

# ECONOMIC IMPACT ASSESSMENT OF OLYMPIC GAMES

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# TABLE OF CONTENTS

TABLE OF CONTENTS.....	1
ABSTRACT .....	4
1. WHY AN ECONOMIC IMPACT ASSESSMENT? .....	5
2. CHOICE OF METHODOLOGY .....	7
3. ADAPTING THE METHODOLOGY TO THE OLYMPIC GAMES.....	11
4. ECONOMIC IMPACT CALCULATION.....	13
4.1 Scope definition: Types of expenditures, reference area, period, and economic actors .....	13
4.1.1 Types of expenditures.....	13
4.1.2 Geographical area.....	14
4.1.3 Time period.....	14
4.1.4 Organisations.....	15
4.2 Calculation method .....	16
4.3 Calculation of the impact .....	16
4.3.1 Step 1. Calculation of the injection .....	16
4.3.1.1 Clarification on the categories of expenditures .....	17
Salaries and social charges .....	17
Goods and services .....	18
Functional investment .....	19
Overhead costs and profit margin .....	19
4.3.1.2 Clarification on the sectors .....	20
Construction .....	20
Tourism .....	21
4.3.2 Step 2: Calculation of the external revenue .....	22
4.3.3 Step 3: Calculation of the net injection .....	23
4.3.4 Step 4: Calculation of the primary income .....	24
4.3.5 Step 5: Calculation of the induced impact.....	25
4.3.6 Step 6: Calculation of the overall economic impact.....	26
4.4 Data collection.....	26
4.4.1 Phase I. Before the event: collection of financial and operational data from OCOG and delivery partners .....	26
4.4.2 Phase II. During the event: attendee spending patterns survey .....	26
4.4.3 Phase III. After the event: collection of financial and operational data from OCOG and other relevant economic actors.....	27
4.5 Data reporting .....	27
5. LIMITATIONS AND POTENTIAL MISTAKES .....	28
5.1 Errors related to evaluation of the initial injection .....	28
5.2 Errors in assessing the multiplier .....	29

6. CONCLUSIVE RECOMMENDATIONS .....31

REFERENCES.....	33
APPENDIX - METHODOLOGY TO CALCULATE MULTIPLIERS KB AND KH .....	37
Calculation of MPI for a Country C .....	37
Calculation of MPI for a Region R .....	38
Calculation of MPC for a Country C .....	38
Calculation of MPC for a Region R .....	38
Calculation of Kh and Kb for Region R .....	39

# ABSTRACT

Multiple studies have analysed the economic impacts of sports events, including various editions of Olympic and Paralympic Games, using different methodologies and finding diverging evidence. However, many of these studies have been criticized by expert for using biased assumptions and methods.

In order to contribute to a stakeholder consultation led by the OECD, this study explores how the methodology could be tailored to the specific case of the Olympic Games with a cautious approach, conservative assumptions and full transparency of the model.

It is advisable to estimate the economic impact using the National Income Accounting (NIA) framework, which provides a baseline calculation of the direct contribution of sport events to the local economy, and a Keynesian model, that relies on multiplier effects<sup>1</sup>.

Unlike the other methods (Input-Output methods and cost-benefits methods), the NIA framework is the most conservative approach of those used in the literature. In addition, this Keynesian method is the simplest and most transparent and can be based on relatively available macroeconomic data.

A tangible economic impact is defined as the product of a net injection and a multiplier. The spending of an economic actor, in the case of the Olympic Games, the OCOG – Organising Committee of the Olympic Games - in a reference area is called an injection. The method consists of estimating the direct, indirect, and induced effects of Olympic Games by looking at two distinct areas of activity related to the Games that generate injection of economic resources : Games organisation and capital investment. The expenditures incurred to finance the Olympic Games are covered from two distinct formal budgets: the Organising Committee for the Olympic Games (OCOG) budget, and the Non-OCOG budget.

The categories of expenditures to include in the calculation are Salaries & social charges, Goods and services, Functional investment and Overhead costs and profit margin across the three following sectors: Games Organisation, Venue and Urban Infrastructure and Tourism.

To make the results as most useful and specific it is recommended to limit and define clearly the purpose of the study. In the case of ex-ante analyses<sup>2</sup>, the number of realistic options available and other constraints, such as time, information, funding, and political realities must be taken into considerations to provide several scenarios following their probability of occurrences, e.g. low, medium and high. Other recommendations are:

- Accumulate sufficient information to conduct a meaningful economic impact assessment.
- Conduct a study based not on assumptions, but on evidence and information.
- If possible, consider all types of impact on the community and not just the economic impact.
- Do not exaggerate the results of the study. On the side of estimating economic benefits, it is better to underestimate than overestimate.

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<sup>1</sup> According to John Maynard Keynes, the output of an economic activity depends on the associated spending by households, businesses, and the government. In particular, Keynesian models assume that the impact (or output) of an activity is driven by some multiple of the increase or decrease in overall expenditures generated by the activity (see this [IMF publication](#) for more detailed description of Keynesian economics).

<sup>2</sup> Ex-ante analyses consist of predictive estimates of the economic impact of a sporting event (Matheson 2006).

# 1. WHY AN ECONOMIC IMPACT ASSESSMENT?

An assessment is needed to measure the economic impact of sport competitions. There are multiple reasons for an impact assessment to be performed. First, many sport events in our communities are funded through public financing. So, economic impact studies can help determine whether the financial resources invested are used wisely. Second, it is uncertain how much sports events can really contribute to the development of a community in relation to its economy. Therefore, accurate estimates should be provided and the results communicated to community members. Third, sport competitions are not only entertaining activities, but are also central to the sport industry, which represents a driver for substantive growth for the wider economy as it generates value added and jobs across multiple industries, stimulating development and innovation. Therefore, the results of an economic impact assessment can represent a cornerstone for developing many related businesses in the communities. Fourth, assessing the positive or negative economic impact of sport events can serve as an important method of determining the budget of communities for the future years.

Over the last 15 years, the International Academy of Sports Science and Technology (AISTS) has gained considerable expertise in this field through conducting multiple economic impacts studies including the assessment of total contribution of the International Olympic Committee (IOC) and other International Sport Organisations to the local economy (i.e. the region of Lausanne, the Canton of Vaud, and the whole Swiss Confederation).

Economic impact refers essentially to the short, medium, and long term effect of the additional economic activity that is generated as a result of preparation and conduction of event activities, reception of visitors, development and improvement of building, venues, and infrastructures. More specifically, short term impact includes all additional economic activities that are generated directly through preparation and conduction of the event and reception of visitors. Medium-term impact refers to the effects on employment and on markets for other goods and services that benefit the companies involved in the event. Long term impact refers to the impact of the constructions put in place to host the events (i.e. sports infrastructure and non-sports infrastructure, such as roads, buildings, etc..) as well as the impacts on the tourism sector that arise over the years post Games.

Multiple studies have analysed the economic impacts of various editions of Olympic and Paralympic Games, using different methodologies and finding diverging evidence (Müller et al. 2022; Langer et al. 2018; Tokyo Metropolitan Government 2017; CDES 2016; Osada et al. 2016; Oxford Economics 2016; Brückner & Pappa 2015; Maennig and Richter 2012; Mehrotra 2012; Tien et al. 2011; Preuss 2011; Rose and Spiegel 2011; Kasimati & Dawson 2009; Leeds 2008; Walton et al. 2008; Owen 2005; Preuss 2000; Teigland 1999). However, many of these studies have violated standard assessment practices using biased assumptions and methods (Preuss 2019). Moreover, the majority focuses only on part of the economic impact, while only few publications have measured the entire economic impact of the Olympic Games (Preuss 2019).

Recently, the Organisation for Economic Co-operation and Development (OECD) took stock of the current advice, guidelines and good practices for measuring the impact of global events and has offered a comprehensive overview of the conditions required to realise more sustainable events and build stronger capacities to leverage local benefits<sup>1</sup>. These efforts have resulted in the following three main recommendations: (1) global events hosts and organizers must weigh the differences between methodologies and select the ones that are more appropriate for each event; (2) the choice of key performance indicators needs to be tailored to the event context and in particular to the target community; and (3) events hosts and organisers need to secure the credibility of the overall evaluation strategy by communicating adequately on robust impact measures.

As a result of this discussion, the IOC commissioned AISTS to explore how the economic impact methodology could be tailored to the specific case of the Olympic Games. This study, therefore, proposes a methodology to assess the economic impact of Olympic Games and contributed to the larger discussion and stakeholder consultation led by the OECD.

