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# Have the Olympics outgrown cities? A longitudinal comparative analysis of the growth and planning of the Olympics and former host cities

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## ABSTRACT

This paper examines the growth of the Olympic Games against that of former host cities to understand whether this mega-event may have ‘outgrown’ its hosts. The increasing hosting requirements and governments’ expansive use of mega-events as tools for urban development would suggest that the ‘Olympic city’ – a term we use for describing the size of the Olympics as hosted in different cities over the decades – has grown at a faster rate than former host cities. The analysis contrasts historical indicators that capture the evolving size of planning for the event based on four dimensions – sport, spectators, marketing and costs – as well as the urban dimension of hosting experiences (venues and infrastructure) with city trajectories based on demographic and economic indicators. This is done through a longitudinal analysis of former Olympic host cities from the 1960s and 1970s and from which continuous longitudinal data are available: Tokyo, Munich, and Montreal. The findings indicate that the Olympic city has grown more strongly than these former host cities, although not uniformly across trajectories. This gives evidence for the need to review the size of mega-event impacts if they ought to continue to generate interest in hosting them in the future.

## KEYWORDS

Olympic games; Olympic urbanism; urban development; urban planning; longitudinal analysis

## Introduction

The Olympics have long been linked to spectacular urban development, extensive planning exercise, and modernization projects that have transformed host cities and societies both materially and symbolically.<sup>1</sup> As perhaps the quintessential showcase of globalized modernity, the Olympics can bestow national and international prestige while hosts reap a variety of potential benefits of event-led development.<sup>2</sup> Subsequently, competition for hosting rights has been fierce. Beneath the promise of spectacular gains, however, actual outcomes from hosting the Olympics typically fall short of the aspirations of the bidding phase.<sup>3</sup> Economic booms too often turn to busts.<sup>4</sup>

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<sup>1</sup>Essex and Chalkley, “Mega-sporting Events in Urban and Regional Policy”; Gold and Gold, *Olympic Cities*, 2017; Roche, “Mega-Events and Modernity Revisited.”

<sup>2</sup>Chalkley and Essex, “Urban Development through Hosting International Events”; Grix, *Leveraging Legacies from Sports Mega-Events*.

<sup>3</sup>Stewart and Rayner, “Planning Mega-Event Legacies.”

<sup>4</sup>Baade and Matheson, “Going for the Gold”; Flyvbjerg, Budzier, and Lunn, “Regression to the Tail”; Müller et al., “The Mega-Events Database”; Zimbalist, *Circus Maximus*.

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Social gains too often are fleeting and immaterial.<sup>5</sup> Interventions into the built environment too often lead to gentrifications, evictions, and white elephant infrastructures.<sup>6</sup>

The deleterious effects engendered by hosting are compounded by the fact that the world's top-tier mega-events have exhibited dramatic growth in roughly the last 50 years having grown more than 25-fold between 1964 and 2016.<sup>7</sup> As demonstrated and discussed in this paper, this trajectory in most respects far outpaces the growth of the cities that have hosted them. The question of Olympic gigantism is a source of longstanding discussion and debate, but it should not be separated from the broader context of urban growth in the past decades.<sup>8</sup> Indeed, understanding the relationship between the growth of the Games and the growth of cities is vital for creating less destructive and more sustainable mega-events.

The strategic use of mega-events to facilitate urban development is illustrative of two large processes affecting cities in the twentieth century, particularly those in the Global North. Firstly, as major cities grew into large metropolises the event was used to equip the required infrastructure. Initially, this focused on building sports infrastructure as physical activity became paramount to healthy lifestyles in modern urban societies. This is parallel to the creation and popularization of sports competitions and coincides with the early Modernity period between 1890s and the Second World War.<sup>9</sup> In the post-War period, the hosting of the Olympics was also pursued within a wider agenda of developing and/or rebuilding urban infrastructure that would include expanding road networks, transport systems, modernizing utilities infrastructure as well as communication systems, exemplified by the Olympic Games in Rome and Tokyo.<sup>10</sup> Secondly, within a period of profound changes in the international division of labour from the 1970s onwards, the event was used – as well as other sports and cultural events – as part of an agenda of transition from industrial to post-industrial local economies in Europe and North America, especially in the creation and revitalization of commercial, leisure and tourist areas.<sup>11</sup> Areas impacted by economic decline and neglect such as city centres, historical quarters, docklands, rail land among others, were increasingly targeted for transformation into post-modern areas of mixed uses. Mega-events were seen as instrumental not only for urban regeneration and redevelopment but also to city marketing as new spaces and iconic architecture were promoted to attract tourists and investment.

Against this backdrop of contested development and growth with relevant impact on the development trajectories of hosts, in this paper we aim to examine the following questions: given its extensive urban footprint, if the Olympic Games is to be thought of as a city, how has it evolved over the last 50 years? Moreover, how does it measure against the growth of actual cities, in particular some of the former host cities? Ultimately, we are interested to examine what such comparison can tell us about the sustainability of hosting mega-events and the extent to which current reform agendas are addressing fundamental issues that have generated scepticism, if not outright opposition to their contribution to urban development.

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<sup>5</sup>Hillier and Wanner, "The Psycho-Social Impact of the Olympics as Urban Festival"; Horne, "Assessing the Sociology of Sport"; Musikavanhu, Ladkin, and Sadd, "The Lasting Social Value of Mega Events."

<sup>6</sup>Alm et al., "Hosting Major Sports Events"; Davis, "International Events and Mass Evictions"; Gaffney, "Gentrifications in Pre-Olympic Rio de Janeiro"; Olds, "Urban Mega-Events, Evictions and Housing Rights."

<sup>7</sup>Müller et al., "Peak Event."

<sup>8</sup>Chappelet, "Managing the Size of the Olympic Games"; Kobierecka and Kobierecki, "The International Olympic Committee's Struggle against Growing Gigantism of the Olympic Games."

<sup>9</sup>Müller et al., "Peak Event."

<sup>10</sup>Chalkley and Essex, "Urban Development through Hosting International Events"; Gold and Gold, "Olympic Cities," 2008; Liao and Pitts, "A Brief Historical Review of Olympic Urbanization."

<sup>11</sup>Roche, "Mega-Events and Micro-Modernization."

There are at least four reasons why attention to these dynamics is important. First, the persistent growth of the Olympics results in fewer potential host cities, making the hosting process more uncertain for all parties, not least the International Olympic Committee (IOC). It is already clear that the Winter Olympics have outgrown former host cities such as Lake Placid and Lillehammer, which have taken to hosting much smaller events such as the World University Games and the Winter Youth Olympics – but nevertheless required hundreds of millions of dollars of investment to rehabilitate and expand ageing infrastructure.<sup>12</sup>

Second, host city populations will be increasingly reluctant to accept mega-events as they perceive the incompatible size difference between their city and the event. This is all the more salient due to the huge costs of hosting and is a crucial issue for former host cities such as Calgary, where residents voted against a nostalgia bid for the 2026 Winter Games.<sup>13</sup> In recent years, similar concerns among residents and policymakers alike cancelled potential bids in Stockholm, Rome, Oslo, Budapest, Boston, Krakow, Munich, Hamburg, and more.

Third, in order to accommodate the sprawling nature of mega-events, those cities still wanting to host will be required to provide more venue, transport, and accommodation infrastructures. These investments increase the financial burden and risk, which already have a tendency to be passed onto the public.<sup>14</sup> The realities of oversized Games periodically spark debate about splitting the Olympics into smaller annual events or moving to a model of regional hosting.<sup>15</sup> Despite important reforms to Olympic planning and delivery, however, much of the problematic status quo remains intact.<sup>16</sup>

Finally, today's policymakers came of age in earlier decades that featured much smaller versions of the Olympics. This gap between nostalgia and present realities can skew the decision-making process regarding the risks and benefits of hosting. A clear example of this time lag problem can be seen in the bidding for Los Angeles 2024/2028, where Mayor Eric Garcetti and Bid Chairman Casey Wasserman both cited their boyhood memories of LA84 as the inspiration for their city's new bid, proudly referring to themselves as 'the 1984 boys' – a moniker that even made it to the IOC's Evaluation Commission.<sup>17</sup> An obvious danger here is that policy decisions should not be made based on romanticized feelings, particularly when the Olympics has grown substantially since then 1984.

