PARIS 2024

EVALUATION OF THE ELITE SPORT EXPENDITURE AND SUCCESS OF 17 NATIONS

Veerle De Bosscher, Simon Shibli, Sofie Smismans, Andreas Ch. Weber et al.

SPLiSS

Co-AUTHORS

This book was written in collaboration with the following co-authors from 17 nations (in alphabetic order):

Abigael Lucas (Belgium; Wallonia), Botwina Grzegorz (Poland), Brosnan Gillian (Ireland), Codoni Davide (Switzerland), Coeckelberghs Tom (Belgium; Flanders), Courtin Olivier (Belgium; Wallonia), Descheemaeker Kari (Belgium), Ferkins Lesley (New-Zealand), Fornalik Jakub (Poland), Funahashi Hiroaki (Japan), Garin Jean-Michel (Belgium; Wallonia), Géczi Gábor (Hungary), Hayman Daniel (Denmark), Johnston Melody (New-Zealand), Kaszubski Rafal (Poland), Kejval Jiri (Czech Republic), Kendelényi-Gulyás Erika (Hungary), Lamsa Jari (Finland), Legg David (Canada), Létal Jan (Czech Republic), Mäkinen Jarmo (Finland), Mattsson Peter (Sweden), Mazzei Leandro (Brazil), Mitt Raido (Estland), Muñoz Joshua (Spain), Noble Gavin (Ireland), Poplawski Piotr (Poland), Cornac Powell (Ireland), Sherrard Peter (Ireland), Six Bert (Belgium; Flanders), Solanellas Francesc (Spain), Storm Rasmus K. (Denmark), Van Bottenburg Maarten (the Netherlands), van Der Roest Jan-Willem (the Netherlands), Weber Salome (Switzerland)

COLOFON

First published 2024 by Vrije Universiteit Brussel, SPLISS
Pleinlaan 2, 1050 Brussel

SPLISS
SPORTS POLICY FACTORS LEADING TO INTERNATIONAL SPORTING SUCCESS

a partnership of VUB Sheffield Hallam University Utrecht University

A catalogue record for this book has been requested
ISBN: ISBN 9789493409033

SPLISS is coordinated by: Vrije Universiteit Brussel (Belgium)
In joint collaboration with Sheffield Hallam University and Utrecht University

CONTENT


ZEGHDAR
8
BIZER
3
10

1. INTRODUCTION

In the run-up to the Paris 2024 Olympic and Paralympic Games, the SPLISS consortium invited nations with an interest in elite sport development systems to (voluntarily) take part in an exercise to quantify their nationally coordinated expenditure on elite sport. In total, 17 nations[1] accepted the challenge and participated in a benchmark study called **SPLISS Pillar 1 – Light 2024**. This report aims to evaluate the financial support for elite sport and to analyse the success achieved at the Paris 2024 Olympic Games. Funding is the first Pillar of the nine Pillar SPLISS model[2] and quantifies the most important input to the process of producing elite athletes capable of competing at the highest level of international sport. The objective for each nation is to be efficient with their financial budgets, striving to achieve optimal performance (i.e. outputs) with minimal support. This is an indicator of the efficiency of elite sport investments and the effectiveness of policies. The processes that show how funding is invested and how elite sport policy is developed in each nation, are not measured in this SPLISS Pillar 1 – Light 2024 study. This is reflected by Pillars 2-9, which are indicators of the throughput stage. Finally, as ever more nations strive for Olympic success by investing strategically in elite sport, resulting in increasing government funding globally[3], there has been a clear shift in discourse amongst these governments from winning Olympic medals to delivering societal outcomes or impact such as togetherness, national pride and identity, wellbeing, and boosting grassroots sport participation[4]. Figure 1 illustrates this process.

SPLISS Pillar 1 – Light 2024 focusses on funding (inputs) and performance (outputs)

Our analysis thus focuses on the input of finance and the output of medals using the Olympic Games in Paris 2024 as our primary case study.

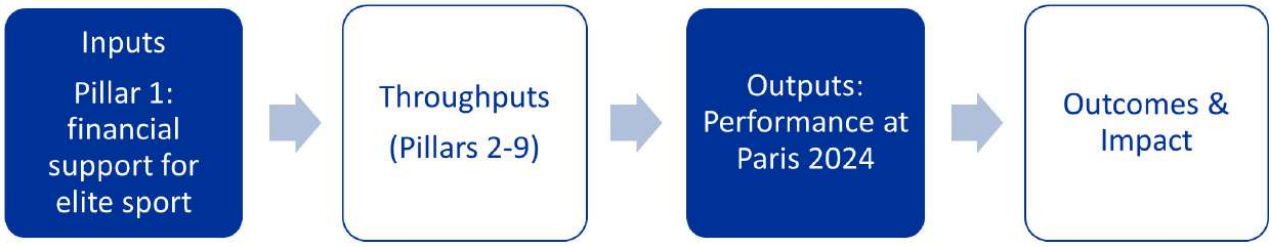


Figure 1. The SPLISS process diagram

Before starting the data analysis, a contextual overview of the factors shaping the Paris 2024 landscape is provided. This overview sets the scene for the subsequent sections: sample nations, outputs, inputs, inputs versus outputs, and conclusions.

1 18 if Flanders and Wallonia are treated as two distinct nations – see further.
2 See De Bosscher et al., 2006 for a complete overview of the SPLISS model. See www.spliss.net for an overview of publications.
3 A phenomenon that is known as 'the global sporting arms race' (Oakley & Green, 2001; De Bosscher et al., 2008).
4 See De Bosscher et al., 2021 for more information.

2. THE CONTEXT OF THE 2024 OLYMPICS IN PARIS: SETTING THE SCENE

Paris 2024 took place three years after the delayed Tokyo 2020 Olympic Games and represented, in theory, a return to 'business as usual' after the disruption caused by the Covid-19 pandemic. As real life takes place in an 'open system' there is never really a 'business as usual' and Paris 2024 had its own peculiarities that legislate against making 'like for like' comparisons, despite our finest efforts. The four major changes are discussed in the subsections below.

2.1 THE NUMBER OF EVENTS

After the largest ever increase to the Olympic programme in Tokyo 2020 to a record 339 events, Paris 2024 was an Olympics of consolidation, with the number of events reduced to 329 as shown in Figure 2.

At Paris 2024: 329 events were contested (10 less than Tokyo) and 1044 medals (36 less than in Tokyo 2020)

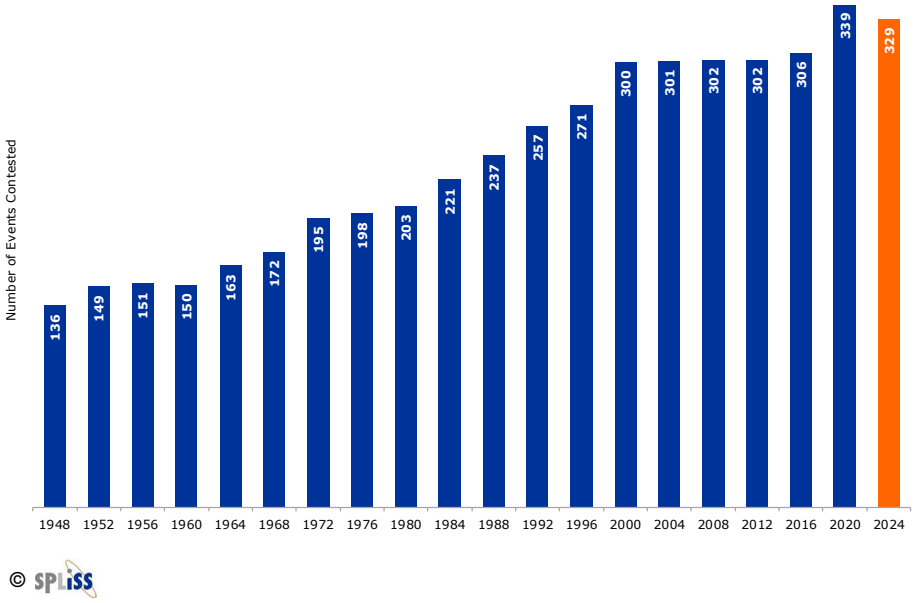


Figure 2. The number of events contested in the Olympic Games 1948-2024

In the 329 events, athletes from across the globe contested 1,044 medals comprised of 329 gold medals, 330 silver medals and 385 bronze medals, which reconciles as shown in Table 1. This is 36 (1,044 v 1,080) medals fewer than in Tokyo.

	Gold	Silver	Bronze	Total
Number of events	329	329	329	987
Wrestling extra bronze for repechage competition			18	18
Judo extra bronze for repechage competition			15	15
Boxing double bronze for losing semi-finalists			13	13
Taekwondo extra bronze for repechage competition			8	8
Swimming Men's 100m Breaststroke tie for second		1	-1	0
Athletics Women's High Jump tie for third			1	1
Canoe Women's K-2 500m tie for third			1	1
Gymnastics Men's Horizontal Bar tie for third			1	1
Totals as per final medals' table	329	330	385	1,044

Table 1. Reconciling the number of medals won to the number of events contested

The medals were won by 64 teams[5] which won at least one gold medal and 92 teams which won at least one medal of any colour.

5 Although the International Olympic Committee does not recognise medals won by Athlètes Individuels Neutres (AIN), for the sake of completeness this report counts AINs as a team and includes the medals they won (5) as part of our overall analysis.

2.2 CHANGES TO THE PROGRAMME

The principal changes to the Paris 2024 Olympic programme are summarised in Table 2 starting with the number of events in Tokyo 2020 and adjusting for the changes made in the interim.

Table 2. Key changes to the Paris 2024 programme relative to Tokyo 2020

Description	Events
Tokyo 2020	**339**
Discontinuation of Karate	-8
Discontinuation of Baseball	-1
Discontinuation of Softball	-1
Reduction in the number of Weightlifting events (14 to 10)	-4
Introduction of Breaking	2
Paris 2024	**329**

In addition, other changes were made to the programme that did not change the number of events contested. For example, in Canoe two events were reduced in the Flatwater discipline to create space for the new Canoe Cross events in the Slalom discipline. In Sailing the number of events was kept the same at 10, but the nature of the boat classes contested changed to include Windfoiling and Kiteboarding. Furthermore, as part of the process to improve gender parity, the Sailing programme was comprised of four events for men, four for women, and two mixed events in which men and women compete on equal terms. In Sailing at Tokyo 2020, the balance had been five men's events, four women's events, and one mixed event.

To a greater or lesser extent, these types of change occur in numerous other sports and disciplines whereby changes are made to the programme of events but not the number of events contested.

2.3 GEOPOLITICS

In an ideal world the International Olympic Committee (IOC) looks upon the Olympic Games as a 'real universality' in which all the world's countries come together in a celebration of sport. There are 206 National Olympic Committees recognised by the IOC and it is the IOC's wish that every member of the 'Olympic family' is represented at the Olympic Games. Some nations are unable to qualify athletes on merit, notably small territories, which are offered Universality Places to ensure full representation of all National Olympic Committees.

The (estimated) net effect of geopolitics is a change in medals that could be contested by other nations:
+ 78 medals from Russia/Belarus in Tokyo
- 6 medals by the return of North Korea

2.3.1 The overall position

Overall, 204 of the 206 National Olympic committees were represented at Paris 2024 and were supplemented by two other teams, namely the 32 AIN athletes outlined in the footnote and a further 36 who took part as the IOC Olympic Refugee Team. Paris 2024 was the third time that the Olympic Refugee Team had taken part in the Summer Games and the first time that an athlete representing it (Cindy Ngamba) had won a medal (bronze in the women's middleweight (75kg) boxing). For our subsequent analysis of 'teams' that won medals or top eight places, we use 206 to be inclusive of all National Olympic Committees and other 'teams' (Olympic Refugee Team and AINs).

2.3.2 The exclusion of Russia and Belarus

For Paris 2024 the IOC's ideal of full representation of all recognised nations was not achieved. Following the invasion of Ukraine by Russia in February 2022 the IOC voted to exclude Russia and its ally Belarus from Paris 2024.

The exclusion of Russia and Belarus was a material change to the competitive balance of Paris 2024, which is illustrated in Table 3.

Measure	Russia	Belarus
Athletes sent to Tokyo 2020	335	101
Number of sports contested	30	17
Gold medals won	20	1
Total medals won	71	7
Ranking	5th	45th

Table 3. The exclusion of Russia and Belarus from Paris 2024

Russia and Belarus won a total of 78 medals between them in Tokyo 2020 and by not contesting them in Paris 2024, the level of competition was arguably reduced and created opportunities for other nations to increase their medal haul. As a concession to Russian and Belarusian athletes who met certain criteria, such as not 'actively' supporting the war in Ukraine, the IOC allowed 'approved' athletes to compete as Athlètes Individuels Neutres (AIN or Individual Neutral Athletes). In total 15 athletes from Russia and 17 from Belarus took part in Paris 2024 as AINs, winning one gold medal and five medals in total.