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<sup>1</sup> For more information, see <https://www.oecd.org/cfe/leed/Implementing-the-OECD-Recommendation-on-Global-Events-Toolkit.pdf>

## 2. CHOICE OF METHODOLOGY

In general, the approach used to assess the economic impact of Olympic Games must be prudent and transparent. Prudence is needed to make assumptions in the case of ex-ante analyses as well as to determine the elements for calculation of the economic impact. Transparency is essential to communicate the methodology and working assumptions used. A very cautious methodology and conservative assumptions therefore are required in measuring the economic impact.

For the methodology, it is advisable to estimate the economic impact using the National Income Accounting (NIA) framework (Stone et al. 1942), which provides a baseline calculation of the direct contribution of sport events to the local economy, and a Keynesian model, that relies on multiplier effects.

There are other models for measuring the increase in activity due to sports events. Leontief method (input(I)-output(O)) uses multiplier analysis based on sectoral interdependence tables (Blake 2005). I-O models are relatively efficient to implement. Yet, major criticisms include overestimation of the impact for large events because of inappropriate and overinflated multipliers, the focus only on the effects of increased demand on inter-industry exchanges, sectoral matrices being very difficult to put together and relying on many assumptions, and negative effects being ignored in addition to behavioural functions not incorporated (Barget & Gouguot 2010; Dwyer et al. 2005; Késenne 2005; Matheson 2009; Porter & Fletcher 2008).

Social Accounting Matrices (SAM) and Computable General Equilibrium (CGE) models are more recent development of I-O method (Stone and Brown 1962; Pyatt & Round 1979, 1985, 1990; Norton & Scandizzo 1981). SAM extend the I-O models to all components of income formation; CGE models add behavioural functions to I-O representation of the economy. However, SAM and CGE models are more complex and difficult to implement and are subject to overestimation of the benefits (Giesecke & Madden 2007, 2011). Moreover, their results depend substantively on the choice of variables and the adequate identification and quantification of the shock caused by the event.

Unlike the I-O and CGE approaches, cost-benefit analysis (CBA) distinguishes positive (benefits) from negative impacts (costs) and quantifies them in monetary terms, presenting the impact of the event in terms of net benefit or loss. It tries to consider both tangible and intangible effects, leading to more accurate and efficient evaluation of the event's impact (Lenskyj 2000; Boardman et al. 2006). For costs, CBA uses estimates of opportunity costs, rather than on actual financial costs; for benefits, it relies on estimates of the increase in value of consumption of local residents, including the public good value of the event and consumer surplus, commonly measured through willingness to pay valuation methods (Barget & Gouguot 2010; Johnson & Whitehead 2000; Mules & Dwyer 2005; Walton et al. 2008; Taks et al. 2011). Unfortunately, many benefit and cost estimates are hard to measure accurately and rely on hypothetical scenarios, leading to large estimate errors (Belfield 2012). Moreover, data requirements are extensive with calculations of opportunity costs, consumer surplus, and the public good value of the event being complex to implement.

The NIA framework is the most conservative approach of those used in the literature, as it is limited to measuring the direct impact of the specific sport activities rather than their wider



impacts on other sectors (Derchi & Stricker 2022). In addition, this Keynesian method is the simplest and most transparent and can be based on relatively available macroeconomic data. Indeed, this methodology has often been used for measuring the economic importance of sport at the national level as a large proportion of data can be obtained from published sources. This methodology adopts multiplier analysis to measure the effects of additional injections of spending into the local economy. It shows the direct, indirect and induced effects of a specific change in expenditure. It is appropriate for estimating the economic impact of sport events and activities, as they generate income, expenditure and employment that are additional to the normal flow of business expenditure in the local economy.

According to this methodology, a tangible economic impact is defined as the product of a net injection and a multiplier. The spending of an economic actor (e.g., OCOG – Organising Committee of the Olympic Games) in a reference area is called an injection. A net injection is the difference between financial flows in and out of the reference area. A multiplier is a factor of proportionality that measures the changes in direct spending and employment in a given area, in response to the net injection, after several rounds of spending. More specifically, a multiplier effect is a process whereby an initial expenditure in one area generates a series of additional expenditures in the area, by cascade. Therefore, the multiplier effect represents the overall economic impact of a sporting event.

The basic principle of the multiplier effect starts with an initial expenditure. Let us take the example of the effect of spending by visitors. Part of the increased income is spent and redistributed in the region. Three elements contribute to the total impact of visitor spending: the direct impact (the first-round effect of visitor spending), the indirect impact (the ripple effect of additional cycles of recirculation of initial visitor spending), and the induced impact, which is another ripple effect caused by employees of affected firms spending part of their wages and salaries in other firms in the host economy (Howard & Crompton 1995).

To calculate the overall economic impact of a sport event six consecutive steps are recommended as illustrated in Figure 1: three steps to calculate the net injection (steps 1 to 3) followed by three steps to apply a multiplier and calculate the impacts (steps 4 to 6).

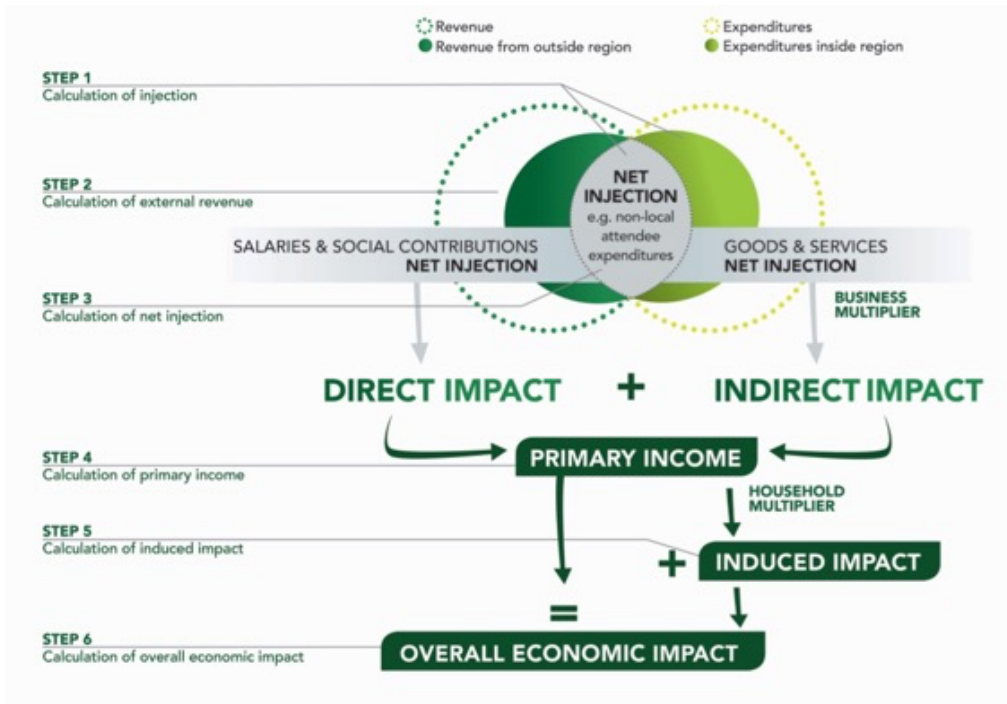


Figure 1. Calculation flow of the overall economic impact

In particular, as net injection has been identified, the primary income (the combination of direct and indirect impacts) is computed. The direct impact mostly corresponds to the effect on local residents of salaries and social charges paid by the event organizer, as well as by the construction and business tourism sectors as a result of the activity generated by the event organiser. The indirect impact corresponds to the effect on local organisations of investments and purchased goods and services. Then, the induced impact (i.e. the expenses induced by the spending of the primary income by local residents and companies) is calculated. Finally, the overall economic impact is estimated by adding the primary income to the induced impact.

		EXPENDITURES	
		Inside the reference area	Outside the reference area
REVENUES	Outside the reference area	Positive Impact	Neutral impact
	Inside the reference area	Neutral impact	Leakage

Figure 2. Net injection<sup>1</sup>

<sup>1</sup>Adapted from Junod (2005) and Preuss and Weiss (2003): injection having a positive impact in the reference area. Cf. section 4.3.3 for more details.

**DEFINITIONS:**

Direct impact: effect of salaries and social security contributions on local residents.

