when growing awareness of the pervasiveness of deindustrialization led city planners to take action to stimulate new sources of economic engines, investment, and employment (Gold and Gold, 2007, p.4) The role of the Olympic Games as a catalyst for urban development and regeneration was first recognized when Barcelona was preparing for its

Olympics in 1992. By hosting the Games, Barcelona was able to boost its economic growth, enhance its image, and transform itself into a globally competitive city. Following Barcelona's experience, Olympic host cities or potential candidate cities increasingly view the Olympics as a means of stimulating urban development processes, on the grounds that the erection of landmarks, the development of infrastructures, and urban renewal processes frequently transform an urban space (Gold and Gold, 2007).

Despite the stated significance host cities expect to achieve, researchers and policymakers have also become more aware of the downside of the catalyst effect embodied in it. The amount and size of the Olympic facilities have outgrown the needs of host cities. It is also difficult for the host city organisers to think beyond the Games in any systematic fashion due to the pressing nature and planning complexity. Therefore, although the post-Games period is by far the longest period that stretches for decades after the Games to affect a host city, it is "clearly the least-planned period" (Cashman, 1998).

The Olympics of the 21st century are increasingly held in emerging markets, rather than the traditional advanced economy. By 2016, the Olympics will have been held in China (Beijing), Russia (Sochi) and Brazil (Rio de Janeiro). In comparison with previous Olympic cities, the host cities in emerging economies face even higher costs of staging such sporting events. Often these host cities have limited existing sport infrastructure and inadequate urban infrastructure to accommodate sporting events at such a scale. Besides, these host cities may lack the technology and management expertise available to their counterparts in advanced economies (Ponomarenko and Plekhanov, 2014). Furthermore, they are constrained by limited investment, which results in difficult choices for the local leadership, between grand sport facilities or investment in social welfare of local inhabitants. If not done well, social conflict demonstrations will be the consequence. Therefore, host cities in emerging economies may face bigger challenges regarding how to balance effort and expected legacy than advanced economies.

To explore the Olympic development for host cities' transformation in an optimal way, one possible point of departure in this research might be to connect the Olympic development strategy closely to the long-term perspectives of the urban regeneration strategy of host cities. This research therefore raises the following questions: 1) What strategies can help a host city improve post-event usage of event-related facilities? 2) What strategies should a host city follow to facilitate post-event development in a more sustainable way? This paper is to examine the experiences of cities that have hosted the Summer Olympic Games, from the perspective of urban development. The paper begins with a brief review of past studies on sustainable development and Olympic legacy creation. This will be followed by characterizing the development strategies of previous host cities regarding the post-event legacy on different levels and tiers. The legacy creation strategies of Beijing and London will be highlighted in particular. Findings and discussion on how host cities use program definition, organisation structure and development processes to increase the leverage of a positive legacy are presented. Finally, concluding remarks highlight the contrasts and contradictions provoked by the strategy of using the Summer Olympic Games as a catalyst for stimulating positive legacy in host cities and, ultimately, sustainable development.

2. OLYMPIC LEGACY

The understanding of legacy cannot be separate from the historical revival and development of the modern Olympics. Preuss (2006, p.86) defines legacy as "all planned and unplanned positive and negative, intangible and tangible structures created by and for a sport event that remains for a longer time than the event

itself". Although there has been much discussion of legacy from the time of Coubertin, the term legacy remains a neglected area (Cashman, 1998). The International Olympic Committee (IOC) congress on legacy recognized different meanings of legacy across different cultures and in different languages, and therefore encouraged each host city to "reflect its own goal right from the beginning of the bidding process and to look at how the Games can be a catalyst for development" (IOC, 2010). Tangible aspects may include architecture, urban planning and sports infrastructure or economic achievements. Intangible aspects include the production of ideas, cultural values, education, voluntarism, experience and knowhow (IOC, 2002). When governments increasingly use mega-event strategies to include city development in a more comprehensive way, evaluation of the strategies and impacts should similarly adopt a more comprehensive approach, combining economic, social, environmental and other concerns (Chen et al., 2013). Following this integral approach, we highlight the legacy in terms of economic, spatial, environmental and social terms as follows.