2.3.3 The return of North Korea

North Korea made a return to the Olympic Games after excluding itself from Tokyo 2020 because of concerns about Covid-19. The North Korean delegation at Paris 2024 was composed of 16 athletes who won six medals across four sports (Diving 2; Boxing 1; Table Tennis 1; and Wrestling 2).

2.3.4 Post-covid Games

The Tokyo 2020 Olympic Games took place in 2021 during the Covid-19 pandemic after being postponed in 2020.

These Games were held under strict conditions concerning the participation of athletes, coaches and officials, while spectators were excluded on public health grounds. In addition, the pandemic affected preparation training and competitions ahead of the 2020 Games depending on national Covid-19 policies during the lockdown period. The net effect was that some nations may have performed better (e.g. Switzerland) or worse (e.g. South Korea) than otherwise expected depending on the extent to which restrictions were implemented. For policymakers, NOC's and federations, there was a three-year planning cycle after Tokyo instead of the traditional four-year cycle. Although certain health regulations were maintained by the IOC for the 2024 Games, the conditions for the delivery of Paris 2024 were broadly comparable to Rio 2016.

2.4 GENDER EQUAL GAMES

Paris 2024 marked a significant milestone for gender equality, with notable advancements across multiple areas, such as the opening ceremony, a more gender-balanced sports programme, and better-balanced media coverage[6] (IOC, 2024). Specifically, of the 32 sports, 28 achieved full gender parity, and medal events were more evenly distributed: 152 women's events, 157 men's events, and 20 mixed-gender events (Figure 3). However, even though this was promoted as the first gender-equal event, there were still more male athletes than female athletes (5,630 compared with 5,416), and more men's teams participated in both football and water polo. Additionally, six national teams did not bring any female athletes[7]. Despite important improvements being made for Paris 2024, true gender equality has yet to be fully realised.

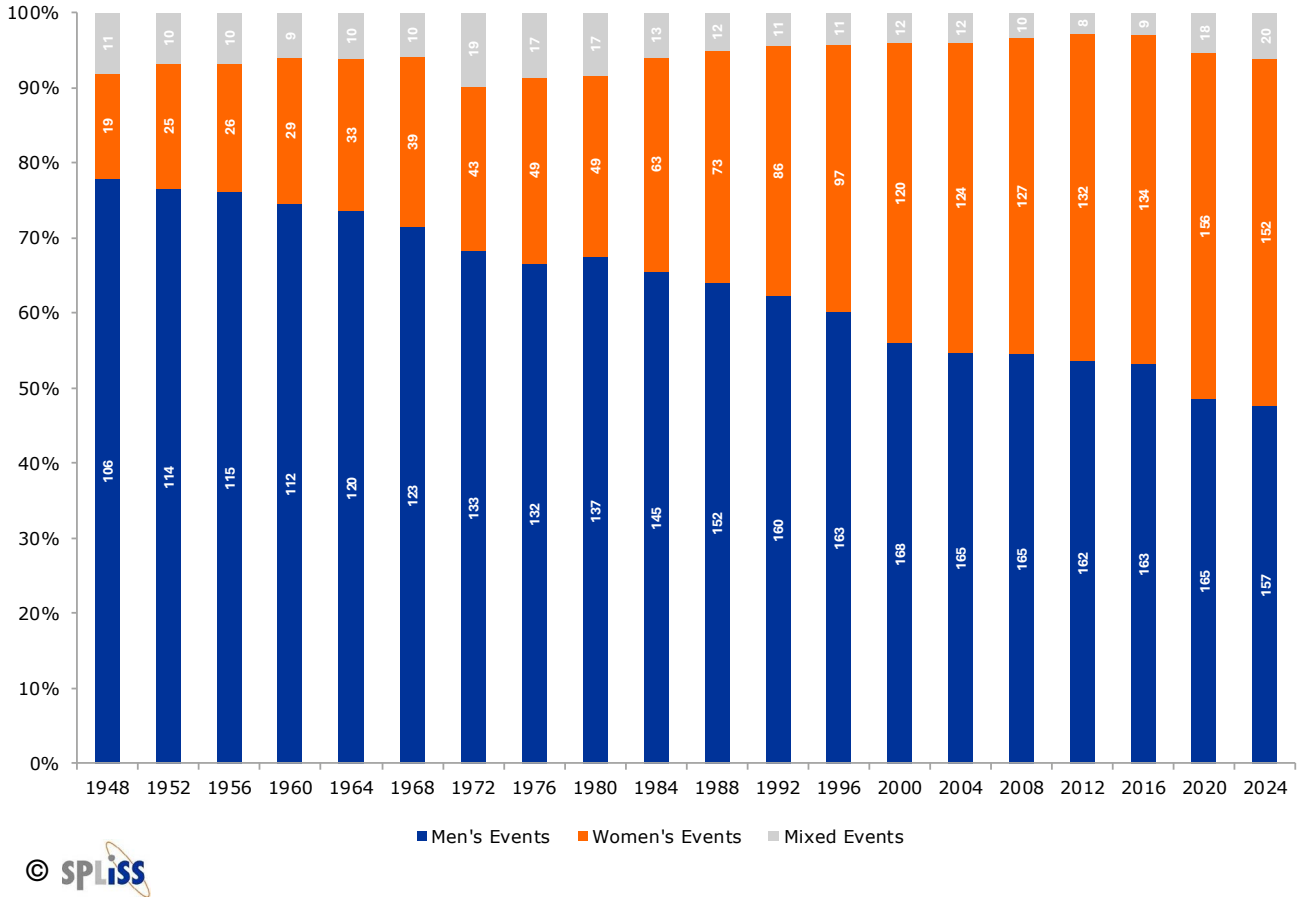


Figure 3. Number of men's, women's, and mixed events at the Olympics over time

Accordingly, over time some nations have begun investing more strategically in elite female sports. For example, the Dutch Olympic Committee's team comprised 163 female athletes (59%) compared to 111 male athletes (41%). Notably, 21 female athletes or teams won medals for the Netherlands (13%), outperforming their male counterparts, who secured 12 medals (11%). Thus, the goal of a gender-equal games might provide some countries with the opportunity to adapt their funding strategies to maximise their medal potential.

Paris 2024 was the most gender equal Games ever

6 See https://olympics.com/ioc/news/genderequalolympics-paris-2024-making-history-on-the-field-of-play for more information.
7 See https://womeninsport.org/news/paris-2024-why-the-first-gender-equal-olympics-was-just-an-illusion/ for more information.

3. SAMPLE NATIONS

The SPLISS Pillar 1–Light 2024 sample can be described as 17 nations and 2 regions (18 jurisdictions in total). Due to Belgium's structure, where sports governance is the responsibility of the communities, Belgium is subdivided into its two autonomous regions: Flanders and Wallonia. This situation results in 18 data points available for the analysis of funding. For readability reasons in this book, we will refer throughout to 18 'sport systems' from 17 nations.

The SPLISS sample are home to 7.7% of the world's population and on average are 4.5 times wealthier than the global average. Our sample nations were responsible for almost a third of both Olympians and medals won.

The 'island of Ireland' has two political jurisdictions, the Republic of Ireland and Northern Ireland (NI). The former is an independent state whereas Northern Ireland is a devolved nation within the United Kingdom of Great Britain and Northern Ireland. However, in sport the Olympic Committee of Ireland represents both the Republic of Ireland and Northern Ireland, as the majority of sports are run on an all island basis. For this reason there is a Team Ireland and Team GB, rather than Team Republic of Ireland and Team UK. Athletes from Northern Ireland have always had a choice as to whether they compete for Ireland or Great Britain. Typically, athletes from NI make up approximately 20 – 25% of Team Ireland. Athletes from NI generally make up less than 3% of Team GB.

For the purposes of this study, population and wealth figures are reported for the Republic of Ireland on the basis of its independent status, whereas medal success is reported on the basis of Team Ireland (i.e. including athletes from Northern Ireland). This approach is a pragmatic compromise as including the population of Northern Ireland in the population figures for the Republic of Ireland would lead to double

counting as the Northern Ireland figures are already included in the Great Britain figures.

An overview of the participating nations, along with their population and GDP per capita, is shown in Table 4. The 18 sport systems represent a diverse sample when looking at the population and wealth, factors that explain 40% of a nation's success (see further). The sample represents 7.7% of the world's population and wealth per capita that is 4.5 times higher than the global average. Sample nations won 308 medals in Paris 2024 (29.5%) and produced nearly one-third (31.6%) of the Olympians present. Brazil and Japan are the largest countries in the sample. With 220m and 123m inhabitants respectively, they are the sixth and eleventh most populous countries in the world. Estonia has the smallest population (1.2m). Also, Denmark, Finland, Ireland and New Zealand have less than 6 million inhabitants. In terms of wealth, Ireland and Switzerland exceed all other nations. Brazil's GDP per capita is much lower than the other nations.

Nation	Population (Mn)	GPD per capita US$ (PPP)	Medals Paris 2024	Olympians Paris 2024
Belgium Flanders Wallonia/Brussels	11.7 6.8 (58%) 3.6 (31.4%)/1.2 (10.6%)	63,600	10 7 3	165
Brazil	220.0	18,600	20	277
Canada	38.8	55,800	27	315
Czech Republic	10.8	47,700	5	111
Denmark	5.9	72,000	9	124
Estonia	1.2	42,000	0	24
Finland	5.6	57,500	0	56
Great Britain	68.4	54,100	65	327
Hungary	9.9	40,600	19	170
Ireland	5.2	80,920[9]	7	134
Japan	123.2	46,300	45	403
Netherlands	17.8	69,300	34	258
New Zealand	5.2	48,800	20	195
Poland	38.7	44,100	10	210
Spain	47.3	46,400	18	383
Sweden	10.6	64,200	11	117
Switzerland	8.9	82,900	8	127
TOTAL	**629.6**	**Avg. 57,029**	**308**	**3396**

Table 4. SPLISS Pillar 1 – Light 2024 2.0 sample nations[8]

8 Source: The CIA World Factbook https://www.cia.gov/the-world-factbook/field/real-gdp-per-capita/country-comparison

9 It is acknowledged by economists and statisticians worldwide, including the EU, that Ireland's GDP is distorted significantly by globalisation and multinational companies based here such as Apple, Google and Meta etc. whose profits are recorded in Ireland's GDP but are transferred immediately back to the countries where they are headquartered. To address this, most statisticians use a modified Gross National Income (GNI) per capita figure to compare to Ireland with other GDP figures. This adjustment provides a more accurate picture of real economic wealth in Ireland which is 29% lower than the headline GDP figures. This technique also applies to countries such as Luxembourg and Qatar but does not affect any other sample countries in this study.

4. OUTPUTS: PERFORMANCE OF THE SAMPLE NATIONS AT PARIS 2024

Overall, 206 nations or teams took part in Paris 2024, which is the same as in Tokyo 2020. However, this point does not mean that it was the same 206 nations or teams that took part. As previously described, from the 206 that took part in Tokyo 2020 Russia and Belarus were excluded and the previously titled Independent Olympic participants team was renamed the Olympic Refugee Team for Paris 2024. In addition, North Korea returned to the Olympic Games and an accommodation was made for eligible athletes from Russia and Belarus to compete as Athlètes Individuels Neutres (AIN).

Of these 206 nations, 64 (31%) won a gold medal, 92 (45%) won a medal of any colour and 123 (60%) achieved at least one top eight place (or Olympic diploma).