Indirect impact: effect of purchased goods and services and investments on local companies.

Induced impact: expenses induced by the spending of the primary income by local residents and local companies.

Injection: spending of an economic actor in a reference area.

Marginal propensity to consume: proportion of a change in the disposable income that would be spent on consumption instead of being saved. It is computed by dividing the change in consumption by the change in disposable income that caused it.

Marginal propensity to import: proportion of a change in the disposable income that would be spent on the consumption of imported goods and services.

Net injection: spending inside the reference area that is financed by revenue from outside of the reference area.

Overall economic impact: sum of the primary income and induced impact.

Overhead costs and profit margins: combination of finance charges, taxes, risks and profit.

Primary income: sum of the direct and indirect impacts.

### 3. ADAPTING THE METHODOLOGY TO THE OLYMPIC GAMES

We apply this economic impact methodology to estimate the overall economic impact (direct, indirect, and induced) of the Olympic Games. There are two distinct areas of activity related to the Games that generate injection of economic resources : Games organisation and capital investment. The economic impact of the Olympic Games can be estimated through measuring the direct, indirect, and induced effect of these two areas.

More in detail, the expenditures incurred to finance the Olympic Games are covered from two distinct formal budgets: the Organising Committee for the Olympic Games (OCOG) budget, and the Non-OCOG budget<sup>1</sup>.

The OCOG budget is mainly privately financed through a large contribution from the IOC—in multiple forms—and other private revenue sources (i.e. domestic sponsorship, ticketing, licensing). It covers all types of operating expenses and functional investments that the OCOG will undertake for organizing the Games. These expenditures refer to employment of workforce and all activities related to venue operations, technology, and Games services. Other OCOG expenditures fund projects in sports for all development (i.e. sport participation) for instance, yet not related directly to Games organisation (for example: Paris 2024 has created an endowment fund of 50 million euros to invest in social innovation through sport; LA28 is investing 160 million dollars in PlayLA, a youth sport programme implemented by the city of Los Angeles).

The Non-OCOG budget is generally under the control of local authorities and comprises several components, including the budget of capital investments and an operational budget. Since the reforms of the Olympic Agenda 2020/The New Norm, the IOC does not require any venues to be built for the Games. Any capital investments must meet a long-term need and originates from a city, region or country planning for its own future. Therefore, capital investments budget must contain detailed financial and operational information that is related to construction or renovation of permanent competition and non-competition infrastructure needed to host the Games. More specifically, such investments may include sport facilities, residential housing, transportation infrastructure, technological infrastructure, conference and tourism facilities, as well as accessibility. The financing of such investments is usually undertaken by public authorities and/or the private sector. Infrastructure that has further-reaching and longer-term implications for a reference area and are not attributed to the hosting of the Games should not be considered in the impact estimations.

Operational budget, instead, include expenses and functional investments associated with the operational services that public authorities will provide in support of the Games (e.g., security, transport, medical services, customs and immigration).

Figure 3 summarises the types of expenditures as well as the sources of financing of Olympic Games, in accordance with the Olympic Agenda 2020/The New Norm.

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<sup>1</sup> Source: [https://olympics.com/ioc/faq/roles-and-responsibilities-of-the-ioc-and-its-partners/how-are-the-olympic-games-financed\(30.1.2023\)](https://olympics.com/ioc/faq/roles-and-responsibilities-of-the-ioc-and-its-partners/how-are-the-olympic-games-financed(30.1.2023))

# THE DIFFERENCE BETWEEN OLYMPIC GAMES ORGANISATION AND CAPITAL INVESTMENTS



OLYMPIC GAMES ORGANISATION			CAPITAL INVESTMENTS	
Organising committee operational budget – mainly private	REVENUES	EXPENDITURES	Private /public	Sports facilities
	IOC contribution	Venue operations		Residential housing
	Domestic sponsors	Workforce		Transport infrastructure
	Ticketing	Technology		Technological infrastructure
	Licensing	Games services		Conference and tourism facilities
Public budget	Government revenues from economic impact generated by the Games	Security		Accessibility
		Medical		
		Customs		

Table not to scale/comparative

Capital investments represent a country and region investing in its future. Since Olympic Agenda 2020/ the New Norm, there can only be capital investments – such as new construction – if there is a long-term legacy need. Such investments are therefore not part of the Olympic Games organisation budget.

Figure 3. Financing and expenditures of Olympic Games (source: Olympics.com)

Based on the proposed methodology, both operating and capital expenditures that are spent in the reference area and are financed through the OCOG and the Non-OCOG budgets will be considered as injection. Moreover, economic impact estimations must take not only all expenditures to finance Games organisation and capital investment, but also all tourism-related expenses incurred by attendees such as accommodation, food and beverage, and local transportation, as a result of the activity generated by the economic actors, into consideration (CDES 2016; Oxford Economics 2016). Other relevant injections to the host region may include expenditures controlled by other entities and linked to Olympic Games, such as additional expenditures in elite sport development in the host country, through joint marketing agreement between the IOC and the National Olympic Committee.

# 4. ECONOMIC IMPACT CALCULATION

## 4.1 Scope definition: Types of expenditures, reference area, period, and economic actors

We define the scope of the Games’ economic impact calculation through the following elements: types of expenditures generating impact, geographical area, time periods, and spending organisations.

### 4.1.1 Types of expenditures

Overall, economic impact estimations must consider all expenditures to finance Games organisation, capital investments, and tourism-related expenses. In particular, the assessment scope should be aligned with the Games budget. For example, the economic impact from expenditures on medical services or refurbishment on competition/training sites should only be included if they are clearly assigned as Games-related costs.

Moreover, the scope should be aligned with the venue master plan. For example, the economic impact from expenditures on construction sites should be limited to venues classified as “temporary”, “existing with permanent upgrades” and “new additional” in the master plan of host sites. Figure 4 displays a table summarising the classification of venues.

<b>Temporary</b>		Shell is temporary. When all the infrastructure of the Games is dismantled, the site is returned to its previous condition.
<b>Existing</b>	Same purpose	Venue already existing. Building shell and footprint remains the same; no major deconstruction/reconstruction. Current purpose of venue is the same as the Games time.
	With permanent upgrades	Venue already existing. Building shell and footprint remains the same. Major upgrades, including partial deconstruction/reconstruction.
<b>New</b>	Planned	No existing facilities before the time of future host election, or deconstruction/reconstruction which changes building shell and/or footprint. Building permit approved, funding scheme secured and legacy plan completed at the time of future host election. Facility will remain after the Games.
	Additional	No existing facilities before the time of future host election, or deconstruction/reconstruction which changes building shell and/or footprint. Facility will remain after and was built because of hosting the Games

Figure 4. Classification of venues

Finally, the scope should also be aligned with the carbon footprint assessment (IOC 2018). Activities considered out of scope for the carbon footprint, should also be out of scope for the economic impact.

In particular, scope definition should be precise that economic impact integrates both Olympic and Paralympic Games.

### 4.1.2 Geographical area

The reference area identifies where the impacts arise and commonly refers to the geographical region hosting all sport events and activities associated with the Olympic Games that take place during the reference period. Careful definition of the reference area is crucial for measuring economic impact accurately as the extent of the impact varies based primarily on the geographical territory involved (e.g. local, regional, and national) in relation to two reasons. First, it affects the geographic allocation of expenditures which generate impact: the more resources are expended inside the area, the higher the injection, the bigger the impact. Second, it determines the origin of revenue: the more revenue originates from actors coming from outside the area, the higher the net injection, the bigger the impact.

Generally, the economic impact of the Games may accrue to the host city, to the wider region or to the nation as a whole. It is important that the assessment is aligned with the objective: for example, spending to promote sports participation across the country should be assessed at a national level rather than just at host city level. Although the host city may be interested in the impacts of the Games on the city or the region, the national government of the host nation that typically underwrites parts of Games spending may be required to evidence the national impacts. Similar to other studies (Derchi & Stricker, 2022; Bousigne & Stricker 2015; Nassar & Stricker 2007), therefore, it is recommended to measure the impacts of Olympic Games for multiple geographical areas (i.e. local, regional, and national) to align better with the different objectives of multiple stakeholders and capture the variation in the effects on different areas. More specifically, defining the local and regional reference areas requires careful analysis and direct discussion with OCOG to identify geographical boundaries with precision. To ease data collection, it is advised to understand the postal code system of each reference area or how the area can easily be defined using digit numbers or other specific codes (Derchi & Stricker, 2022; Bousigne & Stricker 2015; Nassar & Stricker 2007). Caution should be placed when considering multiple reference areas as it adds to the complexity in data collection and calculation. For example: tourism impacts could vary significantly based on the reference area as injections from national tourists coming from outside the reference area should be considered for the host city or the wider region, while they should be excluded for a national level assessment.

