

What makes an event a mega-event? Definitions and sizes

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There is considerable ambiguity about what makes an event a mega-event. Intervening in this debate, this paper develops a definition and classification scheme for mega-events. On the basis of a review of existing definitions, it proposes four constitutive dimensions of mega-events: visitor attractiveness, mediated reach, costs and transformative impact. The paper develops indicators for each dimension and maps onto these four dimensions a sample of the latest editions of nine large events (Expo, Summer and Winter Olympics, Football World Cup, European Football Championship, Asian Games, Commonwealth Games, Pan American Games, Universiade). From this, it develops a multi-dimensional, point-based classification scheme of large events according to size, distinguishing between major events, mega-events and the recently emerging class of giga-events. Concluding, it identifies the need for more systematic data on the size, costs and impacts of a broad range of large-scale events over time.

Keywords: mega-events; definition; hallmark events; size; impact; Olympic Games; World Cup

Introduction

Mega-events are much discussed, but seldom defined. Many of us seem to have an intuitive understanding what the term refers to: we know one when we see one. The Olympic Games certainly, the Football World Cup too. But what about the Asian Games, the Rugby World Cup, the Expo?

The question ‘What is a mega-event?’ is more than definitional bickering. First, having a common understanding makes it easier to talk about the same subject when talking about mega-events. That is currently not the case. Some scholars include Expos, political summits, conventions or festivals (Hiller, 1995; Ritchie & Yangzhou, 1987; Rose & Spiegel, 2011), while others focus on sports events only (Horne & Manzenreiter, 2006; Maennig & Zimbalist, 2012a). Some regard the Winter Olympics as a mega-event (Andranovich, Burbank, & Heying, 2001), while others consider them as a second-order event (Coates, 2012; Horne, 2007). Some add single-sports events beyond the Football World Cup, such as the Rugby World Cup or the Super Bowl, to the list (Fourie & Santana-Gallego, 2011; Gold & Gold, 2008; Maennig & Zimbalist, 2012b). Second, what turns an event into a mega-event will vary depending on the focus. Mega-events have different dimensions in which

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they can be ‘mega’ and not all mega-events are ‘mega’ in the same dimensions and to the same degree. We should thus not only ask ‘if’ an event is mega, but ‘how’ it is so.

The distinction between an event and a mega-event is essentially one of size. Mega-events are larger than regular events. Yet, the size of what? And where does ‘large’ start? This paper takes a dual approach to these two questions. It extracts four key dimensions of mega-events from the array of existing definitions: visitor attractiveness, mediated reach, cost and transformative impact (Table 1). It then maps the most recent editions of nine large events on those four dimensions to see how they differ in terms of size (Table 2). In so doing, the paper identifies both the relevant characteristics of mega-events and how events vary across these characteristics to finally propose a matrix of classification for large events into three size classes: major events, mega-events and giga-events (Table 3). It concludes with a call for a more systematic investigation of the size, costs and impacts of large-scale events over time to complement the predominant focus on case studies and the Olympic Games in the existing literature.

Visitor attractiveness

The term ‘mega-event’ appeared fairly recently in academic studies. Its first use can be traced to the 37th Congress of the *Association Internationale d’Experts Scientifiques du Tourisme* in Calgary in 1987 with the theme ‘The Role and Impact of Mega-Events and Attractions on Regional and National Tourism Development’. At that time, scholars had extensive discussions of what would make an event a mega-event, but a commonly agreed-on definition remained elusive (Jafari, 1988). The definition in the conference proceedings (Ritchie & Yangzhou, 1987, p. 20) relied on Ritchie’s (1984) earlier and highly cited concept of hallmark events (Table 1). It understood mega-events primarily as tourist attractions, as is also evident from the title theme of the conference. In Jafari’s (1988, p. 272) blunt words: ‘in the mind of the majority of the participants and in the word of most presentations, mega-events still meant simply mega-onslaught of visitors’.

The weight accorded to mega-events’ role as tourist attractions in these early discussions reflects that their study was – and continues to be – firmly rooted in tourism and leisure studies (Getz, 2008, 2012). With this focus, scholars examined visitor numbers, additional expenditure through a mega-event and its economic impacts on income and job growth, long-term growth paths, image improvements and host city perceptions (e.g. Burgan & Mules, 1992; Hall, 1989; Jago & Shaw, 1998; Mihalik & Simonetta, 1999; Ritchie, 1984; Ritchie & Smith, 1991; Teigland, 1999).