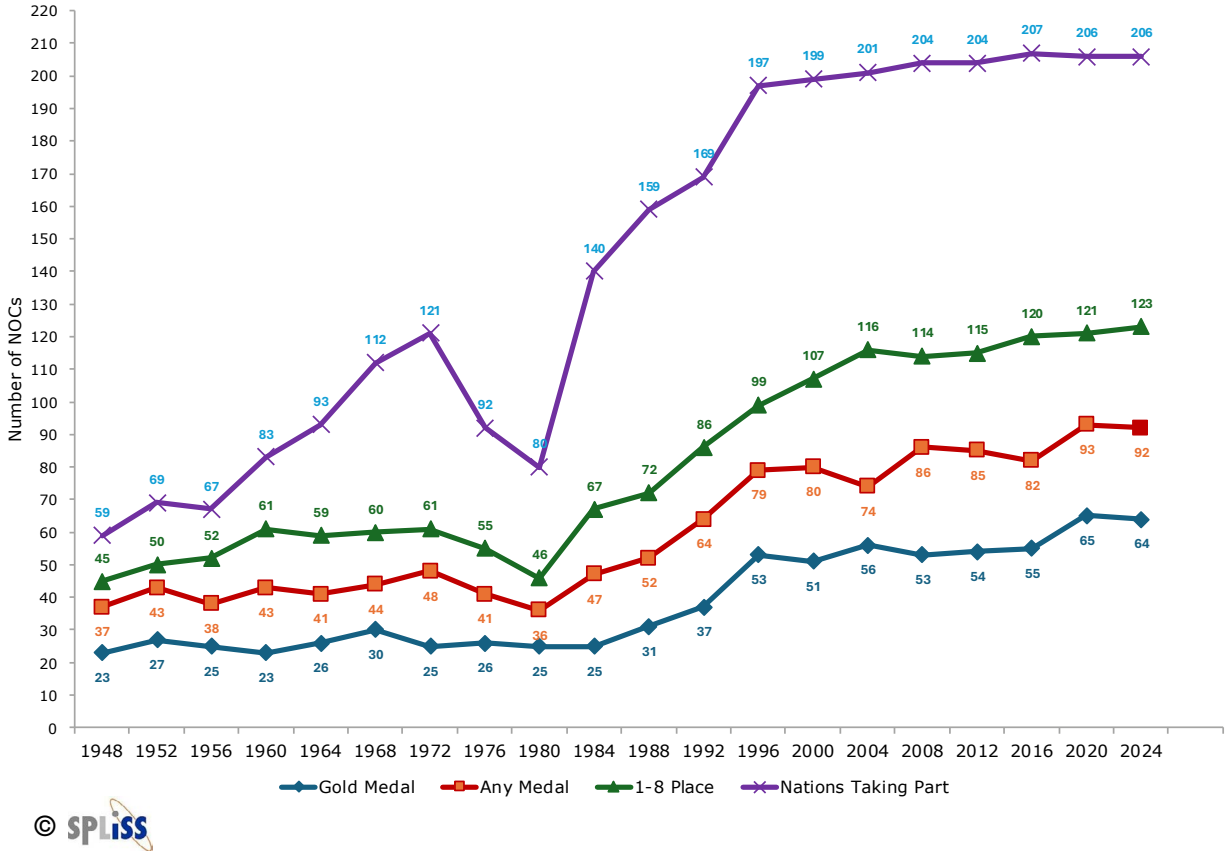


Figure 4. An overview of performance in the Paris 2024 Olympic Games

4.1 ABSOLUTE SUCCESS: MEDALS WON AT PARIS 2024

4.1.1 Overall picture

Moving beyond the high-level picture we now look at the variances in medals won by nations between Paris 2024 and Tokyo 2020 to get a sense of the winners and losers. For the most part measuring variance in the Olympic Games is a zero-sum game. If one nation wins a medal that was previously won by a different nation, then the first nation gains one medal, and the second one loses a medal.

Figure 5 provides an overview of the change in gold medals won and the change in total medals won by the major medal winning nations in Paris compared with Tokyo. The key point about Figure 5 is that the scale of decreases on both medal count measures is greater than the scale of the increases, because 36 fewer medals were contested in Paris than in Tokyo (see Table 2 above). Despite this structural change, a relatively familiar pattern emerges.

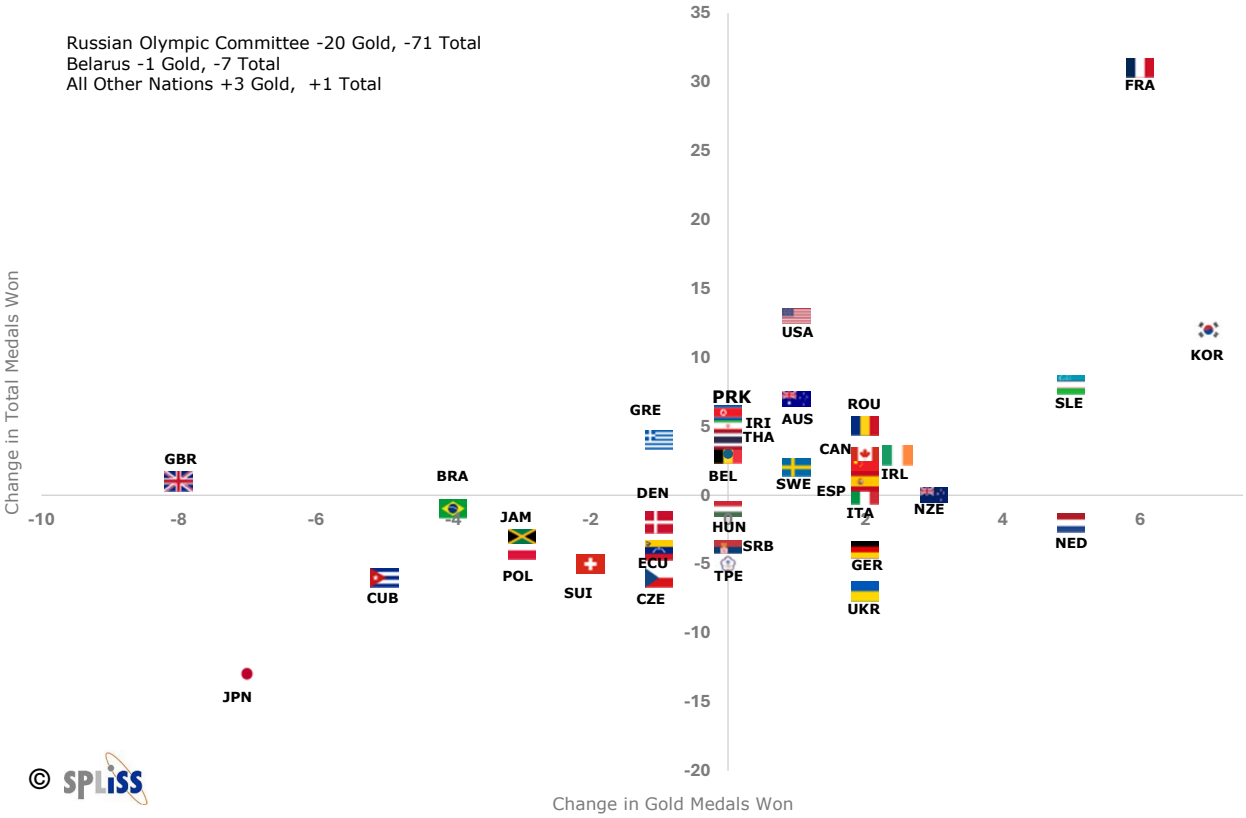


Figure 5. Paris 2024 v Tokyo 2020 major changes in gold and total medals won

The host nation, France, had a very successful Olympics and is the most improved nation in terms of total medals won with an increase of 31 medals overall, of which six were gold, and placed France second behind South Korea as the most improved in terms of gold medals. South Korea won six gold medals in Tokyo, which was its lowest since 1984. A recovery to 13 gold medals was its joint best-ever, equalling its achievements of Beijing 2008 and London 2012.

Perhaps something of a surprise was the performance of Uzbekistan, which had an increase of +5 gold medals and +8 in total. Uzbekistan won all but one of its 13 medals in combat sports, notably five gold medals in Boxing.

USA was second behind France in total medals gained (+13) and with an increase of one gold medal finds itself located in the top right-hand quadrant for increases in both gold and total medals along with Romania, Canada, Ireland, China, Spain, Australia and Sweden.

In the bottom left-hand quadrant are nations that experienced decreases in both gold medals and total medals. It is no surprise to see the previous host Japan (-7 gold, -13 total) in this group as virtually all previous hosts tend not to do as well in subsequent editions. Japan lost not only its generic home advantage, but the removal of Karate, Baseball and Softball from the programme led to a reduction of three gold medals and five medals in total. Also in the bottom left-hand quadrant, and losing two or more gold medals, are Cuba, Brazil, Jamaica, Poland and Switzerland.

Some nations find themselves in a position whereby they trade quantity with quality. In the bottom right-hand quadrant, a notable example is The Netherlands, which enjoyed an increase of +5 gold medals against an overall decrease of –2 medals. Track cyclist Harrie Lavreysen won three gold medals. By contrast, in securing one additional medal relative to Tokyo 2020 (65 v 64) Great Britain lost eight gold medals and thereby offset the increase in quantity with a decrease in quality.

New Zealand entered Paris 2024 with the chance to become the first nation in the history of the Olympic Games to increase its medal tally in six consecutive editions. Having won 20 medals in Tokyo 2020, New Zealand needed at least 21 medals

New Zealand nearly became the first nation in the history of the Olympic Games to increase its medal tally in six consecutive editions

to achieve this unique feat. Despite increasing gold medals by +3, New Zealand's overall change was zero and thus it fell agonisingly close to achieving a piece of Olympic history. Margins in elite sport are slim and New Zealand achieved three fourth place finishes, which on another day could have been the one medal they needed to make history.

Overall, if we look within a boundary of +/- 5 gold medals and +/- 10 medals in total, we find that there are relatively few outliers despite 206 'teams'[10] taking part and 1,044 medals awarded. This point reinforces the notion that there is a strong element of predictability about performance in the Olympic Games (see relative success section later) and that variations in performance tend to occur within relatively constrained bounds.

Where there are apparent anomalies, these can normally be explained by the impact of being host (e.g. France) and no longer being host (e.g. Japan or Brazil). In a way, the position of Great Britain may be seen as an exception to previous hosts. Since London 2012, the total number of medals by Team GB has been 67 (Rio 2016), 64 (Tokyo 2020) and 65 (Paris 2024), which has been helped considerably by increased funding. However, after winning 29 gold medals at London 2012 the quality of medals won has fallen consistently with 27 golds in Rio 2016, 22 in Tokyo 2020 and 14 in Paris 2024.

4.1.2 Performance of the sample nations at Paris 2024

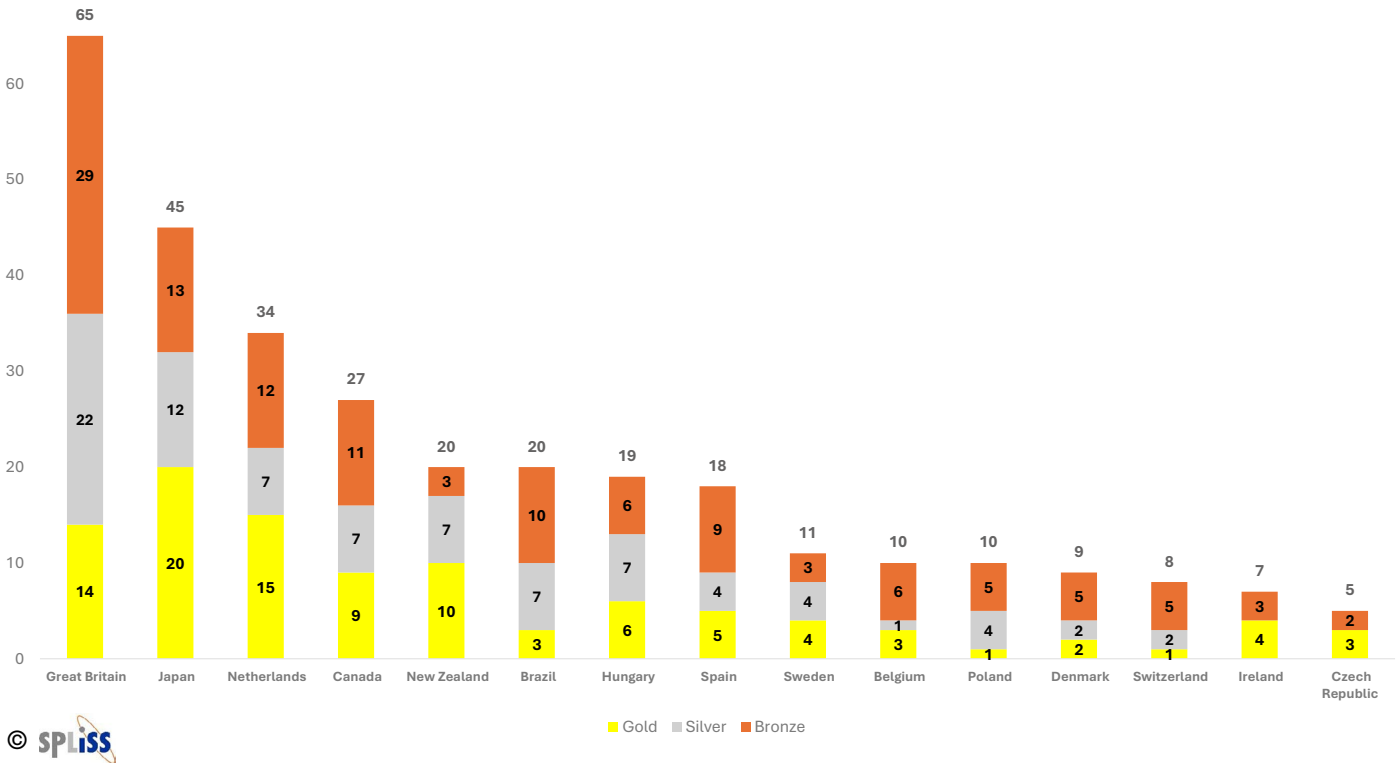


Figure 6. Medals won by participating nations at Paris 2024

The SPLISS nations taking part in this study are of different scales, different sporting cultures and at different levels of maturity in their elite sport development systems. The top four in the distribution have all hosted the Olympic Games previously and achieved between 65 (GBR) to 27 (CAN) medals in Paris 2024. The Netherlands had its best medal table rank at the Olympic Games and moved up one position to sixth place, with 34 medals including 15 gold.