### 4.1.3 Time period

The reference period identifies the time when the economic impacts are generated. In particular, the impact of the Olympic Games can arise before, during and after the event depending on the sector impacted and the purpose of the spending being considered.

For spending on Games organisation, the reference period starts with the creation of OCOG and ends with its dissolution. It therefore covers the full lifecycle of the Games, including all activities and events that relate to Olympic and Paralympic Games and occur before, during, and right after the sport competitions.

For capital investments in constructions and other operational spending on legacy programmes, the impact may accrue over several years, well after the Games have been held. Nonetheless, the analysis should capture the full impact of the spending. This implies either

extending the assessment period over the entire time span of the investment plan post Games or, if it is curtailed, taking into account any estimated residual value<sup>1</sup>.

Also for spending on the tourism sector, a longer period should be defined to better capture post-Games effect. For example, the reference period for the tourism sector could be defined as 5 to 10 years after the conclusion of the Games, in accordance with prior studies (CDES, 2016; Oxford Economics 2016).

To capture the overall impact of the event, results are generally presented in aggregated way as a X-year total, providing a single measure for the entire period. Results could also be reported on a specific temporal basis to identify the value generated across different phases of the event (e.g., before, during, and post the event).

In some cases, specific analyses should be conducted to separate the economic impact of activities performed under certain circumstances that could bias the results (e.g., activities taking place during Covid-19 pandemic should be examined separately given the multiple constraints affecting regular event organisation). Irrespective of the preferred way of presenting findings, data should be collected on a temporal basis to allow better scrutiny. Impact assessment can vary based on the type of analysis performed (Barget 1997, 2001).

Ex-ante analyses employ estimated data and focus on planned operating and construction costs, an estimate of the number of visitors expected, and the number of days of stay and expenditure of each visitor during and after the event (Matheson 2006). Conversely, ex-post analyses employ actual data and examine the evolution of the economic situation in the reference area (Baade & Matheson 2002). Overall, ex-ante studies should be followed by ex-post studies completed within 3 months after the publication by the OCOG of the Annual Financial Statements following the host of the Games. In particular, ex-post studies focus on the economic impact generated before and during the event. To complete the full assessment, follow-up analyses should be performed to measure the long-term impact of the Games on the construction and the tourism sectors.

#### 4.1.4 Organisations

For Olympic Games, the main reference organisations are commonly OCOG and other public or private organisations controlling the capital investments and operating expenditures, commonly referred as delivery partners. Other relevant economic actors include event attendees and the IOC as event owner. Projects in direct relation with the event and undertaken by other entities should also be factored in. For example: if the central government or the municipality of the hosting region establishes an organisational entity in charge of coordinating some parts of the event (e.g. security and medical services), it should be factored in.

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<sup>1</sup> For example, Oxford Economics (2016) used a 5-year period to measure the actual impact on constructions after London 2012 Olympic and Paralympic Games. CDES (2016) used a 10-years period to project the expected impact on constructions post Paris-2024 Games.



## 4.2 Calculation method

We build on the methodology proposed by Barget. (2001), following Stritt. and Voillat (1998), that defines a tangible economic impact as the product of a net injection and a multiplier. Figure 5 shows a simplified model to calculate the overall economic impact of a sporting event. The net injection identifies the spending flow of an economic actor in the reference area that generates added impact to the local economy. The multiplier captures the additional effect in spending and employment in the given area that is activated by the net injection.

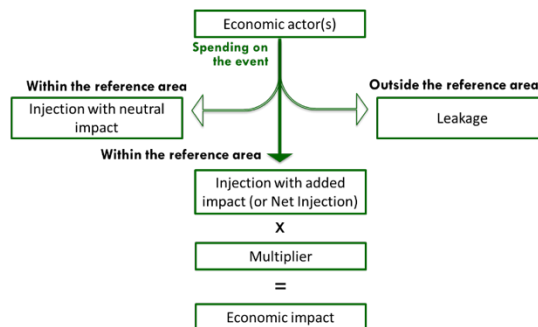


Figure 5. Simplified model to calculate the overall economic impact

More in detail, the process to calculate the economic impact of a large sport event like the Olympic Games requires six consecutive steps (see calculation flow in Figure 1).

## 4.3 Calculation of the impact

### 4.3.1 Step 1. Calculation of the injection

The first step toward estimating the economic impact is to isolate the spending of economic actors (i.e. OCOG, delivery partners, and attendees) in the reference area. This is called the injection. Spending outside the reference area is not considered. Consequently, when calculating the injection for a specific region R, expenditures in the rest of the country or in the rest of the world are excluded.

The injection is calculated for each type of spender— OCOG, delivery partners or attendees—and for each category of expenditure—salaries and social charges, goods and services, functional investments, overhead costs, and investment in constructions. Information on profit margins should also be identified as a source of future potential spending in the reference area.

Moreover, calculations should take all expenditures incurred for the Games organisation, as well as by the tourism and construction sectors, as a result of the activity generated by the economic actors, into consideration.

In particular, for Games organisation, the following types of expenditures should be identified: expenditures for salaries and social charges for the employment of workforce; and expenditures for goods, services and functional investments associated with value operations, technology, Games services, security, medical, and custom-related activities.

Constructions generally include sport facilities, residential housing, transportation infrastructure, technological infrastructure, conference and tourism facilities, as well as accessibility. Information on the cost structure of economic entities in the construction sector can be often derived using archival data (if available) or through prior evidence (if applicable). Ideally, distribution of expenditures should be collected per each subsector that presents significant differences in their cost structures. Accordingly, the construction sector can be spitted in architectural and engineer services and activities related to execution of construction (Barget 1997, 2001). A two-step procedure is commonly used for data collection and calculation. First, spending data for each construction subsector could be retrieved from direct surveying the delivery partners or the OCOG or from indirect archival data. Second, the distribution of expenditures by category should be computed using archival statistics for each subsector identified.

The tourism sector can be generally organized in accommodation, food and beverage (F&B), local transportation, and miscellaneous services. Overall spending in accommodation, food and beverages, local transportation, and miscellaneous is derived directly through surveying the OCOG, IOC, and attendees. Subsequently, information on the average cost structure should be derived for each subsector—using archival data (if available) or through prior evidence (if applicable)—to compute related expenditures by category.

Figure 6 displays a table summarizing the outcome of this data collection effort. Similar examples of cost structures by subsector used in economic impact studies can be found in Stritt & Voillat (1998) and Nassar & Stricker (2007).

		Sector						
		Games Organisation	Venue Construction & Urban Infrastructure		Tourism			
			Planning	Execution	Accommodation	Food & Beverage	Local Transportation	Misc.
Expenditures by category	Salary & Social Charges							
	Goods & Services							
	Functional Investments							
	Overhead Costs & Profit Margins							

Figure 6. Collection of injection

4.3.1.1 Clarification on the categories of expenditures

Salaries and social charges

They include salaries and social contributions as well as per diem, pension fund contributions, vouchers, and employees' benefits for multiple workforce categories: contracted employees residing in the reference area; staff contracted through placement agency who reside in the reference area; secondees that have been relocated to the reference area or local secondees

(hence not relocated to the reference area) who are replaced in their organisation of origin. If salary of secondees is not known, an alternative approach is to take an estimate using the average salary and social charges of a contracted employee.

In contrast, this type of expenditures exclude other workforce categories: workers deployed and/or living outside the reference area; consultants providing services that should be captured under goods and services; other individuals receiving a retribution for services provided during an event (e.g. volunteers, ITOs, NTOs). In particular, should it be an individual retribution to cover 'tourism' expenses (i.e. accommodation, F&B, local transportation, miscellaneous), it should be accounted as part of the tourism sector; should it be an individual retribution in exchange of services provided, it should be accounted as part of the Games organisation sector.

In addition to injection, it is important to gather information on the number of employee headcounts and full-time employees, ideally by area of residence of the workers. This data facilitates a better understanding of the impact on employment and it is used for communication purposes. In particular, the number of employees is defined in terms of number of job positions employed during the reference period. For instance, if 25 new workers are hired and other 25 workers leave from the same organisation in a given year, the number of positions employed accounts to 25 employees, not 50.