This paper investigates vital questions of Olympic size, tracing the historical growth of planning for the Games via the conceptual rubric of the 'Olympic city,' a term denoting an archetypal host as measured along a range of event – and city-specific dimensions. This is then compared to the growth trajectories of three former host cities in different continents for which the Olympics were a transformative event: Tokyo (host of the 1964 and 2020 Games), Munich (1972), and Montreal (1976). The paper builds this model via historical indicators that capture event dimensions, urban interventions, and city measurements for demographic and economic performance. These include data from the mega-event growth index, or MEGIX, comprising four dimensions to make sense of mega-event size: sports (accredited athletes and personnel), spectator (attendance to competitions), marketing (sponsorship and marketing revenue) and costs (organizational and

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<sup>12</sup>Lynn, "Lake Placid's Olympic Revival"; Zaccardi, "Lillehammer Rules out 2026 Winter Olympic Bid."

<sup>13</sup>Markusoff, "How Calgary Outgrew the Olympic Dream."

<sup>14</sup>Müller, "The Mega-Event Syndrome."

<sup>15</sup>Ahl, "Time to Split up the Olympic Summer Games?"; Doig, "The Tantalizing Dream of a "Regional" Olympics."

<sup>16</sup>Wolfe, "The Juggernaut Endures."

<sup>17</sup>Livingstone, "1984 Boys" Considered LA 2024 Strength by IOC Evaluation Commission After First Day of Meetings; Reid, "The 1984 Boys."

venue infrastructural costs).<sup>18</sup> These dimensions give shape to the understanding of the growth of the Olympic city over time. MEGIX data is then compounded with investigations of the urban implications of hosting, which includes tracing a basket of five key Olympic venues over time (Olympic stadium, Olympic Village, aquatics centre, velodrome, and multi-sports arena). Finally, we contrast the rate of growth in these dimensions to related urban indicators such as: population size, tourist arrivals, tax revenues and city budgets. These are examined longitudinally across the three former host cities to which time series were available. In this way, the paper determines that Olympic growth has outpaced the growth of these former host cities, though not uniformly across all dimensions of the model.

Exploring the dynamics between the historical growth of the Olympic Games and the cities that have served as their hosts allows for a more nuanced understanding of the difficulties that hamper progress toward more sustainable mega-events for both cities and event owners. The paper suggests that the remarkable growth trajectory of the Olympic city is not sustainable, and that accurate tracing of the various dimensions of mega-event size can enable planners, policymakers, and event owners alike to organize smaller, more sustainable Games.

### Charting the Olympic city

A defining feature in the revival of the Olympic Games since 1896 has been the organization of the event in a different location every four years, which for Gold & Gold ‘placed the relationship between the IOC and its host cities at the centre of the Olympic project’.<sup>19</sup> While the IOC holds the franchise of the Olympics it depends on the interest of external parties in hosting the event in a particular destination. Historically, the IOC set the general and technical requirements for the hosting of the Games alongside key partners (e.g. International Sports Federations, IFs) while the promoters of a candidate city project situated such demands within their own (political, economic, cultural, urban) agendas and in participation of their respective National Olympic Committee (but recent reforms have sought to review the relationship between the IOC and host cities as discussed later in the paper). Therefore, plans for hosting the Olympic Games in a particular city are underpinned by different demands, expectations, potential conflicts and power relations among stakeholders according to the context in which the hosting rights are awarded – historically via a bidding system – or granted – as in recent decisions.

Analyses of the initial editions of the Olympic Games noted that the event was quite modest in size and did not lead to the significant construction of venues or supporting infrastructure.<sup>20</sup> For Pierre de Coubertin, the founder of the modern Olympic Games, the ‘first thing was to revive them, and the second to refine them’.<sup>21</sup> In fact, between 1909 and 1910, Coubertin articulated a vision of the ideal setting for the Olympics including comments on the aesthetic character, organizational features and symbolic values. Drawing on interpretations of Ancient Olympia and reflecting on late nineteenth century European cities, Coubertin advocated for the ‘Olympic city’ to present a ‘grandiose and dignified ensemble’, one that clearly indicated the ‘athletic and artistic nature’ of the site, and one that ‘seek to harmonize with the surrounding landscape and to take advantage

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<sup>18</sup>Müller et al., “Peak Event.”

<sup>19</sup>Gold and Gold, *Olympic Cities*, 2017, 5.

<sup>20</sup>Chalkley and Essex, “Urban Development through Hosting International Events”; Liao and Pitts, “A Brief Historical Review of Olympic Urbanization.”

<sup>21</sup>Coubertin, “Une Olympie Moderne. IV. Les Qualifiés,” 10.

of it'.<sup>22</sup> Ideally, for Coubertin, all the main buildings of the Olympic city – venues, spectator facilities, ceremonial and administrative – should be in proximity but not too crowded as in ancient sites or disproportionately spread out. He also advocated for the number of athletes to be somewhere between 1,000–1,700 and the main stadium to cater to a maximum of 10,000 spectators thus avoiding large and compact crowds 'unpleasant to the eye' that 'destroy the aesthetics of the setting'.<sup>23</sup> Coubertin's ordered and harmonic vision reflected the values and the utopianism of thinkers of his time, such as John Ruskin, who envisioned ideal societies against the ills of industrialization.<sup>24</sup>

Some of the initial Olympic Games almost did not happen due to financial implications (Athens 1896) or natural disasters (the Rome 1908 Games were cancelled due to the eruption of Mount Vesuvius and transferred to London). For some years, Coubertin championed the idea of a permanent Olympic site.<sup>25</sup> This vision was put in practice, at least partially, when the IOC together with the College of Architecture of Paris called an architectural competition for a model of 'modern Olympia' in 1910.<sup>26</sup> The proposal, won by two Lausanne-based architects, situated the Olympic venues on the banks of Lake Lemman and ascending to the slopes of nearby hills with the main stadium situated higher on top. An 'opulent and triumphant plan', as the president of the jury recognized, 'capable of stimulating new ideas and skills in young architects for future proposals. This model Olympic city had a 'majestic backdrop to an unforgettable location'.<sup>27</sup> Although this model city did not seem to have had significant impact over host cities plans in the decades that followed, the IOC has ever since directly shaped the growth of the Olympic city by way of setting hosting requirements that increased in number and complexity over the following decades.

Requirements to potential host cities were formally expressed through the Olympic Charter – and in recent decades in related manuals and questionnaires to applicant cities – the ultimate set of principles, rules and by-laws governing the 'organisation, action and operation of the Olympic Movement and sets forth the conditions for the celebration of the Olympic Games'.<sup>28</sup> While less aesthetically prescriptive as in the vision of the 'Modern Olympia', we can identify five key foundations to the Olympic city and examine how they evolved through time.

First, there is the very definition of the scale of the location hosting the Olympic competitions. Since the first modern Games emphasis was given to all competitions to be held in the same city and preferably in close proximity unless there were geographical circumstances for otherwise, as in the case of water-based sports.<sup>29</sup> The 1921 Charter stressed that the 'designated city can never share its privilege with another [city]'.<sup>30</sup> The privileging of the local scale was reaffirmed in the 1955 Olympic Charter asserting that 'The honour of holding the Olympic Games is entrusted to a city and not to a country' and that one of the intangible benefits of this designation was that 'the fortunate city becomes the capital of the world of sports and the centre of attention of all sportsmen of every country'.<sup>31</sup> The 1966 charter added that 'when staged properly', the Games 'contribute priceless prestige to the host city'.<sup>32</sup> Facing the prospect of diminished numbers of candidate cities during the 1970s, the IOC implemented a series of reforms, which included 'broadening the principle

<sup>22</sup>Coubertin, "Une Olympie Moderne. I. Le Cadre," 155–6.