The next cluster in Figure 6, New Zealand (20 medals) to Spain (18 medals) contains two former hosts in Brazil and Spain as well as two relatively small nations in terms of population (New Zealand and Hungary). It is an interesting conundrum that New Zealand with around 2.5% of the population of Brazil won the same number of medals as Brazil and more than three times the number of gold medals won by Brazil (10 v 3). The third cluster, Sweden to the Czech Republic won 11 to 5 medals.

Excluding Poland (population c. 40m), nations in this cluster have populations less than 11m. The final cluster is made up of two nations, Estonia and Finland which both won no medals, despite achieving some success in Tokyo 2020. Estonia and Finland find themselves in a list of 16 nations shown in appendix 8.5 that won no medals in Paris 2024 despite featuring in the Tokyo 2020 medals table. Although they won no medals, Estonia achieved seven top eight places and Finland achieved nine.

The number of medals won by any nation is put into a better

10 Includes the Olympic Refugee Team and International Neutral Athletes (AINs)

context by conducting some variance analysis with how it performed previously. Figure 7 below replicates Figure 5 above for the SPLISS nations in this study. Canada, Ireland, Spain and Sweden all enjoyed an increase in gold medals and an increase in total medals. Ireland had its best Olympic Games in terms of both gold medals won and total medals won, with four gold medals won in four different sports. New Zealand and Belgium find themselves on the x and y axis respectively with the former increasing its gold medals won with no increase in total medals, and the latter increasing total medals won with no increase in gold medals.

Canada, Ireland, Spain and Sweden all enjoyed an increase in both gold and total medals won. Japan, Brazil, Poland, Switzerland, Denmark, Estonia and the Czech Republic all had reductions in total and gold medals won.

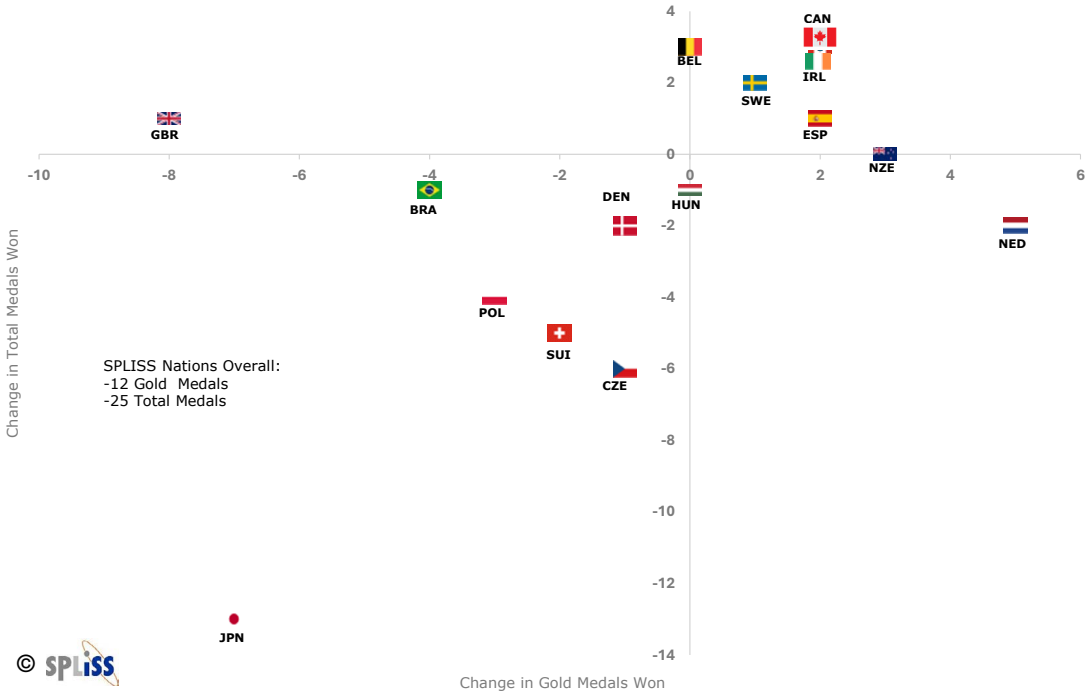


Figure 7. SPLISS nations Paris 2024 v Tokyo 2020 changes in gold and total medals won

The nation experiencing the greatest change was previous host Japan with a loss of 7 gold medals and 13 medals in total. Despite Japan's apparent demise relative to Tokyo 2020, Paris 2024 was the nation's second-best Olympics ever for both gold medals (20) and total medals (45). Tokyo 2020 may well have provided a legacy boost to Japan's elite sport development system. Other SPLISS nations in the bottom left-hand corner for decreased gold medals and decreased total medals are Brazil, Poland, Switzerland, Denmark, Estonia and the Czech Republic. With the loss of one gold medal and two medals in total, Estonia won no medals as did Finland (-0 gold, -2 total).

Although Hungary sits on the y axis reflecting a loss of one medal overall, the reality is that it achieved essentially the same amount of success as it did in Tokyo 2020. With the loss of just one bronze medal and the retention of six gold medals and seven silver medals, Hungary actually improved its market share (see below) because its decrease in medals was less than the overall decrease in medals.

As discussed in the context of all nations (see Figure 5 above) the Netherlands and Great Britain traded quantity with quality. Great Britain lost eight gold medals to win one extra medal in total, whereas The Netherlands gained five gold medals and one place in the medals' table as a trade off against losing two medals in total.

If we take a more technically correct view of performance using market share[11] as one of our measures, the performance of the SPLISS nations becomes more nuanced as shown in Table 5.

11 Market share is a technique to enable like for like comparisons over time. It converts medals won into points (gold = 3; silver = 2 and bronze = 1) and expresses the number of points won as a function of the number of points awarded. In the case of Paris 2024 it enables us to compare performance with Tokyo 2020 in a manner that adjusts for the change in the number of events contested (-10).

Team	Olympians	Top 8s	Gold	Total	Points	MS %	Rank	Δ Gold	Δ Total	Δ Rank	Δ Points	Δ MS PP	Δ MS %	Diagnosis
Japan	403	115	20	45	97	4.8%	3	-7	-13	0	-29	-1.2%	-20.5%	Mixed
Netherlands	258	77	15	34	71	3.5%	6	5	-2	-1	3	0.3%	7.8%	Mixed
Great Britain	327	136	14	65	115	5.7%	7	-8	1	3	-13	-0.4%	-7.2%	Mixed
New Zealand	195	53	10	20	47	2.3%	11	3	0	-2	7	0.4%	21.3%	Mixed
Canada	315	73	9	27	52	2.6%	12	2	3	1	7	0.4%	19.3%	Better
Hungary	170	51	6	19	38	1.9%	14	0	-1	-1	-1	0.01%	0.6%	Mixed
Spain	383	69	5	18	32	1.6%	15	2	1	-7	1	0.1%	6.6%	Better
Sweden	117	28	4	11	23	1.1%	16	1	2	-7	2	0.1%	13.1%	Better
Ireland	134	22	4	7	15	0.7%	19	2	3	-20	7	0.4%	93.6%	Better
Brazil	277	57	3	20	33	1.6%	20	-4	-1	8	-8	-0.3%	-16.9%	Worse
Belgium	165	33	3	10	17	0.8%	25	0	3	-4	3	0.2%	25.4%	Mixed
Czech Republic	111	25	3	5	11	0.5%	28	-1	-6	10	-12	-0.6%	-50.6%	Worse
Denmark	124	24	2	9	15	0.7%	29	-1	-2	4	-6	-0.3%	-26.3%	Worse
Poland	210	39	1	10	16	0.8%	42	-3	-4	25	-11	-0.5%	-38.8%	Worse
Switzerland	127	41	1	8	12	0.6%	48	-2	-5	24	-11	-0.5%	-46.1%	Worse
Estonia	24	7	0	0	0	0.0%	n/a	-1	-2	0	-4	-0.2%	-100.0%	Worse
Finland	56	9	0	0	0	0.0%	n/a	0	-2	0	-2	-0.1%	-100.0%	Worse
Totals	**3396**	**859**	**100**	**308**	**594**	**29.2%**		**-12**	**-25**	**n/a**	**-66**	**-2.3%**	**-7.2%**	

Table 5. SPLISS nations – all key measures of performance

Taken as a portfolio of 17 nations, the participants in this study performed worse in Paris 2024 than they did in Tokyo 2020, with 12 fewer gold medals, 25 fewer medals in total, and an absolute fall in market share of -2.3 percentage points which equates to a 7.2% fall in relative terms.

Much of the apparent decline is attributable to Japan's loss of gold medals and total medals. However, it should be noted that despite Japan's loss of gold medals particularly, it still managed to retain third place in the medals' table. For this reason, it is given a 'mixed' diagnosis for its performance in Table 5 above.

By contrast, there are four nations, Canada, Spain, Sweden and Ireland that improved on all measures of performance, and we can diagnose unequivocally that their performance in Paris 2024 was better than in Tokyo 2020. Similarly, there are seven nations, Brazil, Czech Republic, Denmark, Poland, Switzerland, Estonia and Finland which regressed on all measures of performance and who can be diagnosed unanimously as performing worse than in Tokyo 2020.

For the five other nations, along with Japan, not all measures are uniformly better or worse, which leads to a diagnosis of 'mixed' performance. These mixed performances can be summarised as: The Netherlands (loss of total medals); Great Britain (gain in total medals but loss in quality of medals and a lower medal table ranking); New Zealand (static total medals); Hungary (loss of a medal but a gain in market share); and Belgium (no change in gold medals despite improvement on all other measures).

4.1.3 Diversity of success: the number of sports in which nations won medals

Nations aim to be successful in the Olympic Games with their qualified athletes, who, for the most part, have reached a level of global competitiveness by qualifying to take part. Some nations have a narrow range of sports in which they achieved success (prioritisation) whilst others were successful in a wide portfolio of sports (diversification). Generally, the larger

The UK won medals in 69% of the sports that it contested, which is far higher than all other nations. Czech Republic, Belgium and Ireland had lower strike rates (less than 30%).


BRASIL
BRA
ARiS 2024

the delegation, the more sports a nation competes in at the Games, although this point can be confounded by the impact of nations contesting team sports. However, it is not necessarily the size of the delegation that is important for success of the nations, rather how successful the athletes are in the respective sports in which they compete. As such, the number of sports in which nations win medals can be seen as another measure of success.

Table 6 shows the number of sports in which this study's nations qualified athletes for 2024 and the number of sports in which these athletes won Olympic medals. In this respect, the UK appears to have put together its delegation very effectively, by winning medals in 69% of the 26 sports it contested. By contrast, Czech Republic, Belgium and Ireland had a more focused range of medal winning sports. Most other nations have a success rate of winning medals in between 40% to 50% of sports contested. Although Denmark and Poland won only 9 and 10 medals respectively, they did so in a relatively wider range of sports (8 and 9 respectively). This breadth of success can be seen as another interpretation of success. Belgium, like Denmark, won 10 medals (its best performance in the past 100 years) but these were concentrated in only four sports, indicating a lack of sporting diversity in its success.

Nation	Sports Contested	Sports Medalled In	Success Rate %	Medals
United Kingdom	26	18	69%	65
Canada	28	15	54%	27
Japan	34	17	50%	45
Sweden	18	8	44%	11
Netherlands	26	11	42%	34
Spain	31	13	42%	18
Brazil	29	12	41%	20
New Zealand	22	9	41%	20
Denmark	20	8	40%	9
Poland	23	9	39%	10
Switzerland	18	7	39%	8
Hungary	20	7	35%	19
Ireland	15	4	27%	7
Belgium	21	4	19%	10
Czech Republic	23	4	17%	5
Estonia	13	0	0%	0
Finland	13	0	0%	0

Table 6: Analysis of success rate by number of sports contested and medalled in

The success of the sample nations also differs according to the extent of their portfolio of successful sports.