Accordingly, for this category of expenditures, injection to the reference area comes only through salary and other charges provided to workers who not only work and live inside the reference area, but also meet one of following conditions: they are employed directly by OCOG; they are seconded to OCOG by central authorities; they are seconded by local authorities that replace them with other staff. In Figure 7, we summarize what is considered as an injection of salaries and social charges from a OCOG.

					Salaries & social charges	Per diems, benefits, etc.
Workers working outside reference area					No injection	No injection
AND living outside the reference area					No injection	No injection
Workers working inside the reference area	AND living inside the reference area	Employed by OCOG			Injection	Injection
		OR seconded to OCOG	by central authorities		Injection	Injection
			OR by local authorities	replaced	Injection	Injection
				not replaced	No injection	Injection

Figure 7. Simplified representation of injections from salaries and social charges for an OCOG

**Goods and services**

These expenditures include all types of expenses incurred by OCOG and other reference organisations for the purchase of goods and services from external suppliers. Some examples for OCOG can include: expenses to acquire goods used in preparing and coordinating multiple activities such as merchandising, presents, medals, office materials, and sport

equipment; expenses for external services such as publication, insurance, telecommunications, mail & freight delivery services, trademarks and protection, technology, as well as consulting, audit, and legal services; meetings/commissions expenses such as travel, accommodation, vehicle and residence expenses; other running expenses such as maintenance, energy, rent, and leasing; taxes and financial expenses excluding financial placements.

In particular, expenses for accommodation, food and beverage, local transportation, and other travel-related purchases incurred by OCOG or IOC to host or reimburse attendees should be deducted from the expenses of the reference organisations and captured under tourism expenses. This avoids double accounting issue and allows a more meaningful communication on the impact on tourism. The amount of the injection should be inclusive of VAT. Ideally, an estimation of VAT should be collected for more effective communication on public contribution resulting from the event.

### Functional investment

This category of expenditures includes functional investments, such as furniture, equipment and leasehold improvements, as well as information technology systems. It excludes construction-related investment such as buildings and infrastructures.

### Overhead costs and profit margin

Overhead costs refer to general administration and structure-related expenses that central and local authorities may incur to support the organisation of the event which is under the direct responsibility of OCOG (e.g., depreciation or rent expenses for public offices given to OCOG for free usage; general administration, accounting, and legal services provided by central and local authorities to OCOG for free; finance charges, taxes, other ...).

Given the indirect nature of these expenses, information on overhead costs is, in general, difficult to gather with adequate precision. In addition, overhead costs should be of relatively low amount as all expenses associated with conducting the event should be recorded directly by the OCOG in its books. As a result, main overhead costs are generally accounted under goods and services purchased by OCOG. However, caution should be placed for overhead costs for secondees, that should be captured under the transferring institution or not, depending on the working location of the secondees.

Profit margins should be considered only if positive, as they represent a source of future spending on the reference area. Moreover, OCOGs are often established as non-for-profit organisations, that should lead to any revenues that exceed expenses to be committed to perform activities for the organisation's purpose—commonly, some collective, public, and social goals. However, uncertainty still exists on the actual spending of these resources. For conservatism reason, therefore, it could be recommended even to exclude any profit amount from the injection. Overall, experts preparing an economic impact analysis should decide and explain clearly how overhead cost and profit information should be treated<sup>1</sup>.

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<sup>1</sup> E.g., overhead cost and profit information was included in two studies on the economic impact of International Sport Organisations in Switzerland, for the periods 2004 to 2007 (Nassar & Stricker 2007), and 2008-2013 (Bousigne & Stricker 2015;), yet it was not factored in the following study for the period 2014-2019 (Derchi & Stricker, 2022).

### 4.3.1.2 Clarification on the sectors

#### Construction

Each city/region/country hosting the Games commonly has a long-term investment plan for general infrastructure which entails wider infrastructure investments that will be undertaken independently of the Games, such as investments in roads, airports and rail ways. How this investment plan is funded and the scope of the plan is a function of what already exists in the city and the long term development vision of the city and country.

To estimate the impact specific of Olympic and Paralympic Games, only construction expenditures that can be attributed to the hosting of Olympic Games should be considered, such as the refurbishment of an existing venue to comply with competition rules, temporary venues and new permanent additional venues, as discussed in 4.1.1.

Infrastructure that has further-reaching and longer-term implications for a reference area and are not attributed to the hosting of the Games should not be considered in the impact estimations. Cost and impact of constructions that are not exclusively attributed to the event but receive a significant acceleration in their execution could possibly be considered if they are also in scope of non-OCOG budget and Games carbon footprint. This is, for example, the case of a residential housing whose construction was officially approved before the establishment of OCOG and whose deadline for completion was shortened as compared to original development in order to meet the hosting need of the event.

As previously mentioned, constructions generally include: sport facilities, residential housing, transportation infrastructure, technological infrastructure, conference and tourism facilities, and accessibility. Figure 8 summarizes the types of construction expenditure and the criteria for inclusion as injection.

		« YES » Exclusive attribution	« NO » Exclusive attribution		
			« YES » Significant acceleration	« NO » Significant acceleration	
Capital expenditures	Value construction	Sport facilities	I	PI	NI
		Technological Infrastructure	I	PI	NI
		Accessibility	I	PI	NI
	Urban infrastructure	Residential housing	I	PI	NI
		Transportation infrastructure	I	PI	NI
		Technological Infrastructure	I	PI	NI
		Conference and tourism facilities	I	PI	NI
		Accessibility	I	PI	NI

Figure 8. Injection of capital expenditures

I = Injection; PI = Possible Injection (depending on alignment with budget and carbon footprint methodologies); NI = No Injection

As the impacts of the Olympic Games on the construction sector can arise over multiple years after the event being held, a longer period is required to measure post Games effects. For example, expenditures to convert the Olympic Village to residential or commercial housing can be incurred post Games generating further injections into the local economy (Oxford economics 2016). Generally, a period of 5 years after the conclusion of the Games is recommended based on prior evidence documenting the entire time span of the impact on the construction business (Oxford economics 2016). Data on capital investments on constructions over this time period must be gathered to determine the spending amount injected into the sector after the Games.

### Tourism

To calculate the total injection of the Olympic Games into the tourism sector, expenses from non-local attendees must be estimated for each spending category: accommodation, food and beverage, transport, and miscellaneous.

In general, attendees to multiple events (ticketed as well as non-ticketed), related to the main sport competition and taking place during the whole reference period, should be considered: This includes: attendees to meetings/events prior to the main competition; attendees to test events that would not have taken place if the host had not organised the main event; attendees to side events; and attendees to the main events. Each category of attendees must be clearly defined. Generally, the following categories of attendees are considered for Olympic Games: spectators, athletes, coaches, technical officials, media, contractors, volunteers, OCOG guests, as well as guests of the IOC and other guests (accompanying guests should also be accounted).

For each category of attendees and each type of spending, its cost center—the entity incurring the expense (i.e. OCOG, IOC or other organisation or attendee)—must be clearly defined to avoid missing information or double accounting issues. Indeed, partial information on injection from attendees is often known directly through the accounting systems of OCOG and IOC (i.e., for categories of attendees whose expenses are covered directly by these entities).

In particular, ticketing expenses are not captured under spectators' expenses but ticketing revenue is captured at the level of the OCOG, so that this amount is not counted twice. For communication purposes, however, ticketing expenses could be added to spectators' expenses to provide more accurate and complete information on the impact on tourism. Caution is required to estimate the biasing effect on ticketing revenues due to buyers from outside the reference area who might be buying for spectators from inside the reference area.

When injection is not known directly through the accounting systems of OCOG and IOC, surveys should be used to gather data directly and estimate the spending patterns of a sample of attendees representative of the reference population. Should it not be possible to survey each category of attendees, similarities can be drawn between different categories. Patterns of spectators attending opening and closing ceremony should be differentiated due to the large population size.

In addition to estimate injection, it is important to identify the number of attendees with sufficient precision, and ideally by category of attendees. The number of (both total and individual) attendees must be calculated for each category of attendees when the estimation of spending patterns is conducted through a survey. Ideally, the number of accredited people can be derived from the accreditation system (if pre-set to extract this information); yet only activated accreditations must be considered to produce a meaningful estimate. Overall, conservative estimates are recommended to compute these values.