<sup>23</sup>Coubertin, "Une Olympie Moderne. IV. Les Qualifiés," 13; Coubertin, "Une Olympie Moderne. V. Les Spectateurs," 28.

<sup>24</sup>Gafner, *The International Olympic Committee One Hundred Years: 1894–1994*, Vol. I, 99.

<sup>25</sup>Gafner, *The International Olympic Committee One Hundred Years: 1894–1994*, Vol. I, 145–146.

<sup>26</sup>Müller, *One Hundred Years of Olympic Congresses 1894–1994*.

<sup>27</sup>Trelat, "Rapport Sur Le Concours d'Architecture," 118–120.

<sup>28</sup>IOC, *Olympic Charter 2023*, 6.

<sup>29</sup>IOC, *Règlements et Protocole*

<sup>30</sup>IOC, *Règlements et Protocole*, 8.

<sup>31</sup>IOC, *The Olympic Games: Charter, Rules and Regulations, General Information*, 5, 30.

<sup>32</sup>IOC, *The Olympic Games: Fundamental Principles*, 113.



of the Olympic city to an ‘Olympic Zone’ which would enable a host city to associate a region with the organisation of the Games’.<sup>33</sup> The 1980 charter presented the possibility for the Olympic city to ‘share its privilege with other cities or sites in the same country upon agreement of the IOC’.<sup>34</sup> Reflections of this were seen in the organization of some competitions in Southern California during the 1984 Los Angeles Games and in Catalunya during the 1992 Barcelona Games. This position was once again reviewed later on the face of escalating budget costs and environmental concerns. In 2014 the charter indicated that competitions ‘must, in principle, take place in the host city’ but that at the discretion of the IOC and in exceptional circumstances, it could even take place ‘outside the host country, notably for reasons of geography and sustainability’.<sup>35</sup> As we will discuss in later sections, a result of the IOC current reforms is to overcome tight geographical boundaries to consider ‘where deemed appropriate, ... [to] elect several cities, or other entities, such as regions, states or countries, as host of the Olympic Games’.<sup>36</sup>

Second, the main features of the Olympic city are obviously the venues where competitions will be held. Host cities must provide the facilities for the programme established by the IOC and according to the technical requirements set by the IFs at their own cost. The first modern Games in Athens 1896 had 9 sports, 10 disciplines and 43 events while the Tokyo 2020 Games had 33 sports, 50 disciplines and 339 events. Chalkley and Essex recognized that between 1908 and 1932, purpose-built venues started to become the norm while between 1936 and 1956 sports facilities were used as ‘flag-ship’ symbols of the host society’.<sup>37</sup> Since then, Olympic-related building activity has tended to spearhead wider urban development and regeneration programmes beyond what is required for the staging of the event.<sup>38</sup> While purpose-built venues can modernize the existing sports infrastructure, the evidence of little-used ‘white elephants’ has become a serious point of criticism. Recent editions as London 2012 and Rio 2016 designed venues that could be reduced in capacity after the event as well as temporary arenas. A related impact of the continuous addition of more competitions and the need to build or refurbish more and highly specialized venues, as well as providing training grounds, was the time allocated for the preparatory works. The 1949 Olympic Charter stated that the IOC would decide the host city of the Games at least three years in advance.<sup>39</sup> This would increase to five years in 1955, six years in 1962 and seven years from 1987.<sup>40</sup> As Flyvbjerg et al have demonstrated, the hosting of the Olympic Games has become the most complex and expensive type of megaproject, marked by high-cost overruns and recently the focus of social discontent in host cities.<sup>41</sup> As a result of recent reforms, the IOC has announced future hosts some 11 years in advance as is the case of the 2028 Los Angeles Games and the 2032 Brisbane Games.

Third, the increase in the programme has been accompanied by rising numbers of competing athletes (from 241 in Athens 1896–11,420 in Tokyo 2020), officials, judges, referees, IOC members and media personnel, all requiring accommodation for the duration of the Games. While the initial editions saw athletes accommodated in hotels, camps or barracks, by 1924 the Olympic Charter stipulated that the Organizing Committee of the related event had to ‘provide the athletes with

<sup>33</sup>Gafner, *The International Olympic Committee One Hundred Years: 1894–1994*, Vol. III, 80–81.

<sup>34</sup>IOC, *Olympic Charter: 1980: Provisional*, 21.

<sup>35</sup>IOC, *Olympic Charter: In force as from 8 December 2014*, 18.

<sup>36</sup>IOC, *Olympic Charter: In force as from 26 June 2019*, 69.

<sup>37</sup>Chalkley and Essex, “Urban Development through Hosting International Events,” 374.

<sup>38</sup>Smith, *Events and Urban Regeneration*.

<sup>39</sup>IOC, *Le Comité International Olympique et les Jeux Olympiques modernes*, 9.

<sup>40</sup>IOC, *Conditions à Remplir; The Olympic Games: fundamental principles; Olympic Charter: 1987*.

<sup>41</sup>Flyvbjerg, Budzier, and Lunn, “Regression to the Tail”; see also Müller et al., “Peak Event.”

accommodation, bedding and food, at a fixed price which must be fixed in advance per head per day'.<sup>42</sup> Each participating nation would cover their own costs, which in the following decades would be either fixed at a price approved by the IOC or required to be 'kept as low as possible'.<sup>43</sup> An Olympic Village for 2,000 people was built for the Los Angeles 1932 Games and the concept became a benchmark in the following editions. From the 1949 Olympic Charter onward, the IOC would officially require for an Olympic Village to be built so that 'athletes of the five continents live side by side ... without discrimination in race, colour or religion ... in perfect harmony despite the keenness of the competitions of the Games'.<sup>44</sup> The accommodation of an ever-increasing number of athletes concentrated in the same site has become a challenging project for hosts and in most events the public sector partnered with – often directly subsidising if not bailing out – the private sector in delivering a complex of buildings leading to new neighbourhoods (as in Barcelona and London) as well as gated communities (after Rio 2016), most often oriented toward private luxury housing.

Fourth, tourists also became a point of discussion. A questionnaire to applicant cities was first presented in the 1955 Charter where it mentioned accommodation required for visitors. It asked about the types of accommodation that would be made available while also requesting for 'reasonable rates' to be established for hotel rooms to 'avoid exploitation of visitors'.<sup>45</sup> Typical requirements in the recent past are for the Olympic Village to accommodate 15,000 athletes and officials and a minimum of 40,000 hotel rooms for visitors (Baade and Matheson, 2016). A related impact is that as increasing numbers of spectators and tourists grew, the complexity of connecting sites and transporting people also increased. The distance between Olympic sites has been mentioned since Coubertin's architectural competition for a Modern Olympia. Olympic Charters from 1946 indicated that all events should take place at the Olympic stadium or in the neighbourhood, be easily accessible and 'grouped together wherever possible and that the Olympic Village should be 'conveniently located to the stadium, other facilities and practice fields'.<sup>46</sup> Transportation started to feature in the questionnaire for candidate cities since the 1974 Olympic Charter asking for 'comprehensive air and rail transportation facilities' to be demonstrated and for the sufficient 'provision of cars and buses' to be guaranteed.<sup>47</sup>

Finally, we can also include the infrastructure of the Olympic city with particular attention to broadcasting. As communication technology evolved so did the requirements to provide the necessary infrastructure for the coverage of the event. The 1966 Olympic Charter was the first to request for 'adequate arrangements' to be made for the 'press, television and the radio' with the following update rather requesting for installations to be made at 'the disposal' of the IOC with 'exclusive rights for filming and broadcasting'.<sup>48</sup> It was only in the questionnaire for applicant cities within the 1976 Olympic Charter that a more detailed set of requirements would be presented asking for studios, office space, equipment, circuits, laboratories and stations. This infrastructure would consolidate with the specification for a media hub containing an International Broadcast Centre and a Main Press Centre to be provided from 1978.