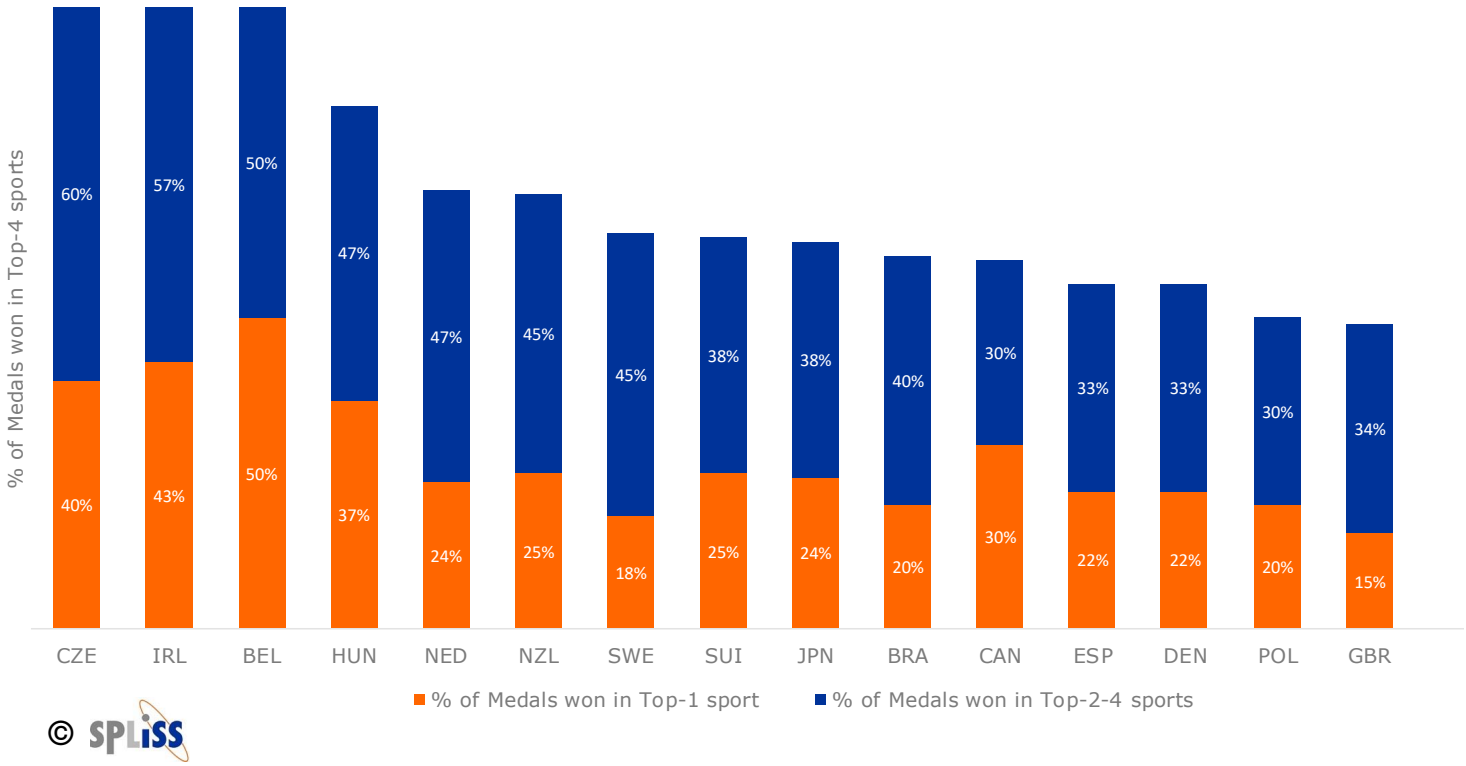


Figure 8. % of medals won in Top 1 and Top 2-4 sports

Figure 8 shows in percentage terms how much a nation's most successful sport contributes to its total medals won. Using the same thinking, it also shows the contribution of the next three most successful sports to produce each nation's 'concentration ratio' or CR4% for its top four performing sports. Belgium, Ireland and the Czech Republic all have a CR4% of 100%, meaning that all of their medals are won in their top four sports. If we delve more deeply into the data it can be seen that Belgium's overall success, depended heavily on its top performing sport (road cycling) which contributed 50% of the nation's medals with the remaining 50% coming from the next three best performing sports.

Whether by accident or design, Belgium, Ireland and Czech Republic derived most of their success from a minority of the sports they contested. Despite qualifying athletes in a relatively wide range of sports (see Table 6) Ireland won medals in 27% of them and for Belgium and Czech Republic the corresponding score was less than 20%. By contrast, the UK has CR4% score of 49% indicating medal winning capability across a broader range of sports as confirmed by Table 6. In other words: more sports are contributing to a significant number of medals to the performance of Team GBR compared to the Teams of BEL, IRL and CZE.

4.1.4 Performance by gender

There is some evidence that nations are realising the importance of women's events as a source of competitive advantage and an area for investment. If 152 of the 329 (46%) events contested are women's events, then all things being equal, it would be reasonable to expect medal winning nations to achieve around 46% of their success in these events. Figure 9 provides an overview of this analysis for the SPLISS nations and reveals that there is considerable variation in the proportion of medals won by gender across the participating nations.

There is considerable variation in the proportion of medals won by gender. Figures vary from less than a third female athletes in Czech Republic, Spain, Ireland and Denmark to over 70% in New Zealand and Poland.

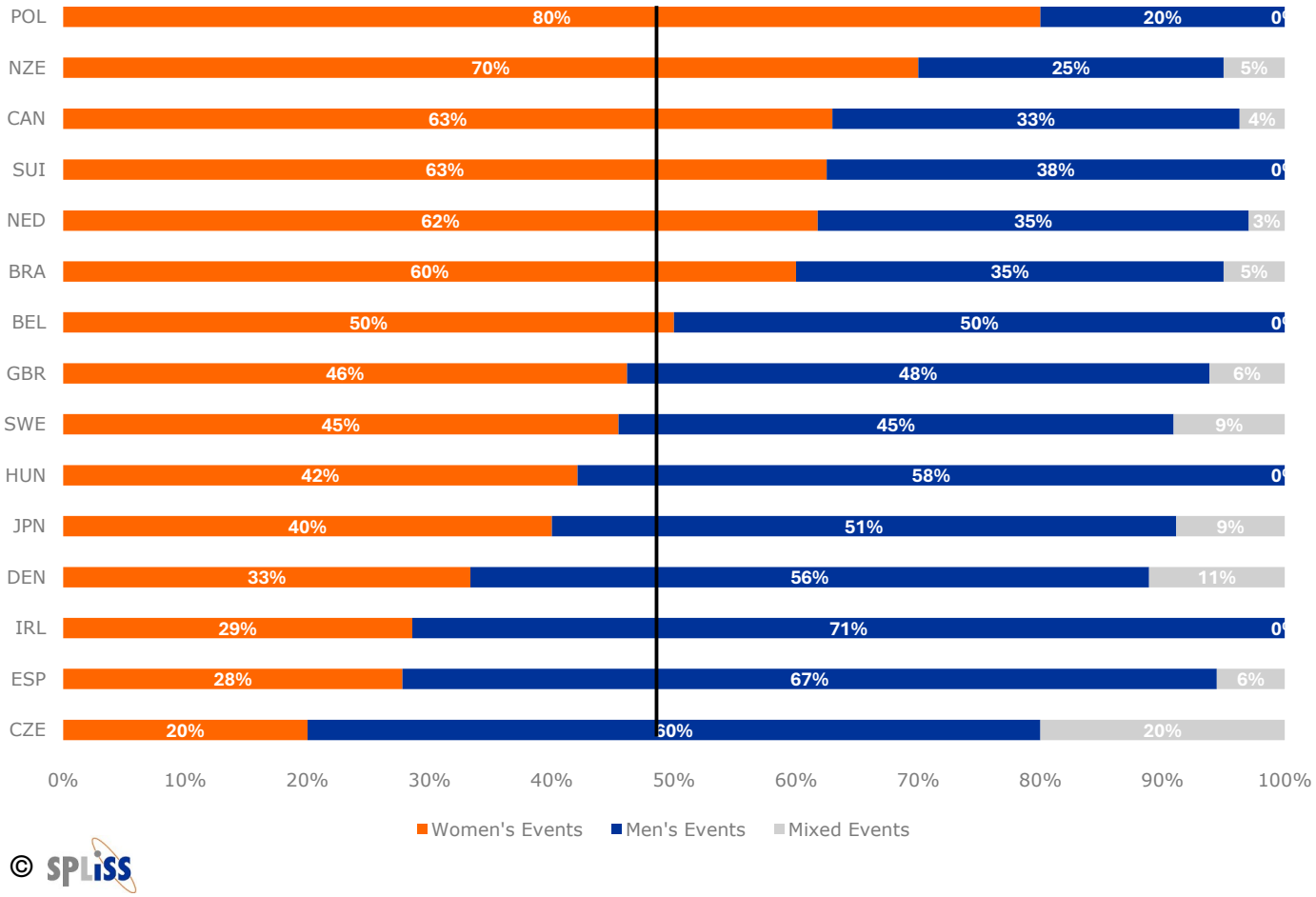


Figure 9. Proportion of medals won at Paris 2024 by gender

The United Kingdom won 46% of its medals in women's events, which is precisely in line with the proportion of women's events. To illustrate variations relative to this benchmark a reference line is drawn through the 46% mark. Two nations stand out for having a particularly high percentage of medals won in women's events, Poland (80% of 10 medals) and New Zealand (70% of 20 medals). Next is a cluster of four nations (Canada to Brazil) which won 63% to 60% of their medals in women's events; followed by Belgium which is the only other nation above the 46% benchmark (50%).

Nations performing below the benchmark are notably Czech Republic, which at 20% of 5 medals, is less than half the benchmark, although this is a small sample of medals on which to compute proportions. Spain, Ireland and Denmark achieve a third or less of their medals in women's events, which in the case of Spain is 28% of 18 medals. Japan, Hungary and Sweden have scores of 40% to 45% and are reasonably close to the benchmark.

The evidence indicates, despite the growth in the number of events for women, nations' success in them varies considerably within the sample (80% to 20%). As a final point of context, it is worth noting that the two top nations in the Paris 2024 medal table, USA and China, won 53% and 54% of their medals in women's events respectively, which is well above the benchmark of 46%.

4.2 RELATIVE SUCCESS: THE OVER – AND UNDERACHIEVERS IN PARIS 2024

The following section covers in greater depth how residual analysis is used as a way to determine the sporting success of nations under *ceteris paribus* conditions, i.e. controlling for macro-level determinants (e.g. population and wealth).

4.2.1 Background information

At the macro-level, international success of nations is influenced by the social and cultural context in which athletes train. These include economic welfare, population, geographic and climatic variation, degree of urbanization, religion, culture[12] and the institutional (political-, social-, educational) contexts in which sport operates[13]. Because these factors cannot be changed, SPLISS studies focus mainly on meso-level factors, namely the role of elite sport policy. In this report we focus specifically on the funding of elite sport. Previous research

12 Source: De Bosscher et al., 2006
13 Source: Andersen et al., 2022


PARIS 2024
PARIS 2024
PARIS 2024

has shown that population, wealth (expressed as Gross Domestic Product per capita) and (former) communism (referring to a particular political system) explain approximately 50% of the total medals or medal points won by countries in the Olympic Games[14]. These factors cannot be influenced by policy interventions in the short term and are relatively stable. However, this point does not imply a linear relationship whereby a country that has twice as many inhabitants can win twice as many Olympic medals as a nation half its size. Therefore, further statistical analysis is needed.

Population, wealth (GDP/CAP) and politics (i.e. (former) communist countries) are the only significant macro variables.

4.2.2 Statistics information

To assess whether a particular country performs 'well' at the Olympic Games, given their population size, wealth and (former) communism, the starting point for our empirical work is a simple OLS (Ordinary Least Squares) estimation. To correct for distributional problems or outliers (Field, 2013), data were transformed logarithmically; the functional form to be estimated is as follows:

$$\text{Ln Medals} = \beta 0 + \beta 1 \text{ Ln (POP)} + \beta 2 \text{ Ln (GDPCAP)} + \beta 3 \text{ COMM} + \varepsilon$$

In the above equation, Ln (POP) is the (logarithm of the) number of inhabitants, Ln (GDPCAP) is the (logarithm of the) Gross Domestic Product per head (recorded as PPP[15] values). COMM is a dummy variable for (former) communist countries (equal to 1 for (former) communist countries and 0 for other countries). ε is the error term or the unknown variation (the vertical deviation from the unknown true regression line). This latter point is particularly interesting for SPLISS research and is used as the benchmark to define relative success. The result is shown in Table 7.

Nearly 40% of the medals won in Paris can be explained by population, wealth of countries and (former)communism. This is lower than in previous Olympics Games.