Economic legacies
Among the various legacies that are listed in the literature, economic benefit is considered to be the prime motivation for those parties with an interest in hosting the Games. Studies often position host cities, especially western industrial cities, in the context of deindustrialization (Surborg et al., 2008). These cities choose to host the Olympic Games as a strategy for facilitating the growth of the service sector, creating new leisure and consumption spaces, and the creation of new business opportunities (Andranovich et al., 2001; Kasimati, 2003; Weed, 2008). Preuss (2004) and Gratton et al. (2006), for example, identify several important tangible economic aspects of holding the Games, such as improved employment possibilities in the construction industry, event revenue, event-related investment, real estate growth, (Olympic) tourism, and retail sector growth. Increasingly, host cities are gearing themselves towards more long-term economic impacts that are intended to sustain such cities after the Olympics have taken place.

Spatial legacies
Improving urban function and facilitating urban regeneration have become increasingly important drivers for host cities in recent years. The construction of Olympic venues and facilities have been seen as a process of forming urban spectacles through the creation of new, iconic stadiums and the construction of landmarks (Gotham, 2005; Coaffee and Johnson, 2007). At the urban level, the Olympic project is increasingly used to facilitate the creation of new urban centres with service, leisure, sport, business and residential functions. Other attempts include upgrading deprived neighbourhoods or transforming heavily polluted suburban areas. Sakai (2006) suggests that hosting mega-events speeds up governmental investment in the construction of venues, facilities and other forms of infrastructure over short time periods. One related issue is the re-branding and marketing of a city or location. Sports events such as the Olympic Games are a powerful tool for developing a city as a 'brand' (Waitt, 1999; Smith, 2001; Hall, 2001; Van den Berg et al. 2002; Surborg et al. 2008). The development of sports facilities may provide a city with important visual symbols that create memorable and positive images in tourists' minds (Smith, 2001, p.136). The global media and the general publicity surrounding the Games can be used to highlight improvements in a city's urban environment, transportation system and organisation, attracting both sports tourists and a more general audience, such as companies, investors and conference delegates. As a result, in both advanced economies and emerging economies, host cities invest heavily in public space. As will be explained in the next section, this has resulted in a form of comprehensive strategic planning that combines Olympic site development with the provision and improvement of infrastructure, tourism facilities, the creation of high-quality public spaces, tourism planning, and

general urban regeneration programmes, so as to maximise urban impact.

Environmental legacies

Environmental commitment has been added to the IOC Charters (IOC, 2005) in recent years. The increasing environmental concern has prompted the host cities to apply certain environmental principles on design, planning and implementation. In the case of Sydney, Beijing and London, host cities not only established green Olympics guidelines, but also experimented in the use of environmentally-friendly materials and technology during construction, and the recycling of water and renewable energy sources, thus limiting the environmental impact (Chen et al., 2013). Host cities generally created a greener image after the Games by cleaning up polluted soil, improving public transportation, enforcing stricter environmental control, adapting advanced technology in energy, water and air quality, and investing in green and open spaces (Chalkley & Essex, 1999). In specific cases, ecologically vulnerable areas and endangered species are protected.

Social legacies

The social impact of the Olympic Games was often neglected in the past, but has been increasingly paid attention to in recent host cities. Much of the social concern expressed in the literature is related to the effects of the Games on local communities. This is due to the fact that not only is community support an essential aspect of a successful mega-event, but also community groups tend to be more vulnerable to, and more affected by, Olympic-led development. Long and Sanderson (2001, pp.189) list a number of community benefits that are key to a smooth event, including: enhanced confidence and self-esteem, empowerment of disadvantaged groups, improving a community's capacity to take the initiative, increased social integration and co-operation, the promotion of a collective identity, and increased cohesion. Jones (2001) and Chen (2012) both suggest that hosting the Olympics should lead to wider participation in sport and greater community access to improved sports facilities in the long term. Olds (1998), meanwhile, draws attention to the importance of guaranteeing housing and tenant rights, particularly for low-income groups, through specific, target-oriented housing programmes.