The features discussed in the preceding paragraphs constitute the foundations of the Olympic city, which we can chart across the decades. Other important aspects such as security, medical services, or environmental control to name a few, also require the attention of prospective candidates.

<sup>42</sup>IOC, *Statuts du Comité International Olympique*, 21.

<sup>43</sup>IOC, *The Olympic Games: Charter, Rules and Regulations, General Information*, 31–32.

<sup>44</sup>IOC, *The International Olympic Committee and the Modern Olympic Games*.

<sup>45</sup>IOC, *Conditions à Remplir*

<sup>46</sup>IOC, *Olympic Rules*, 10; IOC, *Conditions à Remplir*, 27.

<sup>47</sup>IOC, *Olympic Rules and Regulations: Rules Approved in Varna 1973*, 55.

<sup>48</sup>IOC, "The Olympic Games: Fundamental Principles," 115; IOC, *Olympic Rules and Regulations: Rules Approved in Varna 1973*, 52.



Nevertheless, it was only in recent decades that these themes have come to levels of specification and are beyond the scope of the analysis in this paper. As we turn the attention to discrete experiences of host cities in different continents since the 1960s and 1970s, we can deepen our understanding of the growth rate of the Olympic city vis-a-vis actual hosting cities.

## Research design: dimensions of the Olympic city

To be able to compare the growth of the notional Olympic city, with the actual size of the Olympics and of host cities over time, we looked for a relatively complete set of comparable indicators. For the Olympic Games, Müller et al. published a comprehensive dataset of size indicators since the 1960s until 2016, compiled in a Mega-Event Growth Index (MEGIX).<sup>49</sup> MEGIX incorporates five dimensions: sports, media, spectators, marketing and costs, and their article offers a detailed analysis of the expansion of the Olympics over time. These dimensions reflect that mega-events can be large in different ways:

- size of the sporting competition, i.e. the number of athletes, events and participating countries (sports dimension)
- extent of media coverage and broadcasting (media dimension)
- number of spectators and the income from ticket sales (spectator dimension)
- revenue from sponsorship and broadcasting (marketing dimension)
- costs of organization and of venues for the event (costs dimension)

We did not consider the media dimension in this paper as it did not align with the aim to compare the growth of the Olympics with that of host cities over time.

For host cities, we looked for comparable indicators to match them with the remaining four MEGIX dimensions. These indicators needed to be available in a reasonably complete time series since 1960 and across different host cities in the world, which limited us to four basic indicators: population, city budget, tax revenue and tourist arrivals. These indicators were matched to the MEGIX as shown in [Table 1](#). All indicators included in the paper are publicly available online or in the archives of the national or municipal statistical office of the respective country and city.

In the next step, we selected three host cities to collect data from. We decided to choose cities that hosted the Summer Olympics from 1964 onwards, as the Olympics started their strong growth in size at that time, with the development of live satellite broadcasting and the increasing effect of urban development linked to these events.<sup>50</sup> This is also the earliest period for which MEGIX data is available. We checked data availability for Tokyo (host of the 1964 Games), Mexico City (1968) and Munich (1972), but the absence of time series data for Mexico City made us choose Montreal (1976) instead.

We collected data for the four indicators from these cities. While some data were available online, others required in-person visits to archives or extensive exchanges over the telephone or by email to obtain digitized documents. Data was then processed. First, missing values for the city variables were imputed based on the compound annual growth rate of the values available prior to the years where data was missing. Finally, we had to deal with the financial data for Munich that includes both Deutsche Mark and Euro for relevant periods. To allow comparability over the years, we converted these units to World Bank data for local currency units relative to the U.S.

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<sup>49</sup>Müller et al., "Peak Event."

<sup>50</sup>Essex and Chalkley, "Olympic Games"; Gold and Gold, "Olympic Cities," 2008.

**Table 1.** Data availability for time series data.

Olympic city dimensions	Population	Tourist arrivals	City budget	Tax revenue
Definition	Data at the city level for Tokyo and Munich. For Montreal, at the metropolitan area level.	Data at the national level as data for Tokyo is only recorded since 2011. For Munich and Montreal on the city level.	Data at the city level for all three cities.	Data at the city level for all three cities.
Tokyo	1964–2016	2011–2016	1964–2016	1961–1963, 1966–2016
Munich	1964–2016	1967–2001, 2006–2016	1960 <sup>52</sup> –2016	1961, 1964–1995, <sup>53</sup> 1996–2016
Montreal	1964 <sup>51</sup> –2016	1992–2016	1964–2016	1964–2016
<b>Comparable MEGIX indicator</b>	<b>Number of accreditations</b>	<b>Number of spectators</b>	<b>Costs (cost of venues, cost of organization)</b>	<b>Revenue (ticket sales, sponsorship and broadcasting revenue)</b>
Olympic Games	1964–2016	1964–2016 (value imputed for the 1968 Summer Olympics)	1964–2016	1964–2016

dollar. Financial data were deflated with World Bank data to remove inflation and obtain real (rather than nominal) growth rates. The final dataset contained a relatively complete series for the majority of indicators, although with some gaps for some indicators, as displayed in Table 1. The dataset is available for download on the Harvard Dataverse.<sup>54</sup>

In all three cities, we also tracked the subsequent use of five key Olympic venues – Olympic stadium, swimming pool, multipurpose hall, velodrome, Olympic village – to clarify their current status and condition (Table 2). It is particularly useful to examine Tokyo's example, as it hosted the Summer Olympics twice, enabling us to discern which venues were repurposed from the 1964 edition. We also analysed whether these venues were mentioned in the selected cities more recently bids, where applicable. Overall, this data enables us to assess whether the venues required by the IOC in the 1960s and 1970s are still relevant for the latest edition of the Games, or whether they have become obsolete due to the ever-increasing size and demands of the Games and other developments in these cities.

In the final step, we plotted the two matched variables in a series of four graphs to analyse the evolution in Tokyo, Montreal and Munich against that of the Olympic city. To compare across different currencies and bases, we indexed all variables at 100 for the year 2016. Given that the Olympic Games occur once every four years, and most generic variables are collected on an annual basis, we computed the compound annual growth rate for the four MEGIX dimensions for the years when the event was not held. Growth rates for the Summer Olympic Games are sensitive to the reference Olympics chosen for the study (e.g. London 2012 or Rio 2016). We therefore provide calculations for both editions in every figure.

### **Tokyo, Munich and Montreal in context**

For each of our three case studies, the Olympic Games were the occasion for large-scale urban development and reconstruction processes that went far beyond what was technically required

<sup>51</sup>Data on Montreal is on metropolitan level as the city level data was published only every five years (World Population Review 2024).

<sup>52</sup>Except missing data for 1974 and 1984.

<sup>53</sup>Data available for every other year. Annualised growth rate was calculated for the missing year's based on the available data.

<sup>54</sup>Gogishvili and Silvestre, "Urban growth indicators for Tokyo, Munich and Montreal from 1960 to 2016."