Some have suggested a minimum of one million visitors to make an event qualify as a mega-event (Marris, 1987). Measuring the number of visitors directly is difficult. In the absence of primary surveys, the number of tickets sold can be a proxy for estimating attendance for ticketed events (Ritchie & Yangzhou, 1987, p. 28, 39). It should be noted, however, that this is an overestimation of the number of unique visitors, since many visitors go to several competitions. For the 2002 Commonwealth Games, for example, one study found that an average visitor bought between three and four tickets (Preuss, Seguin, & O’Reilly, 2007). Despite these shortcomings, the number of tickets sold is the best proxy variable for visitor attractiveness for which data are available across a large number of events.

Table 1. Definitions of mega-events.

Source	Definition	Tourist attraction	Mediated reach	Cost	Transformation
Ritchie and Yangzhou (1987, p. 20; from Ritchie, 1984, p. 2)	Major one-time or recurring events of limited duration, which serve to enhance the awareness, appeal and profitability of a tourism destination in the short and/or long terms. Such events rely for their success on uniqueness, status, or timely significance to create interest and attract attention	+	-	-	-
Roche (1994, pp. 1–2)	Mega-events ... are short-term events with long-term consequences for the cities that stage them. They are associated with the creation of infrastructure and event facilities often carrying long-term debts and always requiring long-term use-programming. ... [T]hey project a new (or renewed) and perhaps persistent and positive image and identity for the host city through national and international media, particularly TV, coverage	-	+	+	+
Jago and Shaw (1998, p. 29)	A one-time major event that is generally of an international scale. [A major event is] a large-scale special event that is high in status or prestige and attracts a large crowd and wide media attention. ... They are expensive to stage, attract funds to the region, lead to demand for associated services, and leave behind legacies	+	+	+	0
Roche (2000, p. 1)	Large-scale, cultural (including commercial and sporting) events, which have a dramatic character, mass popular appeal and international significance	0	+	-	-
Hiller (2000b, pp. 182–183)	A short-term, one-time, high profile event. ... The mass media carries the event to the world. ... it has a significant and/or permanent urban effect	0	+	-	+
Home (2007, pp. 81–82)	Have significant consequences for the host city, region or nation ... [and] attract considerable media coverage	-	+	-	+
Gold and Gold (2011, p. 1)	Cultural and sporting festivals that achieve sufficient size and scope to affect whole economies and to receive sustained global media attention	-	+	-	+
Mills and Rosentraub (2013, p. 239)	Significant national or global competitions that produce extensive levels of participation and media coverage and that often require large public investments into both event infrastructure, for example stadiums to hold the events, and general infrastructure, such as roadways, housing, or mass transit systems	-	+	+	+
This paper	Mega-events are ambulatory occasions of a fixed duration that (a) attract a large number of visitors, (b) have large mediated reach, (c) come with large costs and (d) have large impacts on the built environment and the population	+	+	+	+

Note: + = strongly present in definition; 0 = somewhat present in definition; - = hardly or not at all present in definition.

Table 2 presents the number of tickets sold for the top two tiers of large events in the period between 2010 and 2013. Roche (2000, p. 4) includes in those tier global events (Summer and Winter Olympics, Men's Football World Cup, World's Fair (Expo)) and world regional events (Asian Games, Commonwealth Games, Pan American Games, Men's European Football Championship, Universiade). This, of course, is a selective sample, but it does show some general tendencies. The list demonstrates that even these largest of events differ substantially in the number of tickets sold. Expo 2010 in Shanghai is far ahead of the other events: it sold almost 150 times more tickets than the Universiade 2013 in Kazan. In part, this is due to its long duration of six months and the absence of a limited amount of seats, as with all other large events in the sample. The Summer Olympics 2012, as the runner-up, has many and rather large venues and thus a high number of spectators, whereas the World Cup has few venues but very large average capacities. Note that many of the world regional events would miss a notional threshold of one million tickets sold.