In particular, the number of spectators should be calculated for both ticketed and non-ticketed events. For ticketed events, the ticketing system can be used to calculate the number of spectators only if it differentiates the following information: the number of individual spectators from the number of cumulative spectators (given by the number of tickets) as one individual can hold multiple tickets for the same day; the no-shows; multiple re-entries at a given event; and information on opening/closing ceremonies. For non-ticketed events, a venue tracking system can be used only if it differentiates multiple re-entries at a given event. Alternatively, a photo analysis can be performed to estimate the number of spectators. If possible, all photos capturing a venue should have been taken at the same time to avoid counting a spectator who has moved in the venue multiple times. If the ticketing or venue tracking system does not allow this, the number of individual spectators can be derived from the number of cumulative spectators. This could be calculated by dividing the number of cumulative spectators by the average number of events attended by an individual. This information could be retrieved from survey results.

As the impacts of the Olympic Games on the tourism sector can arise over several years after the event has been held, the analysis would require a longer period to capture post Games effects. In particular, a period of 50 to 10 years after the conclusion of the Games is recommended based on prior evidence documenting the time span of the Games' influences on tourism business (CDES, 2016; Oxford economics 2016). Over this time period, annual or bi-annual surveys can be administered to capture the proportion of total visitors to the host city or region who have been driven by prior Olympic Games as well as their spending patterns. In this way, injection into the tourism sector after the Games can be estimated using a calculation method that is consistent with the one proposed to assess the impact of event attendees before and during the Games.

### 4.3.2 Step 2: Calculation of the external revenue

The second step toward estimating the economic impact is to isolate the revenue of economic actors (i.e., OCOG, IOC, commercial partners and attendees) from outside of the reference area. This is called external revenue. Revenue from inside a reference area is not considered. For example, in the case of Olympic Winter Games PyeongChang 2018, direct funding from local governmental entities should be excluded when calculating the external revenue in the counties of PyeongChang, Jeongseon, and Gangneung where venues for sport competition were located. By contrast, funding from central government, the IOC and Top Olympic Partners (TOP) should be considered as external injection.

All sources and types of revenues should be considered, including cash and on credit revenues as well as in the form of value in kind. In general, revenue estimates should not include VAT.

Moreover, revenue from domestic commercial partners with global headquarter located outside of the reference area (e.g. international sponsor), should be considered as external if the sponsorship deal funds come from the parent company, regardless of a local branch being established. The same applies to other economic actors located inside the reference area which increase the share of their spending to the local economy to finance part of the event .

Ticketing revenue from spectators is commonly captured at the level of OCOG (as revenue) but is not captured under the tourism sector (spectator's expenses). In this way, this amount is not counted twice. In line with established assumptions, revenue from tickets sold to local spectators cannot be considered as external revenue.

### 4.3.3 Step 3: Calculation of the net injection

The third step consists of calculating the net injection in the economy. This corresponds to what is spent inside the reference area (injection) which is financed by revenue from outside of the reference area (external revenue). For attendees, in particular, only spending in the reference area by those living outside of the reference area are considered autonomous cash injections and should be accounted. For example, in the case of Olympic Winter Games PyeongChang 2018, spectators residing in the counties of PyeongChang, Jeongseon, and Gangneung should not be considered as it can be assumed that they would have spent their money in the reference region anyway, irrespective of the Games. Similarly, counties of PyeongChang, Jeongseon, and Gangneung government spending, both financial and in kind, in a number of cultural and educational projects should not be counted as it is a local institution. Moreover, everything spent outside of counties of PyeongChang, Jeongseon, and Gangneung area and covered by revenue from within PyeongChang, Jeongseon, and Gangneung region is considered leakage. The following simple formula summarizes the calculation of net injection.

$$\text{Net injection} = \text{Injection} \times (\text{External Revenue} / \text{Total Revenue})$$

The alternate way to proceed with the calculation of the net injection is to first identify the external revenue, and then determine with precision how much of this resource is spent inside the reference area. In practice, however, it is difficult to allocate each revenue to an expenditure. So, the ratio (outside revenue/inside revenue) is often applied to all expenditures of a same economic actor. Ideally, or at least wherever possible, should the allocation of a revenue be known, the origin of this revenue should be preferred to applying the ratio. Assuming, for example, that an OCOG has an outside revenue/inside revenue of 85%. As it receives \$10,000 from an outside sponsor to finance the purchasing of t-shirts sourced locally. Then the net injection for this specific revenue should be \$10,000 and not \$8,500.

To calculate the net injection of salaries and charges of a seconded employee of an economic actor A to an economic actor B, it is important to use the outside revenue/inside revenue of the economic actor A, not of actor B. For contracted employees, however, the OCOG outside revenue/inside revenue ratio should be applied.

Finally, to calculate the net injection in the tourism sector, it is important to identify only the injection of attendees coming from outside the reference area, and whose primary reason for visiting the reference area is represented by the event. Attendees coming from inside the



reference area or whose primary reason for visiting is not the event cannot be considered as it can be assumed that they would have spent their money in the reference area anyway, irrespective of the event. However, partial or full expenses of some attendees are often covered by the OCOG or another economic actor, making specific identification of net injection information more difficult. Application of the formula, therefore, results useful to calculate the net injection associated with this type of expenses: the injection of all attendees, regardless of their geographical residence, should be first identified, followed by application of the outside revenue/inside revenue ratio for the OCOG. A different procedure should be used to calculate the net injection of expenses that are paid directly by attendees. In this case, precise estimate requires identification only of the injection from attendees residing outside the reference area and whose primary reason for visiting the reference area is the event. Indeed, any injection from these attendees in the reference area is considered as fully covered by external revenue.

In sum, everything spent outside the reference area and covered by revenue from within the reference area is considered leakage. Figure 9 displays a simplified version of this model for identification of the net injection, based on Junod (2005), and Preuss & Weiss (2003).

		EXPENDITURES	
		Inside the reference area	Outside the reference area
REVENUES	Earned inside the reference area	Positive Impact	Neutral impact
	Earned outside the reference area	Neutral impact	Leakage

Figure 9. Calculation of the net injection

#### 4.3.4 Step 4: Calculation of the primary income

The fourth step consists of computing the primary income, which results from the combination of direct and indirect impacts.

The direct impact corresponds to the effect of salaries and social charges on local residents. This method takes salaries and social charges and an estimated portion of overhead costs and profit margins for the Games organisation, as well as by the construction and tourism sectors as a result of the activity generated by the OCOG, the IOC, and the attendees, into consideration. The following formula could be applied to compute the direct impact based on prior studies (Nassar & Stricker 2007, Stritt & Voillat 1998):

$$\text{Direct impact} = \text{salaries and social charges} + \frac{3}{4} \text{OCPM}^1$$

<sup>1</sup> OCPM (overhead costs and profit margins) corresponds to the combination of indirect administration and structure-related charges and profit. Experts should decide how to treat this amount; in particular, they could exclude it for conservative estimates.

The indirect impact corresponds to the effect of purchased goods and services on local companies. This method takes purchased goods and services and an estimated portion of overhead costs and profit margins for the Games organisation, the tourism, and the construction sectors as a result of the activity generated by the OCOG, the IOC, and the attendees, into consideration. The following formula could be applied to compute the indirect impact in accordance with prior studies (Nassar & Stricker 2007, Stritt & Voillat 1998):

$$\text{Indirect impact} = (\frac{1}{4} \text{ OCPM} + \text{goods and services} + \text{investments}) * \text{business multiplier (Kb)}$$

Based on Nassar and Stricker (2007), The value of the business multiplier corresponds to the rate of leakage. The smaller the reference area, the higher the tendency to import the goods and services required, and therefore the more likely it is that the value of the multiplier would be reduced. The value of the business multiplier is influenced by the propensity to consume, the propensity to import, and the marginal tax rate. Prior research has documented that these factors vary along time and differ significantly based on geographical and social characteristics (Matheson 2009; Pyatt & Round 1979). As a result, calculation of the business multiplier should be done for the reference area and taking into account the current circumstances at the time of the assessment. Moreover, previous studies show that different industries in a specific geographical area tend to have different business multipliers based on specific characteristics (Matheson 2009; Pyatt & Round 1979). Ideally, different business multipliers should be computed for different sectors within the reference area to reflect different local economic conditions.