**Table 2.** List of key Olympic venues with their original and current usage (compiled by authors).

	TOKYO			MUNICH		MONTREAL	
	1964	2023	1972	2023	1976	2023	
Olympic stadium	National Stadium (demolished)	Japan National Stadium (new venue)	Olympiastadion	Olympiastadion (Not used as Munich's main sports venue since the Allianz Arena opened in 2005)	Olympic Stadium (Montreal)	Olympic Stadium (Montreal)	
Swimming Pool <sup>55</sup>	Yoyogi National Gymnasium (converted to an indoor arena from aquatics arena)	Tokyo Aquatics Centre (new venue)	Olympia Schwimmhalle	Olympia Schwimmhalle	Montreal Olympic Pool	Montreal Olympic Pool	
Multipurpose hall	Yoyogi National Gymnasium (converted to an indoor arena from aquatics arena)	Makuhari Messe Hall (convention hall built in 1989)	Olympiahalle	Olympiahalle (extended in 2009, renovated in 2020)	Montreal Forum (Closed in 1996)	Cineplex Cinemas Forum and Dawson College Campus	
Velodrome	Hachioji Velodrome (Converted into a public park called Ryonan Park)	Izu Velodrome (built in 2011 and used as the key venue for track cycling)	Radstadion	Demolished in 2015	Montreal Velodrome	Montreal Biodome (natural science museum since 1992)	
Olympic village	Washington Heights (former US military residence, demolished after the Olympics)	Harumi waterfront district (to be converted into a residential area)	Olympisches Dorf	Olympisches Dorf (converted into student housing. After 2007 riot some parts were rebuilt)	Olympic Village 1976	Converted to mixed residential, commercial and retail uses. Multiple private owners over time	

<sup>55</sup>A new venue was built for swimming disciplines. The gymnasium was used for the Tokyo 2020 for handball matches.

to host the event. The Olympic Games helped shape Tokyo, Munich and Montreal into the cities that they are today, in both an infrastructural and a symbolic sense.

For Tokyo, the 1964 hosting constituted a rite of passage, signalling to the world Tokyo's passage into modernity and Japan's recognition and reception into the world community of peaceful states, after the defeat in World War II. It was tied to an unprecedented upgrade of the urban transport, tourist and sanitation infrastructure, fast-tracking the ten-year development plan at a total cost of 3.2% of domestic Gross National Product.<sup>56</sup> At the heart was the construction of an extensive multi-level transport network, comprising road, rail and bus. At the symbolic level, the 1964 Games occasioned the construction of now-iconic buildings such as the National Gymnasium by Kenzo Tange and the introduction of the Shinkansen bullet-train. The images broadcast to the world showed a city reconstructed from the rubble it had been reduced to barely two decades earlier. It marked the beginning of the economic ascendancy of the country and the Japanese economic miracle from the 1950s to the 1980s, which saw Japan turn into a global economic powerhouse.<sup>57</sup>

Munich also implemented an ambitious urban development plan for its hosting of the 1972 Games, although more focused on specific areas of the city. Experiencing significant demographic growth and riding on a wave of enthusiasm for new, ambitious urban planning schemes, Munich developed the site of a derelict former airport into an extensive Olympic Park, containing the Olympic Stadium and the Olympic Village. Symbolically, Munich sought to break with the pompous, formalist urbanism of the Berlin 1936 Olympics and favoured an open and sinuous design for its main facilities. As in Japan, the 1972 Games marked a passage for Munich, which was transitioning from an economy based on industrial production to services and consumption, and projected the city at an increasingly global scale.<sup>58</sup> The occasion represented a prime example of urban development through leveraging events, where the Games were used for addressing urban problems and challenges, but also for developing new administrative structures to tackle the challenge of integrated urban planning.<sup>59</sup>

Like Munich, Montreal concentrated most of the new facilities in and around a new Olympic Park developed on the green site of Viau Park to the east of the city where brand new venues including a 70,000-seat stadium, a velodrome, an aquatics centre and an Olympic Village for 12,000 athletes were built.<sup>60</sup> The recently built metro system was extended by 20 kilometres while the Olympic momentum was leveraged for the construction of a new international airport and a communications tower. The impulse for large-scale development projects and architectural statements initiated with the organization of Expo'67 some years earlier reached new heights with French architect Roger Taillibert, directly chosen by Montreal's mayor, to design an ambitious Olympic stadium with a retractable roof supported by a leaning tower.<sup>61</sup> The event was far from the promised modest and self-financed event held in a secondary city and is often held as an example of financial mismanagement, overspending and corruption that incurred a 30-year period of debt-servicing with the local population paying a special 'Olympic tax' until 2006.<sup>62</sup> The experience

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<sup>56</sup>Liao and Pitts, "A Brief Historical Review of Olympic Urbanization," 1239.

<sup>57</sup>Tagsold, "Modernity, Space and National Representation at the Tokyo Olympics 1964."

<sup>58</sup>Liao and Pitts, "A Brief Historical Review of Olympic Urbanization."

<sup>59</sup>Geipel, Helbrecht, and Pohl, "Die Münchner Olympischen Spiele von 1972 als Instrument der Stadtentwicklungspolitik."

<sup>60</sup>Roult and Lefebvre, "Planning and Reconversion of Olympic Heritages."

<sup>61</sup>Paul, "World Cities as Hegemonic Projects."

<sup>62</sup>Levine, "Tourism-Based Redevelopment and the Fiscal Crisis of the City"; Whitson and Horne, "Underestimated Costs and Overestimated Benefits?"

**Table 3.** Relative size growth of Summer Olympic Games from the first three events in the sample to the last three (ca. late 1960s/early 1970s to late 2000s/2010s).<sup>63</sup> This development illustrates the transformation of the Summer Olympic Games from a sports competition to a commercial enterprise. For comparison, the world GDP grew 4.4 times from 1964 to 2014.

Sports	Spectator	Marketing	Costs
1.9	5.4	74.6	5.7

coincided with a global financial crisis that led to diminishing interest in hosting mega-events as well as more modest urban interventions in the following editions.

### Comparing the growth of host cities and the Olympic city

The Summer Olympic Games (SOG) have experienced significant growth over our study period, as shown in Table 3. However, this growth is unevenly distributed across the four dimensions considered in this paper. While overall, the SOG grew more than 25 times, the sports dimension has barely doubled over this period, showing a smaller increase than the global GDP during the same period, which increased 4.4 times. The spectator dimension grew slightly more than this global figure. However, this growth is more significant when looking at recent events compared to those in the 1960s and 1970s. The marketing dimension is the main driver of growth. The Summer Olympics grew almost 31-fold over the period. Again, the increase in the cost dimension is relatively ‘moderate’, but still important. Overall, the Summer Olympics grew more moderately than the other largest mega-events – the Winter Olympics and the Football World Cup – which grew 101 and 47 times respectively.<sup>64</sup> Table 4 summarizes the compound growth rates for each city according to different urban indicators and the comparable MEGIX indicator for the Olympic city.

### Population

Population is a useful proxy measure for the hosting capacity of a city, as an increase in population will also result, *ceteris paribus*, in an increase in key hosting infrastructure, such as transport capacity, airport capacity and hotel capacity. The number of people accredited for an event, such as journalists, security personnel, athletes, volunteers, coaches and so on, is one good measure of the required transport and hotel capacities (another one is the number of spectators, treated below).

Comparing the number of persons accredited for the Summer Olympics over time with the population of the three cities studied for this paper, we see that Olympic growth far outpaced urban growth (Figure 1). While the population of all three cities grew to varying degrees between 1964 and 2016, with compound annual growth rates of 0.5% for Tokyo, 0.4% for Munich and 1.1% for Montreal, the number of people accredited for the Summer Olympics increased by a staggering 28.7% between 1964 and 2016. This is not surprising, given the overall increase in the size and the complexity of both the Olympic Games and the Summer Olympics in particular. This latter surge is due to the increased requirements placed on Olympic host cities by the IOC, which demand a larger workforce for making the event happen. This means that for this first pair of variables, urban growth has not nearly managed to keep up with Olympic growth. This result implies potentially more costly infrastructure upgrades if these cities were to host the Olympics again. However, as

<sup>63</sup>Müller et al., “Peak Event.”