Dependent variable	Independent variables	Coefficients B	SE B	Sign.	R^2adjusted
Model Paris 2024 Ln (medal points)	Ln(Population)				0.205
	Ln(Population) + Ln(GDP/cap)				0.376
	(Constant)	-11.064	1.722		0.399
	Ln(Population)	.376	.061	.000	
	Ln(GDP/cap)	.655	.121	.000	
	Comm	.497	.238	.040	

Table 7. Stepwise regression for macro variables and medal points (3-2-1)[16] at the Olympics 2024.

The stepwise regression analysis in Table 7 indicates that the population size explains 20.5% of the medal points won by nations in Paris 2024. Wealth (GDP/CAP) adds another 17% and together with the political system for (former) communist countries, we derive a model in which 39.9% of all medal points are explained by these three factors. This figure is striking because historically it has been consistently around 50%[17].

Two possible explanations may arise from this finding. As Russia and Belarus are both former communist states, their exclusion from the Paris Olympic Games is likely to have a material impact on the explanatory power of the 'communist' variable in regression calculations. This situation may have made a substantial difference to the 'communist' variable in 2024 as Russia sent just 15 AIN athletes and Belarus 17, winning 6 medals in total. In Tokyo 2020, Russia participated with 335 athletes across 30 sports winning 71 medals in total. Belarus participated with 101 athletes across 17 sports and won seven medals in total. To estimate the effect of these two countries, as a test of concept we added them to the Paris 2024 database as if they participated using their Tokyo results. The results of this experimental regression were somehow unexpected, as the explanatory power of the model increased by just 2%, to 42.0% of the Paris medal points being explained by macro-variables.

Second, the results may indicate an increased impact of meso-level factors such as the nine Pillars of the SPLISS model. In a way these are encouraging findings for elite sport policy makers and governments who invest increasingly in elite sport because they believe that "elite sport success is developable". Referring back to earlier SPLISS studies[18], as nations have become more strategic in the way that they produce elite athletes, "they rely less on these uncontrollable variables and more on variables which are widely regarded as being components of an elite sport development system"[19]. As such, Olympic success can be

14 Source: De Bosscher et al., 2015
15 Purchasing Power Parity, see further
16 Medal points are calculated by multiplying gold medals by 3, silver medals by 2 and bronze medals by 1.
17 Sources: Bernard & Busse, 2004; De Bosscher, De Knop & Heyndels, 2003; Johnson & Ali, 2002
18 De Bosscher et al., 2008 and 2015
19 De Bosscher et. al., 2008, p 18

achieved more effectively as the result of proactive resourcing and the creation of an elite sport development system, rather than simply relying on passive macroeconomic variables.

4.2.3 Which nations over-achieved or under-achieved at Paris 2024?

The model can be used for further analysis by looking at the 'residuals' or the differences between what the model predicts and an individual nation's actual performance. A residual score in this context is the difference between a nation's actual medal points and the medal points that would otherwise be predicted by the regression model. A positive residual score indicates that a nation's actual success is greater than forecasted by the model, which in turn points to the possibility of a well-developed elite sport development system being in place. By contrast a negative residual score, indicates that a nation might not be using its resources as effectively as might otherwise be expected.

Over time, it seems that the impact of elite sport policies on Olympic success has increased, leaving room for further strategic development of elite sport.

Country (n=92)	Total Medals	Gold medals	ACTUAL medal points (3-2-1)	Regression PREDICTED medal points	DIFFERENCE	Medalpoints/ PredictedMedal-Points (based on residuals)
1. Australia	52	17	108	18	90	5.9
2. New Zealand	20	10	47	8	39	5.6
3. France	64	16	122	25	97	4.8
4. Jamaica	6	1	11	2	9	4.6
5. Great Britain	65	14	115	25	90	4.6
6. United States	126	40	250	58	192	4.3
7. Netherlands	35	16	71	17	54	4.1
8. Dominica	3	1	3	1	2	4.0
9. Kenya	11	4	21	5	16	3.9
10. Saint Lucia	2	1	5	1	4	3.8

Table 8. Over-achievers at Paris 2024: top ten nations ranked according to relative success based on residual analysis (using medal points (3-2-1), Ln pop, Ln gdp/cap and (former) communism)

Australia, New Zealand, France, Jamaica and Great Britain won 5-6 times more medal points than predicted.

Of the 92 nations winning medals at Paris 2024[20], Australia, New Zealand, France, Jamaica and Great Britain were the leading over-achievers, winning five to almost six times more medal points than what would have been predicted based on their population, wealth and political system (last column in Table 8). To illustrate the point, using a medal point calculation of gold = 3, silver =2, and bronze = 1, the model would predict Australia (with a population of 26.8 million and GDP/CAP of 59,500 $) to win 18 medal points (e.g. 18 bronze, or 6 gold), when in practice it won 90 more (the same as Great Britain). USA won 250 medal points, which is 4.3 times more than predicted (58). It is equally interesting to see small countries like Dominica (74,000 inhabitants) and Saint Lucia (168,000 inhabitants) winning three and two medal points respectively (± 4 times better than predicted); and poor countries like Jamaica (GDP/cap of 10,300 $) and Kenya (GDP/cap of 5,700 $) winning 6 and 11 medal points each. It is also interesting to note that these four nations won medals exclusively in the sport of athletics (Kenya 11; Jamaica 6; St Lucia 2; and Dominica 1).

When we further focus on the SPLISS Pillar 1-Light countries, see Figure 10 and Figure 11, three of them are in the top 10 best performing countries.

Small nations Dominica and Saint Lucia and poorer nations Jamaica and Kenya are over-achieving nations.

20 Out of 206 participating, excluding the refugee team and AIN athletes

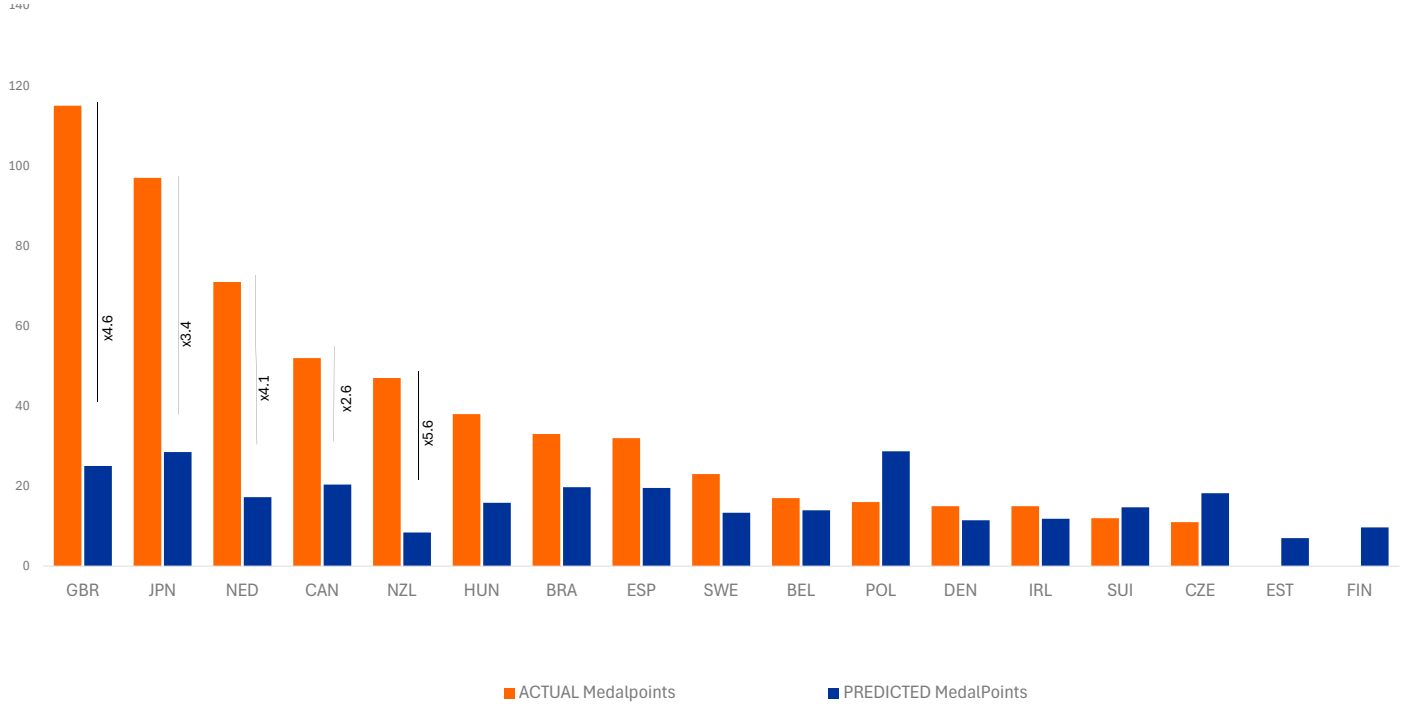


Figure 10. Actual and predicted medal points (bars) and number of times more/less medal points than predicted (line) based on residual analysis SPLISS nations

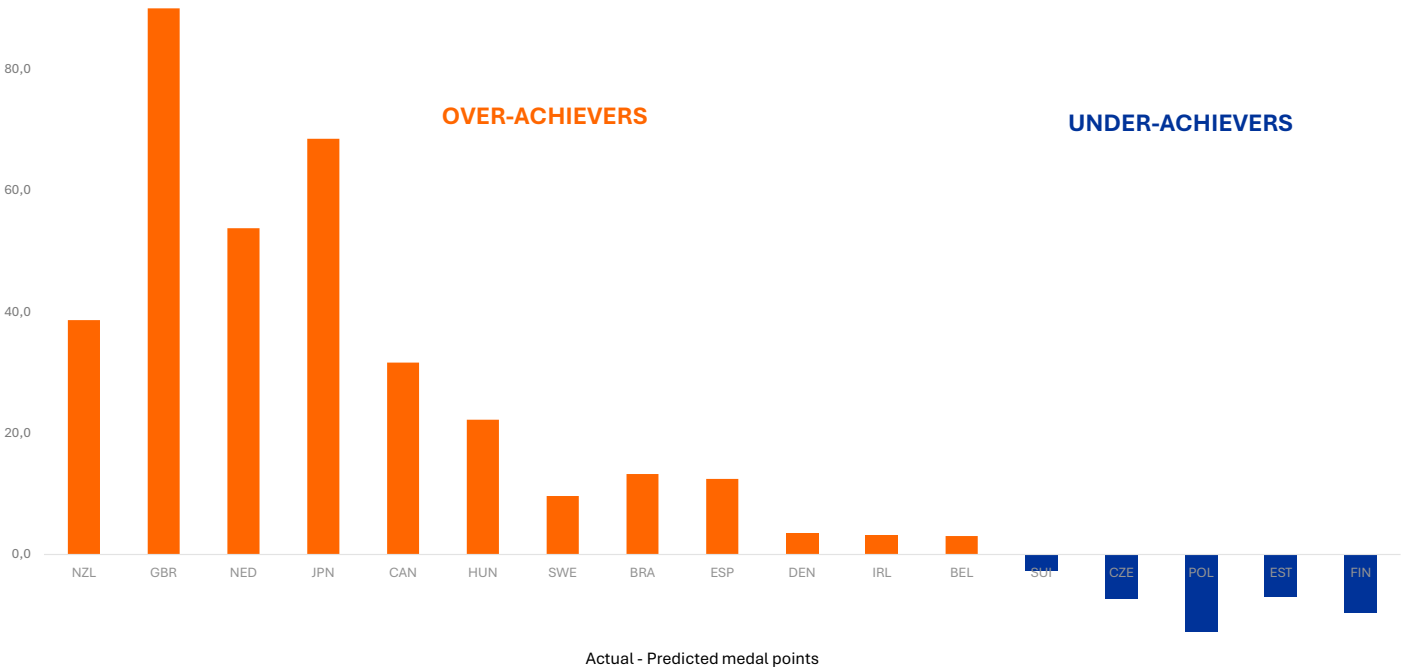


Figure 11. Over-and under achieving SPLISS nations at Paris 2024: difference between actual and predicted medal points (ranked by residuals, i.e. number of times the country has more/less success than predicted)


PARIS 2024
PARIS 2024

Clearly, under ceteris paribus conditions accounting for population, wealth and political system most SPLISS nations (12/17) performed better or in line with expectations. Great Britain won 90 additional medal points which is 4.6 times more than predicted. Japan won 69 extra medal points (3.4 times more), the Netherlands 54 (4.1 times more). New Zealand overachieved significantly, performing 5.6 times better than predicted, with 39 more medal points. Also, Canada (x2.6), Hungary (x2.4), Sweden (x1.7), Brazil (x1.7) and Spain (x1.6) performed at least 1.5 times better than predicted, while Denmark, Belgium and Ireland performed slightly better than the predictions. By contrast, Switzerland, Czech Republic, Poland, Estonia and Finland all under-achieved, winning fewer medal points than predicted, with Finland and Estonia winning no medals at all.