Mediated reach

In order to consume a mega-event, however, it is not essential to travel and watch it *in situ*. In fact, the wide-spread broadcasting of events since the 1980s has meant that the vast majority of those who watch an event do so in front of a screen (Horne, 2007; Sugden & Tomlinson, 2012). From Montréal 1976 to London 2012, the value of broadcasting rights for the Summer Games has risen from USD 34.9 million to USD 2569 million in nominal terms or almost 23 times in real terms. This is striking testimony to the evolution of the global attention economy, but also to the commercialisation of large events. According to the IOC, about half of the world's population, 3.64 billion, saw at least one minute of coverage of the 2012 Summer Games (IOC, 2014). From Barcelona 1992 to London 2012, the number of accredited media personnel almost doubled to more than 24,000 – more than two media representatives per athlete (Chapelet, 2014). This explosion underscores the extent to which large events are nowadays mediated rather than directly experienced.

While the prominent role of the media did not register in the early discussions of how to conceptualise a mega-event in the 1980s, it became more salient in the 1990s. In definitions 'national and international media, particularly TV, coverage' (Roche, 1994, p. 2) and 'wide media attention' (Jago & Shaw, 1998, p. 29) are now considered central (Table 1). The importance of the media has grown to such an extent that Horne (2007, p. 82) even claims that 'an unmediated mega-event would be a contradiction in terms'. More than transmitting information, the media are instrumental for creating a celebratory atmosphere and emotional attachment to mega-events, turning them into the spectacles they are (MacAloon, 2010; Rojek, 2014; Tomlinson, 1996). Media coverage also plays a crucial role in forming place images and awareness. Improving these and building a country or city brand is one of the central goals of many mega-event hosts today (Grix, 2012; Zhang & Zhao, 2009).

Although governing bodies such as the IOC and FIFA often tout global viewership figures, these come with two problems. First, they are rough estimates, based on extrapolations, and as such unreliable and prone to exaggeration and manipulation (Horne, 2007; Maennig & Zimbalist, 2012b). Second, due to differences in estimation methods and units, figures are often not comparable between events. Instead, the value of broadcasting rights can function as an alternative proxy for measuring

Table 2. Size indicators of recent large events 2010–2013.

Event	Most recent edition	Tickets sold	Broadcast rights	Total Costs ¹	Capital investment	Capital investment ¹ (of total costs) (%)	Operating budget
		Million					
Expo	Shanghai 2010	73	–	55	53.2	96.8	1.76
Olympic Summer Games	London 2012	8.2	2569	14	9.3	66.4	4.75
Football World Cup	South Africa 2010	3.1	2408	5.5	5.0	90.1	.54
Asian Games	Guangzhou 2010	2.0	<75 ²	18	16.9	94.1	1.08
Olympic Winter Games	Vancouver 2010	1.5	1280	7.5	4.3	57.1	3.23
European Football Championship	Ukraine/Poland 2012	1.4	1076	48	47.1	98.6	.64
Commonwealth Games	Delhi 2010	1.0	52	6.1	5.3	86.4	.83
Universiade	Kazan 2013	.7	ca. 32	7.2	6.9	95.4	.33
Pan American Games	Guadalajara 2011	.6	<45	1.3	1.2	88.8	.15
TOTAL		91.5	7462	162.6	149.4	–	91.5
MEAN		10.2	1066	18.1	16.6	86.0	10.2
MEDIAN		1.5	564	7.5	6.9	90.1	.83

Notes: Cost estimates are in USD in the year of the event; conversions to USD used the average exchange rate in the year of the event; n/a = not available; – = not applicable; 1 = estimates; 2 = figure includes revenues from licencing; separate figures not available, thus not included in calculation of total, mean and median.
 Sources: BBC; Comptroller and Auditor General of India; El Informador; Euro: Erste Group Research; Expo: Shanghai Audit Bureau; FIFA; Asian Games: Xinhua; Financial Times; Football World Cup: Bond & Cottle; Olympic Summer Games: National Audit Office; Pan American Games: Avalos; Tencent; Olympic Winter Games: VanWynsberghe and Kwan; UEFA; Commonwealth Games: High Level Committee for Commonwealth Games; Universiade: Nezvavisimaya Gazeta; Vedomosti.

the importance of mediated reach. It is a direct correlate of anticipated global reach and puts a price tag on viewers' attention, thus reflecting the mediated commercial value of the event. It is also better suited for comparisons between different events.