However awe-inspiring during the Games, many of the venues created or modified for the Olympic Games later fall into disuse or are used sporadically without generating a profit, and many Olympic Parks remain largely empty and unused. Besides the underused facilities, host cities are often faced with substantial debts and the operating costs of Olympic venues in post-Games periods that take years to pay off. These problems may stem from inadequate consideration and planning of the post-event period because host cities are under enormous pressure to fulfil the requirements of the IOC before the delivery deadline. Since organizing the Games involves both opportunities and risks, it is important to seek strategies that are effective at implementing the cities' main motives, and thereby achieving tangible and intangible legacy aspects in the context of sustainable development. Section 3 addresses various legacy strategies explored in Olympic host cities. The legacy strategies are further investigated upon the transition of the general focus in Olympic legacy, strategies on how to improve post-event usage of event-related facilities, as well as how to combine Olympic plans with the city's strategic plan to ensure post-event development in a more sustainable way.

3.   OLYMPIC LEGACY STRATEGIES: PLANNING
THE GAMES AND BEYOND

3.1   Olympic-led regeneration

Earlier Olympic preparation emphasized mainly the construction of gigantic sport facilities and urban infrastructure but later evolved to take into account a much broader urban regeneration and urban restructuring program using Olympic Games as a catalyst. Host cities such as Berlin (1936), Rome (1960) and Tokyo (1964), reconstructed and expanded existing facilities, added new landmark constructions, and made more general infrastructural improvements to achieve urban upgrading. Some early attempts to combine Olympic preparation and urban restructuring programs to supply long-term demand were explored in Montreal (1976) and Seoul (1988). In Barcelona (1992), not only had the urban structure of Barcelona been modified through the development of four Olympic sites in four different types of locations (like low quality neighbourhood, declining industrial site and waterfront areas), but many earlier proposed programs, such as the creation of public open-space, the general improvement of public transportation, the opening of the city to the sea, the renovation of the city's cultural infrastructure, the landscaping of squares and commissioned new sculptures, were able to be realized which might otherwise have been long delayed or even cancelled (Chalkley and Essex, 1999; Marshall, 2000 and 2004; Monclú, 2007; Coaffee, 2007). Another Olympic host city that followed a similar scattered model is Athens (2004). 20 different locations were chosen for Olympic development. These sites were owned by the public sector and were predominantly greenfield sites. The focus of the developments was put on the historical values of ancient Greece and stressed even more the spatial improvement of infrastructure. Nevertheless, the intention to use different locations to facilitate the development of the whole city was not realised. Research indicated problems in the implementation process arising from conflicts between agencies as well as between different parties, time-consuming planning procedures and archaeological findings on the chosen sites (van Prooye, 2010). The scattered model was not adopted since Athens. Sydney, Beijing and London have all adopted a more concentrated model.

Since 2000, sustainability became a new focus for Olympic preparation. Both Sydney and Beijing adopted the IOC's environmental agenda and produced a 'Green Olympics'. In Sydney, Homebush, a derelict 760 hectare former industrial site that had housed the city abattoir and a rubbish dump, some 19 kilometres from the city centre, was cleaned up and regenerated to accommodate an urban core with sporting, entertainment, exhibition and commercial facilities, an Olympic village and a metropolitan park. Beijing, on the other hand, developed an Olympic plan attempting to integrate the main ideas from the pre-existing 10th Five-Year Plan, as well as the major urban regeneration projects and infrastructure projects proposed in the Beijing Master Plan (2004-2020). About 200 polluting factories inside Beijing's 'fourth ring' were moved out to Beijing's suburbs or even to neighbouring provincial cities (Chen 2012). In addition, Beijing cleaned up 40km of river, planted one million new trees and established 83km of greenbelt. To improve accessibility, Beijing completed two new Ring Roads, eight new subway lines and extended new airport terminals. In this way, Beijing could use OAP to realize both its urban restructuring strategy and the city's economic restructuring strategy, environmental improvement measures and its infrastructure development plan.