<sup>64</sup>*Ibid.*

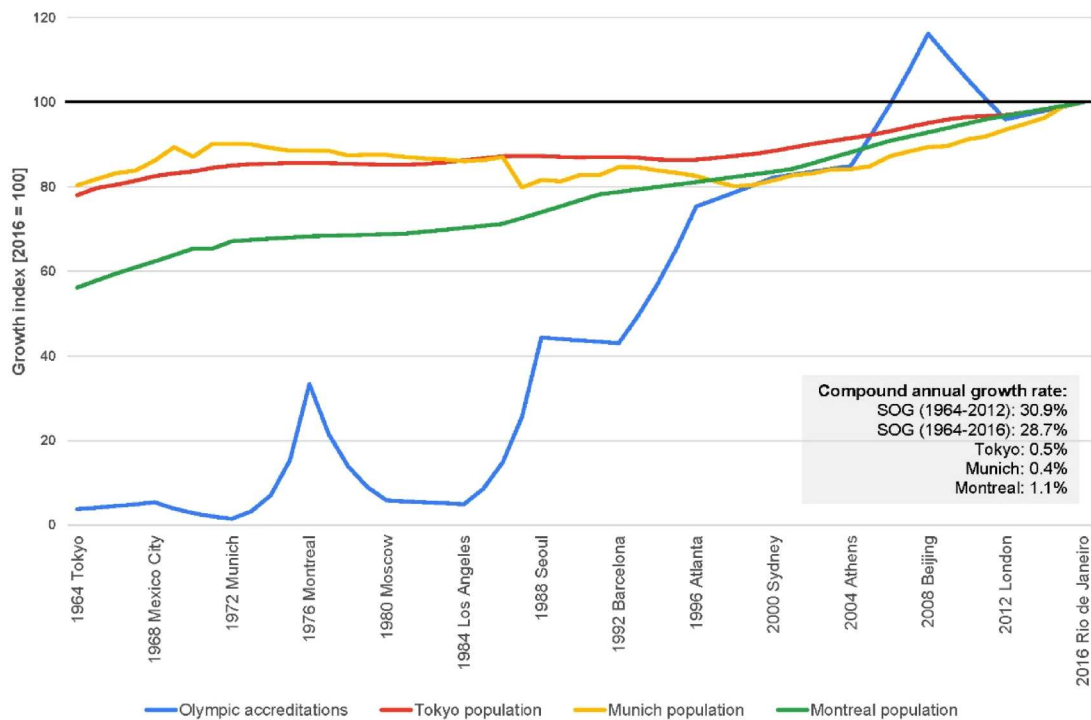
**Table 4.** Compound annual growth rates for the indicators considered in the paper.

	Population	Tourist arrivals	City budget	Tax revenue
Tokyo	0.5%	8.5%	3.2%	3.3%
Munich	0.4%	1.7%	3%	4.6%
Montreal	1.1%	4.3%	2%	1.3%
Comparable MEGIX indicator	<b>Number of accreditations</b>	<b>Number of spectators</b>	<b>Costs (cost of venues, cost of organization)</b>	<b>Revenue (ticket sales, sponsorship and broadcasting revenue)</b>
Olympic city	1964-2012: 30.9% 1964-2016: 28.7%	1964-2012: 12.8% 1964-2016: 8.8%	1964-2012: 27.6% 1964-2016: 18.2%	1964-2012: 45.7% 1964-2016: 39.7%

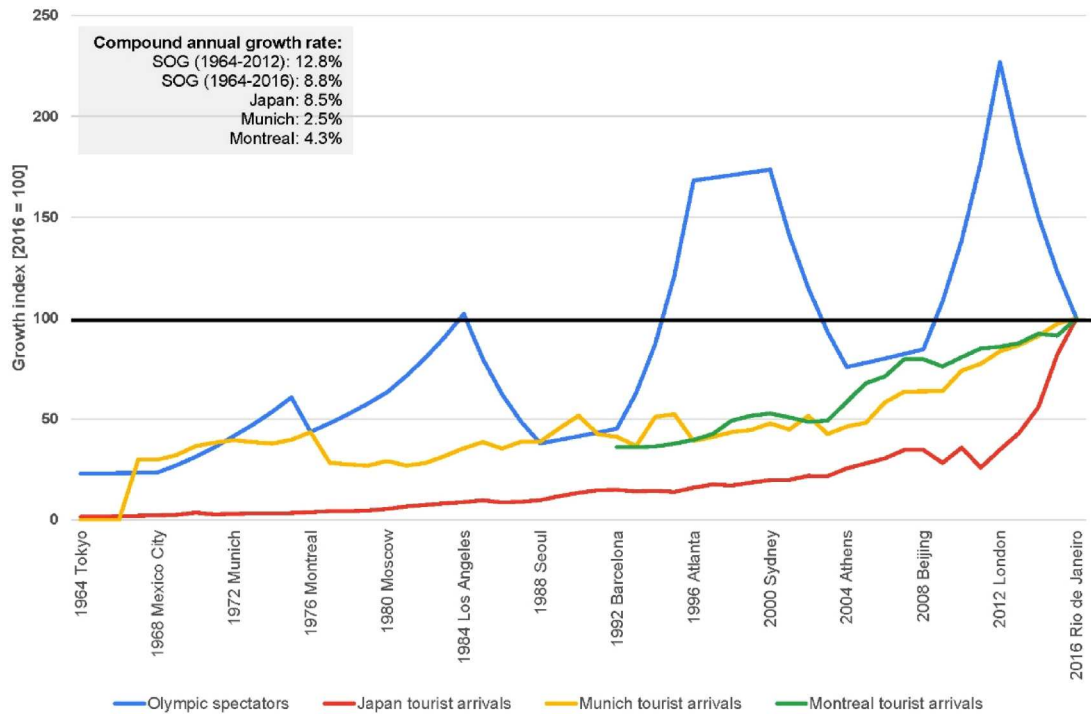
population is an incomplete measure and the number of accreditations also includes local residents, we look at tourist arrivals compared to tickets sold for the Olympic Games.

### Tourist arrivals

The number of tourists is another useful proxy for measuring a city's hosting capacity. An increase in the number of foreign visitors of a city is associated with an increase in the hosting infrastructure, such as hotel, airport, rail, and transport capacities. For the Olympic Games, the number of spectators is the most appropriate indicator to gauge the demand on the tourism infrastructure. By increasing the capacity of competition venues, cities have the potential to attract more visitors.


**Figure 1.** Growth of the Olympic city population (number of persons accredited for the Summer Olympic Games) versus host cities population from 1964 to 2016.





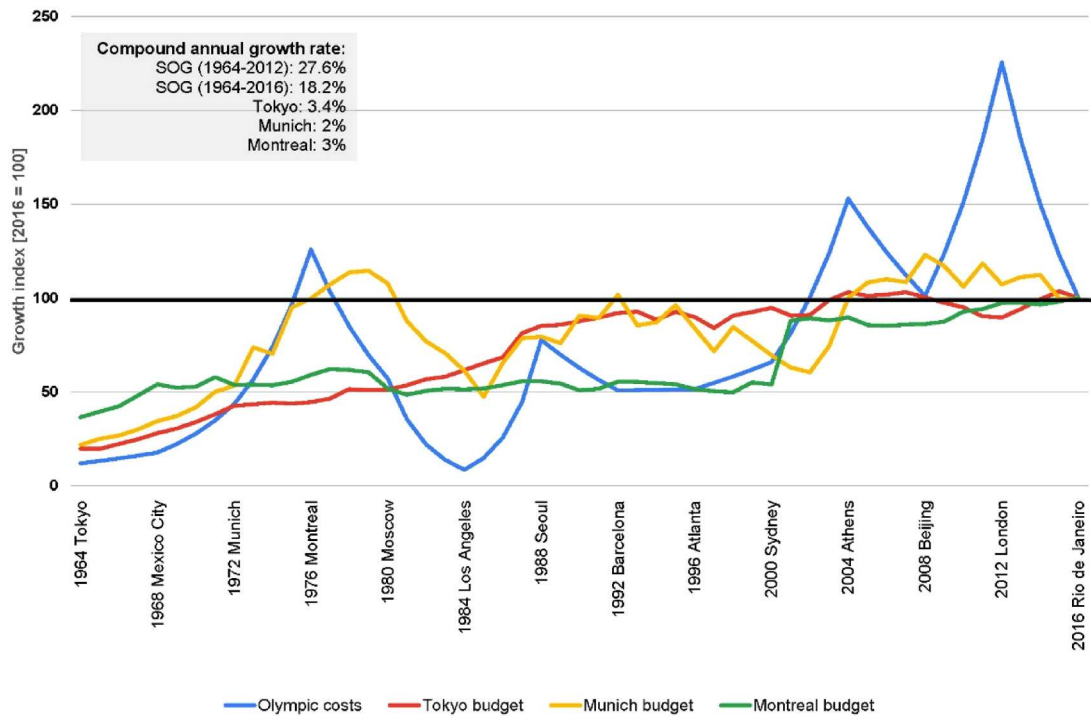
**Figure 2.** Growth of visitors to the Olympic city (number of spectators at the Summer Olympic Games) versus foreign tourist arrivals from 1964 to 2016 in selected host cities. Note: Figures for Japan show tourist arrivals at the national level.