Table 2 shows that the mediated reach of mega-events partly correlates with tourist attractiveness – for the Olympics and the World Cup – but partly strongly diverges from it, as is the case with the Expo. The Football World Cup and the Summer Olympics jockey for first place in revenues from broadcasting rights, with each raking in about USD 2.5 billion. The values for the Euro and the Winter Olympics are comparable and are about half the amount of those two big events. The other events play in a completely different league. The rights for the Commonwealth Games 2010 were valued at USD 52 million – barely 2% those of the World Cup. The Pan American Games 2011 reported a maximum of USD 45 million and the Universiade 2013 about USD 32 million. The Asian Games published only aggregate figures, including licencing, at less than USD 75 million. The value of broadcasting rights is thus somewhere below that. The global media value of Expos is negligible and its governing body, the *Bureau International des Expositions*, does not market broadcasting rights.

Cost

Using tourist attractiveness and mediated reach as size indicators for mega-events focuses on the output side of mega-events, on the attention they generate. Yet mega-events also have an important input side: their costs. Mega-events typically cost hundreds of millions if not billions of US dollars. That is, money that goes into infrastructure required for hosting the event, such as transport or venues, but also into the cost of organising the event itself, such as salaries, temporary overlays or security. Associated with cost is complexity. *Ceteris paribus*, the more expensive an event, the more stakeholders with diverse demands and subcontractors with parallel projects across different sectors, from catering to IT and security, need to be coordinated (Jennings, 2012, p. 21). A multitude of actors become dependent on each other, many of them novices in organising an event of such extraordinary size. What compounds the organisational challenge is the time pressure and the close integration of projects, where if one deadline is missed, this has knock-on effects on several other projects. Thus, mega-events are prone to cost overruns: the average cost overrun of the Olympic Games since 1968, for example, was 179% (Flyvbjerg & Stewart, 2012).

Some definitions, though by far not all, rely on costs as an input indicator to define mega-events (Table 1). Roche (1994), Jago and Shaw (1998) or Mills and Rosentraub (2013) characterise mega-events variously as requiring 'large public investments', 'expensive to stage' or even as 'carrying long-term debts'. But the definitions also make clear that cost cannot be the only defining element for mega-events, always linking it with other features such as tourist attractiveness or mediated reach. None of the definitions suggests a concrete threshold of costs that would turn an event into a mega-event.

For the nine events in the sample, Table 2 presents an overview of the estimated costs. Calculating costs for large events is contentious, because of frequent intransparencies about spending and a certain arbitrariness which costs to attribute to the event rather than to general investment. Much of the investment in infrastructure, for example, has longer depreciation periods due to its use after the event. There are

also opportunity costs, costs of lost productivity during the event and foregone earnings through tax exemptions and other indirect subsidies, which remain unaccounted for. The costs shown in Table 2 are from government or academic sources calculating both operational and capital cost expenditures connected to the event. They, thus, do not show the unique costs of the event, but they show the costs *induced* by the event. This is an approach taken in other studies (e.g. VanWynsberghe & Kwan, 2013) and is useful, because it recognises that infrastructure projects that are fast-tracked for the event become subject to the logic of the event. This means that they have to be completed under time pressure – leading to higher cost overruns than in other large projects (Flyvbjerg & Stewart, 2012) – and they have to satisfy the requirements of the event, thus often transforming the original development plans (Kassens-Noor, 2012).

As with the previous two indicators, costs differ widely between events in the sample, but none is below USD 1 billion. They range from just over USD 1 billion for the Pan American Games 2011 in Guadalajara to USD 55 billion for the Expo 2010 in Shanghai. The mean cost is USD 18 billion, which places mega-events among the largest of mega-projects. For comparison, the two largest mega-projects in Germany in 2013, the new international airport in Berlin and the new train station in Stuttgart, were valued at about USD 7 billion each. The total cost of the latest cycle of these nine mega-events alone was just under USD 163 billion! This is similar to the annual GDP of Ukraine, a country of 45 million.

It is important to point out that costs for the same event fluctuate more between host cities and countries than visitor numbers or the value of broadcasting rights, both of which are more stable. The Winter Games in Sochi, for example, cost USD 51 billion, almost seven times those of Vancouver (Ortung & Zhemukhov, 2014). The costs for the World Cup increased from USD 7.5 billion in South Africa in 2010 to USD 14 billion in Brazil in 2014 (Gaffney, 2014) to an estimated USD 21 billion in Russia for 2018 (Müller, 2014a). Despite this fluctuation, all events in the sample post costs in excess of USD 1 billion, sometimes significantly so.