Legacy creation has become the newest focus for host cities in preparing for Olympics since London 2012. The Lower Lee Valley, a location surrounded by the most deprived neighbourhoods, was regenerated to become a new sub-centre of London. It is worth mentioning the way London incorporated legacy plan

in its existing master plan. The master plan of the whole area was the first vision for planners before the Olympic venues, and the facilities were incorporated in the site.

3.2   Planning Olympic sites and venues

A common problem occurring after the Olympic Games is the creation of the so-called "white elephants". Barney suggests that a "white elephant" is a facility that is built at great cost and after its initial use for a particular event becomes less and less used and therefore the cost of it out-weighs what it offers back to society. When host cities deliver venues or urban areas that are not, or are under-used, after the Games, they usually face major financial difficulties in maintaining the operational cost, as is in the case of Montreal, which found difficulties in connecting Olympic facilities with its surrounding urban functions.

There are several strategies that Olympic host cities explore to improve post-event usage of event-related facilities. First, most host cities attempt to reuse as much as possible the existing or temporary faculties. In Barcelona, the stadium of Montjuïc that was built in 1929 was renovated to become the main stage of the Olympic Games of 1992. In Athens, 75% of the venues already existed. Beijing utilized 32 venues, with only 12 newly-built venues. The remaining 20 venues were either renovated existing venues or temporary venues. In London only six venues were newly constructed. London made extensive use of temporary facilities. The basketball and hockey stadiums were dismantled after the Games so they could be reassembled and used in future competitions. Using existing venues does not necessarily reduce costs. In Athens, many existing venues required extensive renovation, which led to intensive investment. Nevertheless, such a strategy does not result in an over-supply in the post-event period.

Figure 1. Large residential districts were constructed around the Olympic Green and the Olympic Village (left) in Beijing before and after 2008, combined with other urban functions (right) (Source: Scout Real Estate (left), author (right))

Second, some host cities tend to locate newly built sport venues in areas that provide easy accessibility to potential local users. In Beijing, the Olympic village was transformed into luxury apartments for middle-class inhabitants and were sold out even before the Games started. Around the Olympic Green (where the Olympic Stadium Bird Nest, Beijing Aquatics Centre and Beijing National Indoor Stadium are located, see Figure 1) and the Olympic village, large residential districts were built before and after the Games that provided for a

large number of potential users. Besides the Olympic Green as the location for new venues, the rest of the Olympic facilities were located either in university campuses or in existing dense residential areas. In London, most of the venues were aiming at community needs in their post-usage plans. To further facilitate the post-event usage of the sports venues by local communities, it is essential to improve the accessibility of these venues with good public transportation such as metro line and bus systems.

Third, the Olympic villages and venues need to integrate other urban functions such as commercial, residential, retail, and other functions to ensure the Olympic sites are well used and attract inhabitants after the Games. An active sub-centre can gradually integrate with other urban fabrics in host cities and not stand alone after the Games. In Barcelona, the program of Parc de Mar - one of the four Olympic sites in the former harbour area included a commercial centre for leisure and retail, with a temporary function as the Olympic Port for sailing and surfing activities. After the Games the area was transformed into nightlife and restaurant functions, creating a mix of functions in the area. In Beijing, other urban functions were added surrounding the Olympic Green after the Games, including residential districts, parks, a conference centre, science museum, hotel, supermarkets, restaurant and cafes, bus and metro stops. Within the Olympic Green, public events are occasionally held using public space. Despite the popularity among Chinese tourists, walking around the Olympic Green is still not convenient due to the enormous scale of the venues and the oversized and massive fences that prevent the site from being integrated with other urban functions in the surrounding areas.

Fourth, Olympic venue design aims toward post-usage and the reduction of maintenance costs may include flexible concepts that address adaptation. Related design concepts like downsizing, flexibility and multifunctional design were integrated to facilitate the transformation process. The seat number in the London Bowl was reduced from 80,000 to 25,000 after the Game. The Olympic stadiums in Barcelona, Sydney and Beijing have all adopted similar measures to reduce the size of their venues. Furthermore, adopting advanced technology helps sports venues to be sustainable in the long-term. In the design and construction of Olympic venues in Sydney, the Olympic village was intended to be a model of eco-sensitive design, which was undertaken jointly with Greenpeace, incorporating solar power, water recycling and passive heating and cooling. A detailed set of 'green' guidelines that were intended to govern the design, layout and construction of Olympic facilities were published by the Sydney Organizing Committee. 90 Ecologically Sustainable Development (ESD) principles were included, with statements on recycling, renewable energy sources, public transport, derelict land and protection of threatened environments and endangered species (Chen and Spaans, 2010).