Obviously, these findings should be considered from a wider context, whereby Japan may perceive its performance to be below expectations after the 58 medals won in Tokyo (126 medal points, 89 more than predicted). However, according to the researcher from Japan, the outcome largely met the nation's 'post-hosting Olympic 2021' expectations. Belgium had its best performance in the last 100 years and did not under-achieve relative to its natural resources for the first time since we have been doing these calculations. Belgium's performance is perceived internally as having been very successful.

Some of the underachievers identified in our analysis confirmed that they had had higher medal expectations than actually achieved. The Czech Republic hoped to win around ten medals, in line with its performance at Tokyo 2020. In Denmark, two unexpected medals in wrestling and taekwondo helped the team to surpass the lower bound of the official medal expectations. Without these podium finishes, the Paris Olympics would have been considered a failure for Denmark. The overall performance in Poland fell below expectations, with many of the medals won being unexpected and several sports where multiple medals were anticipated not delivering. Although not surprising to Finnish elite sport stakeholders, Finland failed to meet the official goal of winning two medals. This outcome is the first time that Finland has not won a medal since it first took part in the Olympic Games in 1908. Similarly, Estonia acknowledged they had only two or three athletes who might win a medal, but even they were not successful. However, numerous top 10 finishes, including 4th and 5th places, made the outcomes seem more positive.

For Ireland, the seven medals won were in line with the target set by the Sport Ireland High Performance Strategy (2021-2032). According to the NOC, it was particularly pleasing to achieve so many golds. Although Sport Ireland does not target specific medal colours, the narrow margins for gold meant that 'we were fortunate that each athlete delivered to their full potential'.

Among SPLISS nations, New-Zealand is the strongest over-achieving country, performing 5.6 times better than predicted. Followed by Great Britain, the Netherlands and Japan.
Under-achievers are Switzerland, Czech Republic, Poland, Estonia and Finland.

Among the overachievers, Sweden marginally exceeded their expected 10 medals (11), while Hungary (19 medals) performed in line with the number predicted by sport policy institutions. Hungary had several near misses for medals, with 32 athletes or teams achieving 4th to 8th places (Olympic Diplomas), in addition to the 19 medals won. New Zealand reported satisfaction with its performance. Despite being identified as an overachiever, Canada's performance, according to the local researcher, aligned with expectations.

What these data suggest is the particular role that other factors play in developing elite sport success. What is it that some countries overachieve, whilst others under-achieve? In particular, what role does elite sport policy play here? We have learned from the previous SPLISS studies that there is a direct relationship between elite sport policies and international success. Six of the nine Pillars from the SPLISS model correlate significantly with success in either summer or winter sports. The funding of elite sport (Pillar 1) was seen as the most significant explanation for success in summer sports with the highest correlation to success of all Pillars. The next section continues with further analysis of Pillar 1.

21 See De Bosscher et al., 2008 and 2015


72
21
DURA-ACE

5. INPUTS: FINANCIAL SUPPORT FOR ELITE SPORT IN THE SAMPLE NATIONS

Before analysing the nations' inputs for elite sport, please note that measuring inputs on a consistent 'like-for-like' basis is challenging. Not all contributors could provide the required data in the specified format for every variable. As a result, our analysis is pragmatic and uses the available data as effectively as possible. Where there are caveats to data quality, these are stated.

5.1 PARIS CYCLE INVESTMENTS FOR THE OLYMPICS

5.1.1 Process of data collection

In September 2023, approximately one year before the Olympic Games in Paris, all potential sample nations were contacted to participate in the SPLISS Pillar 1 – Light 2024 study. Upon confirmation, countries received login details for the SPLISS software by October 2023. This platform facilitated the completion of an online questionnaire about each country's financial investments in elite sport. Local researchers collaborated with policy institutions, such as ministries and National Olympic Committees, to gather the necessary data. Once the questionnaire was completed, three data validation phases were conducted between the local researchers and the SPLISS light pillar 1 project coordinator. First, national data were summarised in an Excel file with graphs and descriptive statistics and sent to participating nations, accompanied by critical questions to enhance understanding of the data. Where necessary, online meetings were arranged to facilitate further discussion and ensure the data were interpreted correctly. Second, all data were thoroughly reviewed and re-validated based on the responses received from the participating countries. Third, based on an internal report, any ambiguities were addressed through online meetings. Finally, a preliminary report was sent to all nations, allowing them to provide feedback on the results.

5.1.2 Absolute amount of funding for elite sport

As an initial view of the financial investment or input made by each nation, Figure 12 presents the total national expenditures on elite sport (including Paralympic sports) for the sample countries in 2023[22]. The data include nationally coordinated funding from government sources, lotteries, and the National Olympic Committee (see Figure 13 for the breakdown by funding source). In Spain, the budget provided represents the total amount of funding for sport, leading to an overestimation since it is unclear what portion of this budget specifically supports elite sport. To ensure comparability, the following other income sources were excluded:

- specific tax systems (e.g., tax-relief system for companies in Hungary and Brazil);
- specific funds for elite sport that are not (completely) nationally coordinated (e.g., the Swiss aid foundation for elite athletes, the Japanese sports promotion fund);
- army programmes for elite sport (e.g., in Belgium, Brazil Finland, and Switzerland);
- one-time large investments for staging elite sport events (e.g., the European Games in Poland);
- one-time large investments in high-performance infrastructure construction (e.g., the Czech Republic's one-off investment in building new elite sport facilities); and
- television-rights and commercial sponsorships (e.g., Denmark).

We are aware and transparent about the caveats these decisions imply for like for like benchmarking. Comparing national expenditures on elite sport between nations is a challenging exercise. To ensure relevant comparisons, SPLISS studies only include nationally coordinated funding, which means that the NSA (National Sports Association) responsible for elite sport development can lead the decision-making process of funding allocation. Accordingly, it is important to recognise that the financial data provided for this exercise can be underestimates of the real level of elite sport funding in some countries. For instance, in Poland, private companies and state treasury-associated entities play a significant role in funding elite sport, but since their contributions are not nationally coordinated, they are excluded from this analysis. Similarly, figures from the Swiss Sport Aid Foundation supporting athletes are not included, as the NSA does not manage their decisions but only attempts to coordinate and align with them to some extent. However, this is an interesting example of funding for elite sport through other sources. Swiss Olympic does not provide direct financial support for athletes. By awarding Swiss Olympic Cards to athletes based on their performance, Swiss Olympic contributes to their recognition by other stakeholders within the Swiss system. The Swiss Sports

For comparability reasons, national expenditure on elite sport is measured through nationally coordinated funding only: from government sources, lotteries, the NOC and other sources.

22 for Japan, Spain, and Switzerland, 2022 was used as the reference year.

Aid Foundation is a private, non-profit organisation with the aim of supporting athletes according to their financial situation. To this end, the Foundation raises money from companies and private individuals, for example at charity events. Their funding criteria are based on the Swiss Olympic Card, provided by Swiss Olympic as the recognition of elite athletes. This process adds value to the support system because Swiss Olympic does not provide direct financial support for athletes.

Armed Services also play a crucial role in some countries, especially when military service is compulsory, and athletes receive dual career support to focus on their sport, as is the case in many countries. In some countries the army's role is more explicit in the development of elite sport. For example, in Switzerland military service is compulsory for all men between the ages of 18 to 30. During this time, the federal government covers 80% of their salary, provides a small military per diem payment and insures the athletes. Since athletes are able to complete a maximum of 100 days of voluntary service as sports soldiers in addition to the 30 days of compulsory military service, the Armed Forces can be considered an indirect funder of the elite sport system. Accordingly, the military service has also become increasingly attractive to female athletes becoming sports soldiers. Every year, two recruit schools start with a maximum of 70 women or men athletes each. In addition, the Swiss Armed Forces provide 18 positions at 50% full-time equivalent (FTE) as temporary professional sports soldiers for the duration of an Olympic cycle. Similarly, other successful European sporting nations such as Italy (i.e. 447 FTEs), Germany (i.e. 827 FTEs) and France (i.e. 218 FTEs) have similar arrangements for athletes in their Armed Services.

For these reasons, Figure 12 and Table 10 should be considered together. Table 10 offers crucial additional information about each country. In addition, while the section below focusses on total overall elite sport expenditures that are linked to performances of nations, it is equally important to distinguish between investment in winter and summer sports as some countries allocate a significant portion of their budget specifically to winter sports, while others focus on summer sports (see section 5.1.3 for more information).

For more information on Figure 13, please refer to Appendix 8.1, which includes a table detailing the exact amounts for each category (national government, NOC, lottery, Paralympics).

Disclaimer: please note that since comparing nations is a notoriously difficult exercise, Table 9 offers crucial additional information for each country, detailing all funding provided for elite sport. It is essential to consider these details, as Figure 12 and Figure 13 cannot be accurately interpreted without the clarifications provided in Table 9.

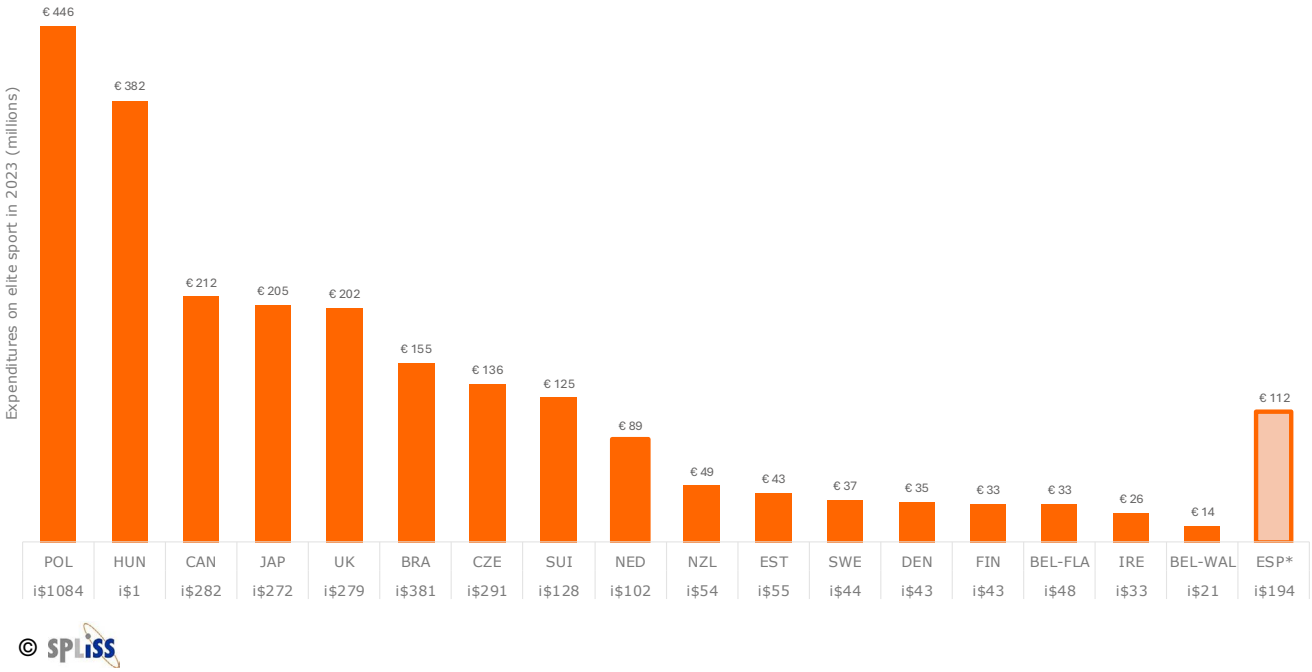


Figure 12. National support for elite sport from government, lotteries, and NOCs in 2023[23, 24]

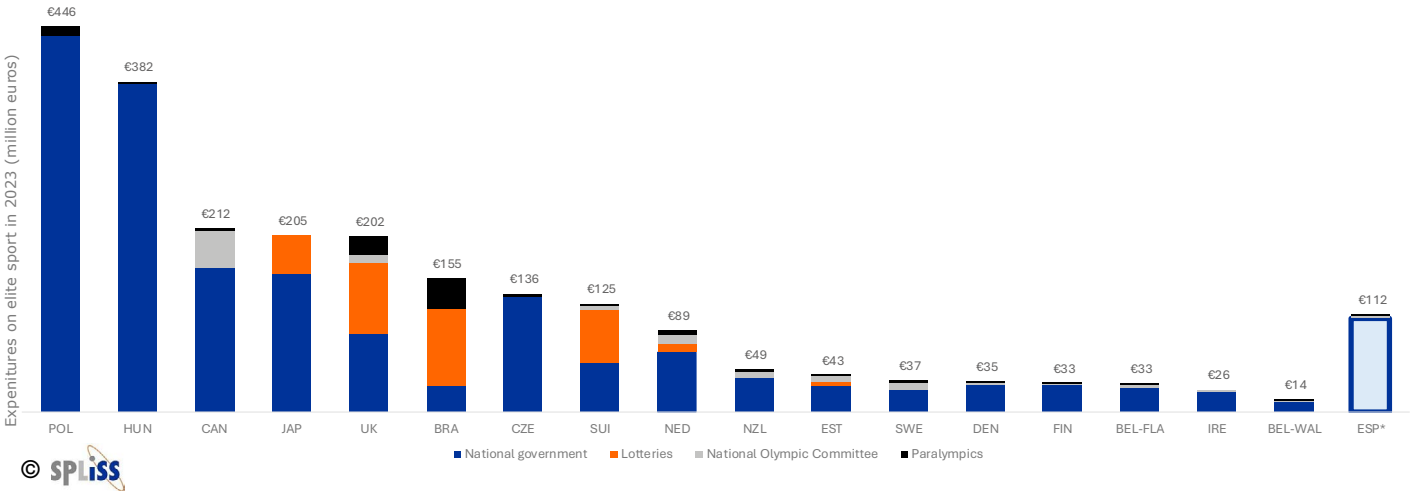


Figure 13. National support for elite sport by funding source in 2023 (€)

23 *ESP: The budget provided includes both grassroots and elite sport funding and consequently is an overestimation of the budget for elite sport. Therefore, we have placed Spain at the end of the graph.