Urban transformation

The multi-billion dollar spending on mega-events has an immediate impact on host cities and regions, both on the population and on the built environment, as hosts construct or upgrade stadia, conference facilities, roads, railway and metro lines and hotels or power stations. In fact, most cities, countries and regions aim to make strategic use of mega-events to develop infrastructure and push urban renewal, often through leveraging funds that would not be available otherwise (Grix, 2013; Hiller, 2000a, 2000b; Smith, 2012). Governing bodies such as the IOC or FIFA encourage such transformative impacts under the label of ‘legacy’, i.e. long-lasting transformative impacts on the urban and regional fabric that justify the high outlays for mega-events. Those impacts, however, have often been negative, resulting, among other things, in the displacement of people, gentrification, the commercialisation of public space or environmental damage (Gaffney, 2010; Horne, 2007; Lenskyj, 2002) – a complex of symptoms that has been called ‘the mega-event syndrome’ (Müller, 2014b).

Urban transformation is the fourth and last dimension that appears in definitions of mega-events, though again not in all of them (Table 1). A mega-event must have ‘long-term consequences for ... cities’ (Roche, 1994, p. 1) or a ‘significant and/or

permanent urban effect' (Hiller, 2000b, p. 183). Some even go so far as to claim that mega-events must 'affect whole economies' (Gold & Gold, 2011, p. 1). Others place an emphasis on the effects of mega-events on the population of host cities (Gursoy, Jurowski, & Uysal, 2002; Hiller, 2012). An event that does not intervene to a significant degree in its host city, region or even country would thus not qualify as a mega-event.

One way of gauging the transformative dimension of mega-events is to look at the share of capital investments in total costs. Using this approach, Liao and Pitts (2006, p. 1247), for example, found that 97% of the spending on the Olympic Games in Tokyo in 1964 was on ancillary infrastructure, whereas it was just about 50% for Los Angeles in 1984. While this does not say much about the nature and the impacts of the spending and, therefore, cannot substitute for a qualitative investigation of urban transformation (e.g. as in Chalkley & Essex, 1999; Kassens-Noor, 2012), it provides a useful scale for comparison between different events.

Table 2 shows the capital investment, operating budgets and the percentages of capital investment in total costs. Capital investment, here, includes infrastructure (transport, energy, ICT, accommodation, etc.) and spending on the construction of venues and ancillary buildings (e.g. media centres, etc.), but it excludes operating costs (e.g. overlays, administration, security and technology). In all cases, capital investments surpass operating costs. In half of the cases, capital investment is more than 90% of total cost. This is a clear indication of the transformative impact of this most recent round of mega-events. Spending 94% on capital investment, Guangzhou, for example, harnessed the 2010 Asian Games for its wholesale urban restructuring and redevelopment (Shin, 2014) and Poland used the Euro 2012 as an occasion to modernise its highways. Kazan, too, upgraded its roads and airport and built a railway link between the airport and the city for hosting the Universiade (Makarychev & Yatsyk, 2015). Note that high total costs are often but not always associated with a high percentage of capital investment: the only two events hosted in high-income countries (according to the OECD classification), the 2010 Winter Games in Vancouver and the 2012 Summer Games in London, have the lowest shares of capital investment. Thus, it is particularly emerging economies in which mega-events effect large urban transformations.

Towards a definition and classification: major, mega and giga

Existing definitions of mega-events in Table 1 incorporate one or several of the four dimensions this paper has discussed so far: visitor attractiveness, mediated reach, cost and transformational impact. Yet none of them incorporates all four. For an event to become truly 'mega', however, it should be large on each of the four dimensions. Thus, this paper proposes a consolidated definition:

Mega-events are ambulatory occasions of a fixed duration that attract

- (1) a large number of visitors,
- (2) have a large mediated reach,
- (3) come with large costs, and
- (4) have large impacts on the built environment and the population.

This is a parsimonious definition incorporating constitutive necessary elements of mega-events. It goes without saying that most mega-events share several other

Table 3. Scoring matrix for event classes according to size.