Fifth, securing post-event users is important for the sustainable usage of the sports venues. In Barcelona, the Olympic stadium has been used by a local soccer club. In Atlanta, the Olympic stadium was transformed to become the new baseball stadium for the Atlanta Braves. In Athens, the stadium managed to get users such as the Greece National Football Team, Olympiacos Piraeus, Panathinaikos and AEK Athens after the Games. Panathinaikos was the last user of the stadium, but have returned to their home grounds. Football is a sport that can pull large crowds besides the Olympic Games that is able to use the large capacity Louis Spiros Stadium has. Only athletics stadiums are not fully suitable for football due to the 400m track around the pitch, creating a large distance between the field and the spectators.

3.3   Olympic legacy planning

Although most ambitious Olympic hosts use the Games as an opportunity to bring forward long-term plans, accelerate the pace of change, or introduce new planning concepts, using major events to achieve long-term urban goals is a task

that has proven difficult to manage and implement. In most host cities, a main strategy for legacy planning is to integrate the Olympic plan as much as possible with host cities' master plans. In the city development strategies of Barcelona, its long-term and short-term goals were combined. Firstly, the most essential experience of Barcelona involves its emphasis on a long-term vision towards urban revitalisation and the continuity in city development strategies. Many plans and projects associated with the 1992 Olympics had already been generated in the 1960s and the 1970s – they were thus not the result of new proposals that had been developed purely for the Games (Chen et al., 2013). Among which, the experience of two host cities -Beijing and London - may shed some light on how legacy planning can be integrated in long term urban strategies.

The Olympic plan in Beijing (2008) was an attempt to integrate the main ideas from the pre-existing 10th Five-Year Plan as well as the major urban regeneration projects and infrastructure projects proposed in the Beijing Master Plan (2004–2020). Beijing used its Olympic Action Plan to realize its urban and economic restructuring strategies, environment improvement measures, and infrastructure development plans (Chen, 2012). During the preparations for the Olympics, about 200 polluting factories inside the fourth ring were moved out to Beijing's suburbs or even to neighbouring provincial cities. At the same time, eight new subways, two ring roads, and more than 200 kilometres of new highways that were part of a long-term plan for the city were realized within a decade. The transformed Olympic site, owing to its new sport venues, leisure facilities, retail and business space as well as a rapidly growing retail sector, has gradually grown into a new urban district in Beijing with a strong sport and culture identity.

In London's Olympic Games, creating legacy for its citizens after the Games was focussed very early in the process. The master plan was created to define what would be permanent in 2030 (Figure 2: right plan) and what should be temporary in 2012 (Figure 2: left plan) following the IOC's requirements. The middle Olympic Plan below shows how the urban area should look after the Games. In this way, the Games not only creates a framework for the area to develop within the expected urban vision, but also ensures a smooth transition for both permanent buildings and temporary buildings after the event. In addition, the London Legacy Development Corporation was established and given the mandate to continue developments on the Olympic site after the event. London could ensure the transition from the Olympic event to post-event period according to the demand of the time.