The number of spectators fluctuates somewhat between editions of the Olympic Games. This dynamic is driven by several factors, including stadium capacity as well as political and economic conditions at a particular event.

Figure 2 shows that the annualized growth rate of spectators for the studied period is 8.8% between 1964 and 2016 but rises to 12.8% if calculated between 1964 and 2012, as the London Games had sold 3 million tickets more compared to the Rio Games. Again, the growth rates for tourist arrivals are significantly lower in at least two of the three cases – those of Munich (2.5%) and Montreal (4.3%). For Japan, a growth rate of 8.5% comes close to the lower bound of the spectator growth rate. Japan obtained such growth mostly through tourism promotion strategies from the late 2010s onwards, which led to the tripling of tourist arrivals within the space of just a few years. It is worth noting that while the Summer Olympic Games spectator dimension has generally grown over the years, this growth is not linear but presents peaks and troughs.

## Costs

While the size of the population and of tourist arrivals give a sense of the infrastructural hosting capacity, they do not provide conclusions about the financial capacity to host. For that purpose, we analysed the evolution of city budgets over time. Cities do not pay all the public costs associated with hosting the Olympic Games, as national governments often contribute. However, the



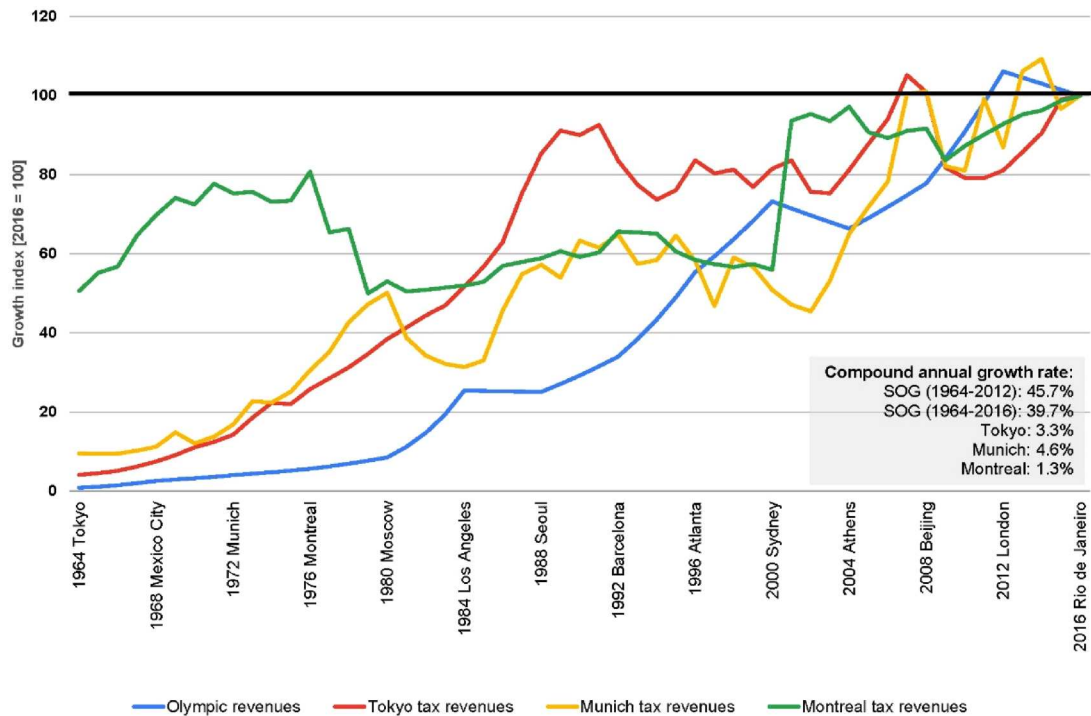
**Figure 3.** Growth in Olympic city costs (infrastructural and organizational costs) vs city budgets, 1964–2016, in real terms (controlled for inflation).

growth of city budgets provides a good indication of how the fiscal capacity of cities has evolved over time.

Since 1964, the (organizational and venue infrastructure) cost of the Summer Olympics has shown an upward-sloping trend, though with significant fluctuations (see Figure 3). The budgets of Tokyo, Munich, and Montreal, by contrast, have shown a much slower growth trend and then remained almost flat since the late 2000s. None of the host cities have come close to the growth rate of the Olympic city, not even Tokyo, where the budget grew by 3.4% over the study period. The annualized growth rate of the Olympic costs is 18.2% between 1964 and 2016 but jumps to 27.6% if calculated between 1964 and 2012. This is not surprising, as the cost of the London Games was more than double that of the Rio Games. The costs of the Summer Olympics have continued to rise because of continuous increases in organizational costs. Organizing costs for Rio 2016 reached USD 2.9 billion, while the London Summer Olympics had the highest organizing costs among the Summer Olympic Games, exceeding USD 3.3 billion. Organizational costs show an overall steady growth trend, unlike venue costs, which have varied from one edition to another depending on the urban context and sports culture present in the area. Once again, the London 2012 Summer Olympics had the highest expenditure on venues at USD 7.75 billion.

## Revenues

In addition to city budgets, examining tax revenues is another way of judging fiscal hosting capacity. Tax revenues are a good indicator for the revenue generation power of cities and



**Figure 4.** Olympic city revenues (ticket sales, sponsorship and broadcasting revenues) vs host cities tax revenues, 1964-2016, in real terms (controlled for inflation). Note: Montreal tax revenue for 1976 is only available from May to December. Missing data for January–April have been calculated using the average of the available months. The substantial variation in the tax revenue of Montreal between 2000 and 2001 is due to the merging of all municipalities in the island of Montreal that took place in 2001.

therefore the capacity to invest in infrastructure. City tax revenues of the three host cities increased over the study period, though at varying rates. When compared with the population growth, the growth rate of the city tax revenues is significantly higher in Tokyo and Munich compared to Montreal.

Comparing the revenues of the Summer Olympics (ticket sales, sponsorship and broadcasting revenue) over time in [Figure 4](#) with the tax revenues of the three cities studied for this paper, we see that Olympic growth, once again, far outpaced urban growth. While the indicator grew for all host cities to varying degrees between 1964 and 2016, showing rates of 3.3% for Tokyo, 4.6% for Munich and 1.3% for Montreal, the revenues of the Summer Olympics increased by an astonishing 39.7% between 1964 and 2016 and 45.7% between 1964 and 2012. The Summer Olympic Games compound annual growth rate of revenue dwarfs the rates of the three cities we studied. This drastic increase came as a result of the commercialization of sports and the Olympic Games in particular since the mid-1980s. [Figure 4](#) demonstrates that in the early 1960s, the Olympic Games did not create nearly as much income as today, if any at all.