Size	Visitor attractiveness <i>Number of tickets sold</i>	Mediated reach <i>Value of broadcast rights</i>	Cost <i>Total cost</i>	Transformation <i>Capital investment</i>
XXL (3 points)	>3 million	>USD 2 billion	>USD 10 billion	>USD 10 billion
XL (2 points)	>1 million	>USD 1 billion	>USD 5 billion	>USD 5 billion
L (1 point)	>.5 million	>USD .1 billion	>USD 1 billion	>USD 1 billion
Giga-event		11–12 points total		
Mega-event		7–10 points total		
Major event		1–6 points total		

Table 4. Size classification of selected events (APEC: Forbes; ECoC: Garcia et al.; Rugby: Economist; Super Bowl: Gardner & Guthrie).

Event	Location	Visitor attractiveness	Mediated reach	Cost	Transformation	TOTAL	Class
Olympic Summer Games	London 2012	3	3	3	2	11	Giga
Euro	Ukraine/Poland 2012	2	2	3	3	10	Mega
Football World Cup	South Africa 2010	3	3	2	2	10	Mega
Expo	Shanghai 2010	3	0	3	3	9	Mega
Asian Games	Guangzhou 2010	2	0	3	3	8	Mega
Olympic Winter Games	Vancouver 2010	2	2	2	1	7	Mega
Commonwealth Games	Delhi 2010	2	0	2	2	6	Major
Universiade	Kazan 2013	1	0	2	2	5	Major
Pan American Games	Guadalajara 2011	1	0	0	0	1	Major
APEC Summit	Vladivostok 2012	0	0	3	3	6	Major
European Capital of Culture	Liverpool 2008	3	0	0	2	5	Major
Rugby World Cup	New Zealand 2011	2	2e	0	0	4	Major
Super Bowl	New Orleans 2013	0	1	0	0	1	Major

Note: e = estimation.

characteristics, such as an ambulatory character, temporary organisations in charge of the planning, a fixed date for delivery, governing bodies that set the rules and own most of the rights for the event and so on (e.g. Gold & Gold, 2008; Hiller, 2000b). These features, however, shall not be considered necessary elements to turn events into mega-events.

This definition, however, does not resolve the question of what qualifies as 'large'. This is where the mapping of Roche's (2000) top two tiers of mega-events on the four key dimensions helps to provide thresholds for differentiation (see Table 3). The largest of events have more than three million tickets sold, more than USD 2 billion in broadcast revenue, more than USD 10 billion in total costs and more than USD 10 billion in capital investment. These largest of events are rare. None of the events in the sample exceeds all of these four thresholds, although the Beijing Olympics in 2008 did so and the World Cups 2014 in Brazil and 2018 in Russia look set to. Two events in the sample exceed three of these thresholds (Expo 2010, Olympic Summer Games 2012).

Based on the distribution of size indicators in Table 2, this paper proposes a differentiation of each of the four dimensions into three size intervals (L, XL and XXL) with a point scoring scheme, as shown in Table 3. The maximum number of points (three points) can be obtained if an event belongs to the largest of its size in a particular dimension (XXL). Two points are awarded for events that range in the middle of the size distribution (XL) and one point for events at the lower end of the distribution (L), but still meeting a certain minimum value (to distinguish them from regular events). The following thresholds divide events into three different size classes:

- Major events (1–6 points): with a maximum average score of 1.5 on each of the four dimensions, major events are of significant size. To qualify as a major event, an event needs to have an L size on at least one dimension.
- Mega-events (7–10 points): mega-events need to have an XL size on at least three of the four dimensions, but not more than two XXL sizes. Mega-events are the most common among current large events.
- Giga-events (11–12 points): giga-events are the very largest of events and need to have an XXL size on at least three of the four dimensions. Thus, they have to be very large across the board. Giga-events are rare, but they might become more common, particularly if the current trend of growing costs continues.

This categorisation is a heuristic, since it is only based on the latest cycle of mega-events. It does not claim to represent somehow objective cut-offs for size, which do not exist, and other studies have used different thresholds, for example for mega-projects (Flyvbjerg, 2014). Yet, applying it to the sample of nine mega-events (Table 4), it shows face validity, providing a useful differentiation of the events into the three size classes: Only the 2012 Summer Olympics, for example, emerge as a giga-event, whereas the much costlier (but less mediated) Expo qualifies just as a mega-event. Five events are classified as mega-events and three as major events (Commonwealth Games 2010, Universiade 2013, Pan American Games 2011). There are also some surprises: the Euro 2012 has the same size as the World Cup 2010 and the Asian Games 2010 are larger than the Winter Games 2010.