Figure 2. Olympic plan of London in 2012, 2014 and 2030 (source: Robouts 2013)

3.4   Olympic legacy strategies in comparison: Beijing vs London

In this section, the Olympic legacy strategies of Beijing and London are compared. In Table 1, the characteristics and adopted urban development strategies of two Olympic host cities – Beijing, from an emerging economy, and London, from an advanced economy - are summarised. Both cities have strongly emphasized the integration of Olympic plans with the cities' master plans and measures for venues and sites in the post-event era. At the urban level, both cities use the strategy to incorporate Olympic legacy plans into the wider master plans of the cities and use the games as a catalyst for urban transformation. Because Beijing is still busy transforming itself from an industrial city to a post-industrial city, it mainly focused on economic restructuring, moving out the manufacturing sector out of town and creating a new sub-urban centre focusing on retail and leisure. London, already in its post-industrial era, specifically focused on transforming the deprived Lower Lee Valley, which would not have had a chance to attract any investors without the Games. Similarly, Beijing spent mass investment on establishing a proper infrastructure system while for London the infrastructure system had already been developed, so only small modifications were necessary. While both cities invested heavily in environmental efforts, London drastically worked on the improvement measures decades before while Beijing faced serious environmental challenges. Although drastic measures helped bring blue sky to Beijing during the Games, temporary measures could not result in sustainable results after the Games. Both cities paid attention to social progress. Beijing advocated for sport participation by adding sports facilities in neighbourhoods. London, on the other hand, focused on young people and job creation for the surrounding neighbourhoods. At the Olympic site and venue level, both cities examined previous Olympic cities and explored similar strategies to take post-use into account. Nevertheless, the transformation plan has not led Beijing to find permanent tenants for the Olympic Stadium, while in London, the tenants were settled before the

transformation plan was implemented. In these cases, the Olympic sites and their surroundings have been improved with a mix of retail, sport, cultural, residential and infrastructure functions. Nevertheless, there are fragmentations when crossing over from one function to the other. This fragmentation may be caused by the enormous scale of individual buildings, not well designed public space, accessibility problems, or simply ownership barriers (for example, fences between two venues in the Olympic Green, or boundaries between different boroughs). Both cities have focused on the comprehensive development of the area to achieve a more sustainable outcome, therefore the chosen strategies inevitably cover economic, physical, environmental and social perspectives.

Table 1. Legacy creation strategies in Olympic host cities: Beijing and London

Comparison items	Beijing	London
Goal	International recognition; economic restructuring	Catalyse urban regeneration, create city spectacles
Initiative stakeholders	Central government, supported by local government	Non-profit organisation BOA, supported by Municipal government and mayor
Olympic plan	Concentrated model	Concentrated model
Size of Olympic park	1215 ha	227 ha
Location of Olympic park	Olympic Green is located north of Asian Game Village, north Beijing, relative well developed urban area adjacent to existing 1990 Asian Game facilities	Queen Elizabeth Olympic Park is located in Stratford, in the Lower Lee Valley, in East London.
Strategy at urban level		
Relation with city vision	Integrating Olympic plan with long-term master plan; Economic restructuring from manufacturing sector to service sector as the goal.	Help city expand to the east; [d] incorporate legacy plan in Olympic plan to define what is permanent and what is temporary; Regeneration of deprived districts. [c]
Infrastructure strategy	Massive investment in constructing new infrastructure, like ring roads, expressways and regional railways; eight new urban subway lines, Third Terminal of Beijing Capital International Airport.[a]	Develop Stratford International Railway Station; upgrade the Stratford Region (Metro), in combination with the development of private-invested 460,000 m^2 Westfield Stratford City Shopping Centre [d]
Environmental strategy	Permanent measure: moving about 2000 polluting factories out of city; planting 126 km rings of trees around Beijing; 30 million trees and rosebushes were planted in newly created public green space; using renewable energy, recycled water and other advanced environmental technology; [b] Drastic temporary measures including shutting down factories and construction sites in Beijing and neighboring cities and provinces; strong restriction of car use. [a]	Remediation of contaminated land; re-use or recycle demolished materials; the combination of biomass boiler, photovoltaics and small scale wind turbines as renewable energy; large-scale energy solution by developing a combined cooling heat and power (CCHP) system to serve the largest community in the UK.[b]
Social strategy	Sports facilities provided in all residential communities, along major roads and in residential	Improve skill level of local workforce; Olympic trust to offer young people and diverse