#### 4.3.5 Step 5: Calculation of the induced impact

The fifth step toward estimating the economic impact is to calculate the induced impact. This refers to the expenses induced by the spending of the primary income by local residents and local companies. The following formula could be applied to compute the induced impact in accordance with previous studies (Nassar & Stricker 2007, Stritt & Voillat 1998):

$$\text{Induced impact} = \text{primary income} * \text{household multiplier (Kh)}$$

In line with this argument, Appendix illustrates the calculation of Kh.

It is worth mentioning that both data availability issues and advances in existing knowledge could change the application of a specific method to calculate both Kb and Kh multipliers. As a result, should the calculation method changes over the years, former results should be re-calculated with the new method to allow full comparison.<sup>1</sup>

In addition, the dynamic nature of these multipliers explains them being influenced by changes to the local economies. It is, therefore, recommended to estimate the economic impact of the event using different scenarios, depending on the chosen value of the multiplier. This procedure is particularly relevant for ex-ante studies or for events taking place in reference areas where the structural conditions of the local economy could not be captured fully by standard application of the model (i.e. existence of a substantive shadow economy).

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<sup>1</sup> Please refer to Appendix for an overview of calculation of Kh and Kb multipliers.

### 4.3.6 Step 6: Calculation of the overall economic impact

Finally, the overall economic impact can be estimated by adding the primary income to the induced impact.

It is important to note that, based on this method, effect on indirect employment cannot be accounted, in line with this approach being among the most conservative methods for economic impact assessment (Derchi & Stricker, 2022; Bousigue & Stricker 2015; Nassar & Stricker 2007).

Moreover, rather than looking at the absolute injection, sometimes it is more relevant to look at relative impact metrics such as the ratios impact/injection and impact/subsidies. The former ratio (impact/injection) measures the efficiency of the impact. Caution needs to be placed to calculate this ratio with precisions as injection data available for attendees from inside the reference area should be included as well. Without this information, only the efficiency ratio of impact/net injection could be computed. The latter ratio (impact/subsidies) also measures the efficiency of the impact but compares it only to the overall amount of fundings provided by public authorities (i.e. subsidies) to organize the event, rather than taking into account the overall injection (including both public and private financing).

## 4.4 Data collection

The impact of Olympic Games covers the impact of attendees, Games organisation and constructions. Based on defined reference periods, data should be collected before, during and after the event. The following steps for data collection, therefore, are recommended:

### 4.4.1 Phase I. Before the event: collection of financial and operational data from OCOG and delivery partners

Financial and non-financial data regarding the preparation of the event should be collected from OCOG, IOC and delivery partners. Consistency checks should be conducted to verify the accuracy of the information gathered and avoid double counting.

For instance, consistency of information should be verified between similar data provided by different organisational units or economic actors, such as headcounts and full time equivalents given by human resources and accreditation departments. Checks are often also needed on the inclusion of VAT in financial data (i.e. VAT should be removed from revenues and added on expenditures).

### 4.4.2 Phase II. During the event: attendee spending patterns survey

During the event, surveys with attendees across the whole event period should be conducted on a random basis to gather information on spending patterns related to the sport events. Accredited attendees commonly include athletes, delegation officials, national and international technical officials, OCOG as well as IOC family members, media and volunteers. As the OCOG often already conducts multiple surveys with key Games stakeholders (here identified as attendees) during and after the Games, the design of attendee spending patterns surveys should be coordinated to secure efficiency and avoid redundancy. To clarify

this point: it makes sense to conduct a survey with spectators on site, but for athletes, media, volunteers and others it would be more effective to add questions to existing surveys.

Results obtained from spectators are used as a primary source of data to calculate the impact of the non-local attending spectators.

Careful planning is needed to select the sample for the survey. Sample size should be defined depending on the expected estimated population for each category of attendees. The size of a sample influences the precision of the estimates as well as the power of the assessment to draw conclusions (Bickman & Rog 2008). Established statistical techniques can be used to determine the minimum sample size to ensure adequate accuracy (Bickman & Rog 2008).

To facilitate data collection and verification procedures, interviews could be administered online or face-to-face using electronic devices that allow automated data input and storage. Questionnaires should be available in multiple languages (at least, in English and local speaking language) and contain a limited number of questions to reduce response effort and improve the accuracy of replies (Bickman & Rog 2008).

#### 4.4.3 Phase III. After the event: collection of financial and operational data from OCOG and other relevant economic actors

Financial and non-financial data from OCOG and other reference organisations regarding the competition and all activities taking place also after the closing of the event should be gathered. Multiple exchanges of information and coordination are recommended to facilitate data collection and verification.

In particular, data on construction investments over the 5 years after the Games period must be gathered from the local authorities and delivery partners to determine the spending amount injected into the sector after the event being held.

In addition, annual or bi-annual surveys can be administered over the 5 to 10 years after the Games to capture the proportion of total visitors to the host city or region who have been driven by prior Olympic Games as well as their spending patterns.

## 4.5 Data reporting

Data reporting should differ depending on estimated results. In general, the following elements should be included in addition to a section explaining in adequate details the methodological aspects of the assessment: overall economic impact; distribution of impact per type (direct, indirect, and induced), economic actor, sector (Games organisation, construction, tourism), phase of the event (preparation and competition), and reference area; efficiency ratios, between external revenue (autonomous revenue) and injection in the reference area (minimal leakage), as well as in comparison with injection from local authorities; impact on VAT and direct employment; impact on tourism sector, also including information as number of nights, daily spending, origin of attendees; and impact on construction sector.

## 5. LIMITATIONS AND POTENTIAL MISTAKES

The calculations may be affected by multiple types of limitation. First, it is important to note that results from this methodology depend strongly on the primary data received from OCOG, delivery partners, and the attendees with limited possibility to control for their accuracy. However, verification is needed to ensure the quality of data gathered. For example, checks need to be performed to control for remaining double accounting issues (e.g., expenses from attendees on accommodation, food and beverages, and local transportation that are covered by the organizer should be captured under OCOG expenses but not under the attendees' spending; ticketing revenue from spectators should be captured at the level of the organiser but not captured under the spectators' expenditures). Verification also includes clarification through both face-to-face and online meetings, as well as other ways to exchange information.

Second, there are multiple mistakes that can be made in performing economic impact assessments and affect the quality of the estimates. We identify two main categories: errors related to the evaluation of the initial injection and errors in assessing the multipliers.

### 5.1 Errors related to evaluation of the initial injection

#### **Confusion between the weight and the economic impact of sport event.**

The former measures the total expenditure on the sport event in the region, while the latter measures only the additional wealth created by the event under assessment. The financial resources injected into the economy by visitors, media, public institutions, banks, and investors residing outside the territory must be taken into account exclusively.

#### **Inclusion of local spectators' expenses.**

This criticism is the most frequently encountered illustration of the confusion between weight and economic impact. If residents had not spent their money on these sporting events, they would have had it available sooner or later to buy other goods and services in the community: this is a transfer of expenditure, not a new economic stimulus. Expenditure which residents would have made outside for entertainment purposes, if the show had not existed, should in principle be considered as avoided leakage and made into net injection.

#### **Inclusion of subsidies from local public institutions.**

This does not represent new inflow of financial resources for the community. The money invested in the event has an opportunity cost, in terms of other projects that could have been carried out: building a school, etc.

#### **Non-exclusion of temporal displacement of visits and occasional visitors.**

Some visitors may have planned their visit for a long time, but have changed the date to coincide with the sports show. Burns, Hatch and Mules surveyed 21% of visitors who had moved their visit (1986). Other visitors may have already been in the area, and decided to go

to the sports show rather than to be entertained in some other way. In both cases, the expenditure incurred should be excluded from the analysis, as it is difficult to assess the expenditure actually incurred by the show. In any case, it is preferable to minimise the impact by making pessimistic assumptions, rather than the opposite.

#### **Failure to take into account a crowding out effect on the regular tourist clientele.**

The sports show, whose nuisance (congestion, noise, etc.) must not be overlooked, may encourage tourists who normally come to the region to cancel their visit or to move it. In the first case, there is a loss of wealth for the community, which must be taken into account. In the second case, there is a simple temporal displacement of expenditure by the usual tourists, with likely no significant consequence for regional wealth.

#### **No account is taken of the temporal displacement of public investment.**

Sporting events act as a trigger, but also as a means of accelerating work (for example, the construction of a motorway or a metro line is brought forward by ten years). Only those investments that were not decided upon before the official designation of the host city and that are completed by the opening ceremony should be included.

#### **Leakages at the injection are frequently omitted.**

Wages paid directly to local labour are in total a wealth input, whereas for the purchase of goods and services, part of the expenditure will take the form of regional leakage if the product has been imported.