### **Infrastructure**

Examining statistical indicators, as in the preceding section, can give a general idea of the fiscal and infrastructural hosting capacities and their evolution over time. Hosting the Olympic Games,

however, also requires specific venues for competitions, such as stadiums, and for hosting athletes, such as the Olympic Village. [Table 2](#) provides an overview of a set of five key venues for our three case studies and their current usage.

Some of the key Olympic venues have been demolished for a variety of reasons detailed below, while others are still standing and, in some cases, have been extended several times. Nevertheless, many of them do not meet the capacity and other requirements imposed by the IOC today. This is not only due to the increase in the number of athletes competing in the Summer Olympics today compared to when these cities first hosted the Games, but also to higher technical specifications.

For its hosting of the Games in 2021, Tokyo made the decision to demolish the National Stadium built for the 1960 Summer Olympic Games and build a new one in its place. The initial design was supposed to be by Zaha Hadid Architects, but its high cost led to a public outcry and the commissioning of a new design by Japanese architect Kengo Kuma. In the end, the stadium still cost almost double of its projected price, reaching 1.4 billion USD.<sup>65</sup> The capacity of the new stadium is around 20,000 spectators higher, compared to the one completed in the 1950s, which could accommodate around 48,000 spectators. New venues were built both for aquatic sports and cycling and multipurpose halls hosting various sports disciplines, even if the previous venues were still in place. Thus, the majority of the key venues were newly constructed for the Games that Tokyo hosted in 2021, leading to controversies and public criticism of the government and the organizing committee for the high cost of the Olympic Games and the reported use of rainforest timber in the construction of the Japan National Stadium.<sup>66</sup> Moreover, the architect of the stadium, Kengo Kuma, was accused of plagiarism by the author of the previous version of the structure, star architect Zaha Hadid, whose initial design had been scrapped.<sup>67</sup>

Munich has retained most of its Olympic venues since hosting the Summer Olympic Games in 1972. The Olympic Stadium, after 1972, acted as a key venue for the local sports teams and attracted the attention of architectural critics and tourists due to its outstanding design. However, the stadium lost its importance after the Allianz Arena was built for the 2006 Football World Cup, as it could not accommodate the increased spectator interest and modern event hosting needs. The only venue that did not survive until now was the Radstadion hosting the cycling events, as its capacity was limited to around 1500 spectators. It was demolished in 2015 to make way for a new multi-purpose arena that is set to be completed in 2024. The Olympic Village hosted thousands of athletes for the 1972 Summer Olympic Games and was later converted into student housing and renovated several times to serve its new function better.

Unlike Tokyo and Munich, Montreal has faced far greater backlash over its Olympic venues. The Olympic Stadium, which still stands, has had numerous structural problems, as well as problems with its post-Olympic use, to the extent that its demolition has been proposed on several occasions. The Montreal Forum, built in the 1920s and expanded several times, including once for the 1976 Olympics, was closed in 1996 and later reopened as a cinema multiplex, while the Montreal Velodrome was converted into a tourist attraction called 'Biodome' in the 1980s, largely due to its under-utilization.

Looking at the fate of the five key venues for the Summer Olympic Games in the three host cities, it is clear that a significant proportion of the venues from previous events in these three host cities no longer exist, having either been repurposed or found to be too small and

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<sup>65</sup>Associated Press, "Japan Picks Olympic Stadium Design to Replace Zaha Hadid Plan"; Wade, "Tokyo's New Stadium."

<sup>66</sup>Kato, "Opposition in Japan to the Olympics during the COVID-19 Pandemic"; Neslen, "Tokyo Olympics Venues 'Built with Wood from Threatened Rainforests'."

<sup>67</sup>Ravenscroft, "Five Architecture and Design Controversies That Rocked the Tokyo Olympic Games."

outdated (and often underused after the Games) for modern Olympic Games. A prime example of this is the extensive new construction for the Tokyo 2020 Olympic Games, where key venues required substantial investment due to the inadequacy or absence of existing facilities. The worst example of this is the demolition of the national stadium originally built for the 1960 Games in Tokyo, only to be replaced by a new national stadium in the same location. The expansion of the Olympic city in all dimensions has resulted in cities being unable to provide pre-existing venues that align with the evolved requirements of the IOC in terms of capacity, security, and other technical demands. Notably, this issue is underscored by the substantial cost incurred for the construction of the Kengo Kuma-designed national stadium, exemplifying the financial burden associated with providing venues to meet contemporary Olympic standards.

## Conclusion

Over the course of the modern history of the Games, the Olympic city evolved as a complex of sports venues, accommodation, transport connections and supporting infrastructure, particularly communications and hospitality. Its urban footprint grew exponentially as it catered to an increasing population of competing athletes and officials as well as spectators. A dominant aspect in the longitudinal analysis of the evolution of planning the Olympic city presented in this paper is that of growth, in all its dimensions. As demonstrated, if we ought to consider the Olympic Games as a city, it has grown 25 times over the last 50 years if we combine all four dimensions. The population of the Olympic city displayed an average annual growth rate of around 30% while its visitors grew at an annual rate of 10%. The organizational and infrastructural costs increased by 28% if we consider London 2012 as the end point or by 18% per year if we rather conclude with Rio 2016. Finally, the revenue stream increased between 40-46% per year, which includes sponsorship, ticket sales and broadcasting revenue.

Cities around the world have exhibited strong growth over the past decades. In this paper, we have shown that the urban growth of former Olympic hosts has not kept pace, however, with the growth of the Olympic city. This is visible along the indicators analysed in this paper, such as population, costs, revenues and sports infrastructure. While the growth in the tourism dimension is almost similar between cities and the Olympic Games, urban populations have grown much more slowly than accreditations for the Olympic Games. This result implies potentially more costly infrastructure upgrades if these cities were to host the Summer Olympics again. Potential upgrades to infrastructure are often financed from public funds. While the paper shows that the financial dimension of the Olympic city has skyrocketed, both in terms of costs and revenue, this has not been matched by a similar increase in the budgets and tax revenues of the host cities. As a result, the financial capacity of the host cities appears strained compared to the financial growth of the Olympics. With the impressive growth of the Olympic City in these dimensions come increased demands. This is best illustrated by the example of the Tokyo 2020 Games, where the majority of major venues were either newly built or expanded, at significantly higher costs than envisaged in the bid document submitted to the IOC.

The IOC has understood that the Games cannot continue on this trajectory of unsustainable growth. Indeed, untrammelled growth is one of the reasons that potential host city populations have become reluctant to support bids. Historically, the IOC has flexibilized the scale of planning the Olympic city to spread the onus over to neighbouring cities, regions and more recently, also open to other countries. Resolving these problems is one of the rationales underlying the IOC's decade of

organizational reforms, beginning with the programmes known as Agenda 2020, the New Norm, and Agenda 2020 + 5. These reforms have refashioned the relationships between the IOC and host cities in an attempt to bring size and costs under control, and ultimately to restore legitimacy to the Games and their organizers. Thus, one of the pillars of the reforms was the attempt to eliminate cost overruns and white elephant infrastructures, largely by streamlining Games delivery to eliminate overscoping, while also realigning the event to cohere more with the host city's existing development trajectory. An examination of the preparations for Paris 2024 reveals that, in many respects, this attempt already appears to show first fruits, with improvements to event governance and institutional transparency, and a stark reduction in the construction of new infrastructures. Yet, as this paper demonstrates, host cities still cannot keep pace with the growth of the Olympic city. This raises questions not just about the overall efficacy of the reforms, but also about the viability of the Games in years to come. As more and more voices are calling for an end to limitless growth, and even for degrowth, the Olympic Games need to step up their game to not just reduce the costs, numbers of visitors and new infrastructure required, with all the energy and resource consumption that goes with it, but also to keep the event at a size that does not place it outside the reach of all but the largest and richest cities in the world.

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