Comparison items	Beijing	London
	neighbourhoods. [a]	communities the opportunity to fully participate [d]
Governance strategy	Local government as leadership to ensure the efficiency and effectiveness of the process; Involving private sector through bidding, BOT and public–private partnership models [a]	Non-profit organisation BOA to ensure the legacy creation is focused from preparation to post-event transformation [c,d]
Focal point of strategy at site and venue level		
Venue planning strategy	Making use of 32 existing venues; building 12 new venues; locating most new venues on university campuses to ensure post-event use. [a]	Making use of existing 20 venues; make use of two temporary facilities; only building five new venues. [d]
Venue design strategy	Iconic design that drew world attention; using advanced sustainable technology in venue development; including post-event transformation plan in venue design; adopting design techniques include downsizing the venue capacities, designing multi-functional venues and establishing commercial plans for Olympic facilities. [a]	Taking into account clear post-event use strategy in design, such as recycling, dismantling, or down-sizing; create flexible stadium in terms of use; combine sport function. [c]
Post-use strategy	Using iconic design to attract large tourist group; creating mix-function area by adding new function in venues; selling apartments in Olympic village before the Games.	Securing permanent user/tenants; construction materials and chairs recycle to other venues and to Rio de Janeiro; selling apartments in Olympic village before the Games. [c]
Governance strategy	Involving private sectors and private investment [a]	Involving private sectors and private investment

Sources:
a) Chen 2012
b) Walker, Kopec and Elliott 2012
c) Kirchert and Reinders 2014
d) Rombouts 2013

4.   DISCUSSION AND CONCLUSION

"Sport is increasingly seen as a central strategy for cities to promote their image and global position, undertake regeneration, and tackle problems of social exclusion" (Herring, 2004). The Olympic Games are particularly attractive to cities due to the unique impact that the intense media interest associated with the Games can have on a global audience. Whilst much is known about the event's impact, there are considerable gaps in our knowledge about the event's strategies in creating post-event legacy. Can the efforts city make before the Games lead to sustainable development of cities? This paper attempts to fill the gap by examining what kinds of strategies host cities have explored that can lead to a comprehensive impact on buildings, districts and cities in the post-event era in terms of economic, spatial and social development. Host cities need to consider the sustainability of the facilities and projects of the host cities,

maintaining the quality of the facilities for the athletes, but avoiding any form of luxury and the investment that cannot be justified for the long-term benefit of local citizens. From the trend of Olympic-led regeneration, we can see host cities not only use the opportunity to improve existing facilities and construct new venues, but also upgrade the cities' urban structures by developing difficult urban locations, for example, brownfield or deprived neighbourhoods. These areas, if developed properly and connected with fast transportation systems, can become new urban sub-centres. The focus on sustainability, especially from an environmental perspective has been high on the IOC's agenda since 2000. The introduction of the Green Olympics concept has led to the adoption of advanced environmental technology in building design, construction, and planning and Olympic site management. From the perspective of Olympic site preparation and venue construction, host cities can enhance post-usage by introducing concepts that increase the flexibility of adaptation. Existing facilities should be made use of. The location of new facilities located next to potential users and easily accessible by public transportation increases the chance of re-use. It is important to search for permanent tenants for venues even before the Games to ensue post usage. Whether London has reduced unnecessary construction and reduced the chance of underused facilities needs to be further tested in the next decades.

From the perspective of legacy planning, it is not only important to consider how to combine all urban visions and (existing) planned urban projects, but also, more significantly, to have a vision regarding how the urban locations for Olympic preparation should be developed in the long-term. The long-term vision should include its economic function, spatial structure, as well as social improvement. In this way, both the Beijing and London cases are useful examples demonstrating how host cities can put sustainability and post-event legacy into preparation at the building, district and urban scales, and how a host city can develop its strategy in terms of spatial, economic and social development. It is clear that cities in emerging economies, as in the Beijing case, face higher costs of staging the Olympic Games due to the need to amend limited sport infrastructure, poor urban infrastructure, dreadful environmental situations and the pressure of excellence. Beijing's experience also shows that drastic measures can be implemented using the Games as a legitimate argument. While technology and management expertise can be borrowed from previous host cities, and lessons can be learned from other host cities, it is important for the local leadership, business society and local communities to jointly define the vision, means and expected legacy.

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