#### **Presence of double counting.**

The same amount should not be counted twice. For example, ticketing receipts should not be counted at the same time as the expenses of the organising committee, which they are partly used to finance.

#### **The flows should not be formulated in current currency, but in constant currency taking into account inflation.**

As the expenditure associated with a one-off event is mainly spread over a period of six years, the failure to take account of currency erosion removes any credibility from the economic benefits calculated.

## **5.2 Errors in assessing the multiplier**

#### **A sales multiplier is often used rather than an income multiplier.**

The increase in regional wealth measured by the economic impact concept is not embodied in the volume of sales achieved, but in the portion that will be transformed into local income. Expressed differently, it is necessary to reason in terms of value added and not in terms of turnover.

#### **The adoption of an employment multiplier.**

The measurement of benefits in terms of job creation is inappropriate in the case of sports entertainment, and particularly in the case of one-off sports events. The spike in demand is by definition short term, so companies will cope by increasing the use of existing employees rather than hiring. Only sustainable jobs should be included.

#### **Inadequate definition of the reference area.**

The choice of area of analysis affects the value of the injection, but also the value of the multiplier, as the structure of the host community is decisive.

**The use of multipliers taken out of context.**

The value of a multiplier cannot be used for another territory than the one for which it was established. Each situation is different. Where a multiplier cannot be calculated, the most prudent approach is to "borrow" the multiplier from a similar region and present the results in tables with alternative multiplier values.

## 6. CONCLUSIVE RECOMMENDATIONS

### Limit and define the purpose of the study.

This can save time and make the results more useful and specific.

### Prepare alternatives to be considered.

For *ex-ante* analyses, the number of alternatives to consider depends on the number of realistic options available and other constraints, such as time, information, funding, and political realities. It is a very useful activity for leadership to narrow down the number of alternatives to the three or four realistic ones to include in the analysis. For example, in the *ex-ante* economic impact study of Olympic Games Paris 2024, three different scenarios have been considered: low, most-likely, high (CDES 2016).

### Accumulate sufficient information to conduct a meaningful economic impact assessment.

In order to produce accurate estimates, appropriate and diverse information for the study needs to be collected such as a demographic profile of visitors and study respondents, the degree of economic development of the host community, fiscal impact, and other social guidelines. This information is effective in preparing research questionnaires and other necessary research instruments.

### Conduct a study based not on assumptions, but on evidence and information.

One of the debatable problems mostly in *ex-post* economic impact studies is that the researcher relies often on assumptions. These assumptions do not lead to accurate results and apply to the community's decision to host a sports event.

### If possible, consider all types of impact on the community and not just the economic impact.

Economic impact studies should be complemented by studies of social and environmental impacts. Often, positive and negative impacts on community life such as increased sport practice in the host community, vandalism, increased use of active transport modals, increased traffic congestion, and environmental restoration or degradation are not considered and reported. Sometimes, however, social and environmental impacts can be more important to a community than the economic impact.

Both the tangible and intangible impact of a sport competition should be assessed (Solberg and Preuss 2007; Preuss 2007). Intangible effects include both multiple social benefits (e.g., quality of life of the inhabitants, catching up on the development of certain areas and industries, feelings of national pride, development of the elite sport system) and changes to the reputation and image of the host country/region that go hand in hand with the opportunity to make a region more attractive for tourists and visitors after the event (Barget & Gouguot, 2010).

In addition, further analyses can focus on the economic impacts as perceived by who experiences them. The economic impacts of the Olympic Games may indeed accrue unevenly across different social groups in society (e.g., by income, age, gender, ethnicity). But the value people attach to the impacts may differ: for example, low income groups may attach a



higher value to the same tangible impact than those on higher incomes, and it would be appropriate to attach greater weight to such benefits.

**Do not exaggerate the results of the study.**

Since the results of an economic impact study may lead to a decision to use public tax support, the political sponsor may tend to exaggerate or misinterpret the results of the study. This is often the case for ex-ante studies used to provide evidence and legitimize use of public funding.

**On the side of estimating economic benefits, it is better to underestimate than overestimate.**

The promoter of a sports event frequently exceeds the estimates of its projects to attract public approval and political support. This is related to moral and ethical issues. Even if no one can produce an exact estimate of sports events, researchers should keep the study based on the outcome data. Furthermore, based on the results, other alternatives for the sport event can be considered.

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# APPENDIX - METHODOLOGY TO CALCULATE MULTIPLIERS K<sub>B</sub> AND K<sub>H</sub>

The calculation of the business (K<sub>b</sub>) and household (K<sub>h</sub>) multipliers for a given region draws on draws on M. Zarin-Nejadan and A. Schneiter (1994).

$$K_h = 1/(1-(1-MPI)*(1-t)*MPC)$$

$$K_b = (1-MPI)/(1-(1-MPI)*(1-t)*MPC)$$

where:

MPI = import-related share of the marginal propensity to consume

MPC = marginal propensity to consume

t = marginal tax rate

For the case of a sport event, we can assume that the additional tax revenue is not saved but spent as it has not necessarily been budgeted<sup>1</sup>. Hence the marginal tax rate is not considered as a leakage and is not included in the formula, so:

$$K_h = 1/(1 - (1 - MPI)*MPC)$$

$$K_b = (1-MPI)/(1-(1-MPI)*MPC)$$

## Calculation of MPI for a Country C

In a linear Import function,  $I = \alpha + \beta GDP$

where I is imports of goods and services;  $\alpha$  is the intercept;  $\beta$  is the MPI.

MPI for Country C is obtained econometrically by regressing imports of goods and services on the Gross Domestic Product in Country C using annual time-series data from the first year available to date. This data is available from the World Bank at <http://data.worldbank.org>.

We estimate the following by running a regression statistics on excel. (R-square obtained should be close to 1):

$$\text{Imports} = \alpha + \beta GDP + \varepsilon$$

where  $\alpha$  is the intercept;  $\beta$  is the MPC and  $\varepsilon$  is the error term

Which gives us: MPI<sub>country C</sub>

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<sup>1</sup> As do M.A. Stritt and F. Voillat (1998)

## Calculation of MPI for a Region R

In a small region, almost all goods are imported. In a very large region (the size of a country) very few goods are imported. The smaller the reference area, the higher the tendency to import the goods and services required. Frey and Häusel (1983) have proposed that, instead of a linear relationship, we use a logarithmic (convex) relationship between MPI and regional revenue. Therefore we use the natural logarithm (ln) of the regional revenue (Y) to model the MPI.

So we have  $MPI = -a (\ln Y)^b + c$   
with a, b, and c parameters to be defined.

We know 3 points:

	Y in USD	MPI
A very small country, with revenue equaling 1 USD, imports everything it consumes	1	1.0
Country C	$Y_{\text{country C}}$	$MPI_{\text{country C}}$
The world, which does not import anything	$Y_{\text{world}}$	0.0

So by solving the 3 equations we obtain the parameters a, b, and c, with  $c = 1$ .

<https://www.symbolab.com/solver/system-of-equations-calculator>

We know that:

$$Y_{\text{country C}} = (\text{xx}\%) Y_{\text{region R}}$$

So we can deduct  $Y_{\text{region R}}$  and subsequently  $MPI_{\text{region R}}$

## Calculation of MPC for a Country C

In a linear consumption function,  $C = \alpha + \beta Y$ , where  $\beta$  is the MPC.

We regress household consumption expenditure on the Gross Domestic Product in Korea using data available from all years.

The equation to estimate is  $C = \alpha + \beta Y + \varepsilon$   
where  $\alpha$  is the intercept,  $\beta$  is the MPC and  $\varepsilon$  is the error term.

We obtain  $MPC_{\text{Country C}}$

## Calculation of MPC for a Region R

We assume that the Region R has a similar MPC to Country C.

So  $MPC_{\text{Region R}} = MPC_{\text{Country C}}$

## Calculation of Kh and Kb for Region R

Based on 3.1.3 and 3.1.4 we know:

$$\begin{aligned} & \text{MPI}_{\text{RegionR}} \\ & \text{MPC}_{\text{RegionR}} \end{aligned}$$

$$\text{So Kh Region R} = 1/(1 - (1 - \text{MPI}) * \text{MPC})$$

$$\text{and Kb Region R} = (1 - \text{MPI}) / (1 - (1 - \text{MPI}) * \text{MPC})$$