How do other large events compare in this classification, such as world championships, sport finals, political summits or cultural events such as the

European Capital of Culture programme? For comparison, Table 4 includes scores for four recent editions of events: the Asia-Pacific Economic Cooperation (APEC) summit, the European Capital of Culture, the Rugby World Cup and the Super Bowl. These events rank as major events, but only score in a maximum of two of the four categories. Some of them, however, are larger than the regional games.

Political summits *can* be large events according to the classification offered here. The APEC Summit 2012 in Vladivostok came with profound infrastructural investments of about USD 20 billion, but did not attract large numbers of visitors or broadcasting revenue. Yet, previous APEC summits had bills well below USD 1 billion and the Russian case is likely an outlier. Liverpool's tenure as European Capital of Culture in 2008 attracted 9.7 million additional visitors and was linked to more than USD 8 billion in investment into urban regeneration, thus scoring highly in visitor attractiveness and urban transformation (García, Melville, & Cox, 2010). Here again, however, Liverpool seems to have had one of the most ambitious programmes among recent European Capitals of Culture and expenses in this range are not the norm.

The Rugby World Cup 2011 was large in terms of visitors and media rights, but did not involve costs of more than USD 1 billion. The Super Bowl 2013 – that American 'event of events' – generated significant media revenue of more than USD 600 million, but did not count as large on the three other dimensions. Other events do not qualify according to the definition, because they are recurring in the same place and not ambulatory. That is true for the Sydney Mardi Gras Parade, with an estimated half a million visitors each year, large international conventions, such as the Frankfurt International Auto Show and the North American International Auto Show in Detroit, or religious pilgrimages such as the *Hajj*.

Conclusion

Mega-events are ambulatory occasions of a fixed duration that attract a large number of visitors, have a large mediated reach, come with large costs and have large impacts on the built environment and the population. This is the consolidated definition of a mega-event this paper has proposed on the basis of a review and synthesis of existing definitions. It includes sports and non-sports events alike, but it excludes recurring events in the same location.

The definition per se does not designate certain events as 'mega' or postulate a certain minimum size. For that purpose, a scoring scheme has been developed from the size distribution of the latest editions of large events (Table 3). It works with three size classes to distinguish between 'major', 'mega-' and 'giga-events'. Giga-events are a recently emerging and still rather rare class of the largest events in the world. The Olympic Games in Beijing in 2008 and in London in 2012 and the World Cup 2014 would fall in this category. Yet, if the upward trend in size continues, giga-events might well become the norm rather than the exception.

The consolidated definition and the classification into three size classes come with two crucial advantages. First, they recognise that large events are multi-dimensional and do not just use one indicator for measuring their size, whether that is cost or visitor numbers. Table 3 shows that cost alone does not qualify events as mega-events. The scoring scheme requires events to be large across at least three of the four dimensions to become a mega-event and to be very large on at least three of the four dimensions to become a giga-event. As a consequence, one- or

two-dimensionally large events – such as the Super Bowl – do not qualify as mega-events or giga-events.

Second, the thresholds for the differentiation into size classes have emerged from induction. Thus, they are based on the actual sizes of current mega-events rather than representing notional values. As a consequence, the Asian Games may be a mega-event in one edition, but a major event in the next. This circumvents a rigid classification of events ‘once and for all’, for example, of the Asian and Pan American Games as ‘second-tier events’. The analysis in this paper takes account of the fact that an event becomes larger if host cities and countries pursue broad transformational agendas with it. With the growing size of events, however, the thresholds proposed for classification should be periodically revisited and revised upwards where necessary to continue to serve the purpose of differentiation.

Further research should build a more complete and systematic record of these four dimensions of large events, since evidence hitherto is mostly anecdotal: we know comparatively much about the Olympics, less about the Football World Cup and hardly anything about the other events, notwithstanding that many of these are not much smaller in size. Even for the Olympics, visitor attractiveness and mediated reach are much better documented than costs or urban transformation. In order to better understand the dynamics of these events, beyond individual case studies, longitudinal, comparative research is called for. This would allow a better assessment of costs, benefits and impacts across a significant number of events to inform future bids. It is also crucial for enhancing transparency on costs and benefits as well as event outcomes that often shape urban and regional futures for decades.

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