24 I$ = international dollars express the relative value of currencies to be equivalent to each currency' purchasing

Detailed information on the funding sources	
BEL-FLA	**Flemish government** (Sport Vlaanderen): employment of full-time athletes, operational resources from BeGold talent programme, ad hoc funding. **NOC's** (BOIC) budget includes **lottery** funding, but the exact amount is unknown. **Paralympics**: the exact amount of lottery funding to the Belgian Paralympic Committee is unknown. Note: NOC and Paralympics data estimates are based on a 71% Flanders and 29% Wallonia distribution.
BEL-WAL	Same as Flanders for NOC, Paralympics, and note.
BRA	Lottery: support for Olympic, Paralympic, and club Committees. **NOC's** (Brazilian Olympic Committee): sponsorships, donations, rentals and other NOC revenue. Total budget includes expenses for international high-performance events and new sports facilities. These amounts are unavailable, so they cannot be excluded. The budget excludes army and tax exemption program for elite sport projects.
CAN	**National government** (Sport Canada): national and multi-sport organisations, COC, CPC, hosting, and athlete assistance. **NOC** (COC) budget excludes Sport Canada's funding and includes Olympic preparation, team preparations, and fundraising. **Paralympics** (NPC): included in national government budget. Total budget excludes funding from B2Ten, an independent elite sport support group.
CZE	**National government** (National Sports Agency): elite sport associations, women's team sports, major international events, para-sports, elite sport facilities, and equipment. The budget excludes a one-time investment of CZK 700.000.000 (€27m).
DEN	**National government** (from the Ministry of Culture and the Finance Act): the total income for the NOC (DIF) and additional DIF funding. **Lottery** (Danske Spil): included in government funding. Total budget excludes private funds, TV rights, interest, and municipal-level resources.
ESP	**National government** (Consejo Superior de Deportes): budget provided is an overestimation, as the exact amount spent on elite sport is unknown. Federations receive funding for both grassroots and elite sport, but the distribution between these areas is unclear. The budget provided applies to funding in 2022.
EST	**National government** funding (Ministry of Culture, Sports Department) covers support for NOC (Team Estonia), coach development, Audentes Sports Gymnasium, sports facilities, international events, the Sports Medicine Foundation, European Championships preparation, and national sport scholarships. **Lottery funding** supports sports projects through the Cultural Endowment of Estonia.
FIN	**National government** (Ministry of Education and Culture): NGBs, state athlete grants, Finnish High Sport Institute KIHU, estimated % of the NOC's general subsidy allocated to elite sport, sport academies, international events in Finland and national sport high schools. **Lottery** (state owned gambling company, Veikkaus) is included in the government budget. **NOC** includes sponsorship (calculated % of elite sport). For **Paralympics**, the exact amount is unknown.
GBR	**National government** (DCMS) expenditure on elite sport includes NGBs, sports clubs, talent development, athlete wages, elite coach development, international events, sport science, and other costs. **NOC** (British Olympic Association) budget comes from fundraising and merchandise. Accurate **Paralympics** expenditure data is difficult to obtain.
HUN	**National government** (State Secretariat of Sport) figures include direct support to elite sport (high performance events, Olympic preparation, sport innovation, development programmes of federations) and **NOC** funding. **Lottery** funding is not included due to lack of data. The budget excludes sports infrastructure development, facility construction and renovation, and tax relief system funds.
IRL	**National government** (Sport Ireland). **Paralympics** budget is included in the national government budget. Total budget excludes investments in Northern Irish Sporting Bodies, all-island National Sport Governing Bodies, and **lottery** funding.
JPN	**National government** (Japan Sports Agency; Competitive Sports Division): **Paralympics**, high-performance events, athletes, talent identification, and elite sport programmes of NGBs. **Lottery** (Japan Sport Council; Sports Promotion Lottery Subsidies). The Sports Promotion Fund subsidies, while including some government contributions, primarily rely on investment returns from private donations. As such, they are not included in the total budget. The budget provided applies to funding in 2022.
NED	**National government** (Ministerie van Volksgezondheid, Welzijn en sport) includes, amongst others, 'Fonds van de Topsporter' (salary for athletes). **NOC** (NOC*NSF; TeamNL) budget includes sponsorship and TeamNL proposition. **Paralympics**: budget is included in the national government budget.

Detailed information on the funding sources	
NZL	Information not available.
POL	**National government** (Ministry of Sport and Tourism). **NOC** (Polish Olympic Committee) budget is included in national government. The total budget excludes funds from private companies/sponsors and state treasury.
SWE	**NOC** (Swedish Olympic Committee) includes funding from commercial resources, but the exact amount is unknown and therefore not excluded. **Paralympics**: the exact amount is unknown. The total budget excludes expenditures for the Swedish National Sports High Schools
SUI	**National government** (Schweizerische Eidgenossenschaft; FOSPO) includes only the budget from FOSPO, with amounts from other federal offices and Swiss Armed Forces unknown. Furthermore, internal cost of FOSPO including personnel costs of scientists at the Swiss Federal Institue of Sport Magglingen SFISM are excluded. **Lottery** (Sport-Toto-Gesellschaf; from 2023 on Stiftung Sporthilfe Schweiz). The budget excludes the SWISS Sports Aid Foundation, Swiss Sport Integrity, and service costs for comparability reasons. The budget provided applies to funding in 2022.

Table 9. Detailed information by source of funding in each nation (see also Appendix 1)

Hungary and Poland are outliers with elite sport expenditures over 300 million Euros in 2023

As indicated in Figure 12 there was considerable disparity in the scale of investment made by each nation in 2023, with Poland and Hungary being notable outliers in the sample with elite sport investments over €400 million and €300 million respectively. The expenditures mainly concern government funding. Three nations invested more than €200 million (Canada, Japan and the UK) and three others spent over €100 million (Brazil, Czech Republic and Switzerland). The remaining eight nations' funding varied between €74 million and €14 million. To ensure we adjust for the different wealth of nations, the values below the X-axis in Figure 13 are adapted for Purchasing Power Parity PPP (in international $)[25]. The rationale for this approach is that developing elite sport in a high-cost country like Switzerland for example, is more expensive than in most of the other sample nations. While its expenditures in Euros are in a comparable group of Czech Republic, the PPP value of the latter in international Dollars (i$) is 2.3 times higher. This situation occurs because there are significant differences in price such as the cost of living and building costs between these two nations. The usefulness of Figure 13 lies in providing a nearly complete, current data point for the last full year (2023) for each of the 18 sport systems in the sample, which in turn provides a sense of the broad scale of investment made in elite sport by each nation.

Governments are the major funders of elite sport in most nations (Figure 13), with a proportion of government funding over 90% in six countries (Hungary, Czech Republic, Poland, the Netherlands, Ireland and Spain). Brazil, Poland, Sweden and Switzerland reported a rise in their government funding for elite sport through specific COVID-19 funding. Only in three countries, Switzerland, the UK and Brazil, is the proportion of government funding below 50%, which is compensated for by a higher proportion of lottery funding (more than 40%). In Brazil, revenue from the national lottery - coordinated by the public bank Caixa Econômica Federal - provides stable and consistent funding for elite sport, secured by specific legislation. As betting volumes increase, the funds distributed by lotteries also rise, benefiting the country's major elite sport organisations, including the Olympic, Paralympic, and Club Committees. In Switzerland, the figures should be interpreted with a degree of caution. The reported government funding is likely to be underestimated, as various federal offices provide both direct and indirect support for elite sport. However, only the data from the Federal Office of Sport (FOSPO), the primary funder, are included, since obtaining figures from other federal offices is extremely challenging.

In most countries government funding exceeds 70% of total elite sport expenditures. In Switzerland, the UK, and Brazil, higher proportions of lottery funding offset the lower government funding.

25 Purchasing power parity (PPP) is an economic concept and a technique used to determine the relative value of currencies to be equivalent to (or on par with) each currency's purchasing power. It asks how much money would be needed to purchase the same goods and services in two countries and uses that to calculate an implicit foreign exchange rate. Using that PPP rate, an amount of money thus has the same purchasing power in different countries. Among other uses, PPP rates facilitate international comparisons of income. The values are expressed in international dollars (i$). The international dollar is a hypothetical unit of currency that has the same purchasing power parity that the U.S. dollar had in the United States at a given point in time. Figures expressed in international dollars cannot be converted to another country's currency using current market exchange rates; therefore Figure 12 shows the absolute expenditures in euros. From De Bosscher et al. (2015).

Source: Penn World Tables, https://pwt.sas.upenn.edu/php_site/pwt71/pwt71_form.php; Reference: Robert Summers and Alan Heston (1991). "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988," Quarterly Journal of Economics, 106(2), pp. 327-368.

The funding of elite sport in most sample nations is heavily reliant upon public funding sources. This might place nations in a vulnerable position as it depends heavily on the party in power.

While national governments seem to attach importance to elite sport through their investments, reliance on government funding makes elite sport vulnerable to shifts in political priorities. A new party in power might reduce investments in elite sport. This concern has been raised in countries like Brazil, Finland, and the Netherlands following recent changes in government with decreased government investments announced. However, some countries including Brazil, Czech Republic, Hungary, Japan and Switzerland benefit from a more permanent legal foundation and specific legislation on elite sport that ensures a stronger, more stable framework for sports funding. For example, in Switzerland, the Federal Act on the Promotion of Sport and Exercise from 2012 states that "The Confederation shall support the promotion of performance sport for talented young athletes and of elite sport." This statement forms the legal basis for the administration (i.e. Federal Office of Sport FOSPO) to support competitive sport and, at the same time, the precondition for making funds available by the parliament in the annual budget debates in accordance with the Confederation's legal mandate.

Interestingly, Brazil, Czech Republic, Hungary, Japan and Switzerland benefit from a specific legislation on elite sport that ensures a stable framework for (elite) sports funding.

In Brazil, three laws support elite sport funding: one mandates the transfer of national lottery proceeds to performance sports, another provides grants for athletes, and a third offers tax exemptions. Such legal measures ensure clear, standardised and transparent support for sport, reducing vulnerability to political changes. In Hungary, an increase in government funding was achieved after sport was designated as a strategic sector.

Lottery funding for Belgium and Denmark is included within National Olympic Committee funding. The exact amounts of lottery funding are unknown and, therefore, not separately listed. In Hungary, the game tax from total sports betting (12%) is allocated to support sports, with a primary focus on football. However, no data are available on the exact budget allocated to elite sport which is why this category is left blank for Hungary. In Finland, starting from 2024, lottery funding will be redirected to the state budget without specific allocations, making sports funding subject to political debate and potentially leading to significant changes in elite sport expenditures in the near future. Czech Republic has not had lottery funding since 2017, following a change in shareholders who discontinued payments to sports associations. The National Lottery remains popular in the United Kingdom, where innovations in the product have helped maintain and even increase sales. Successful athletes often publicly thank the lottery for its funding, creating a virtuous circle that reinforces the lottery's success and ongoing support for sports.

Expenditure by NOCs on elite sport is relatively small in most nations.

In most nations, the National Olympic Committee's contribution to total elite sport expenditure is relatively small. Across all nations, NOC revenue typically comes from sources such as sponsorships, donations, rentals, sales of merchandise, as well as other NOC-specific income.

Diversifying funding sources (e.g., public funds, own funds, third-party funds) might be crucial for ensuring the stability and sustainability of elite sport. In Sweden, for example, sport federations are particularly strong at attracting their own commercial funding, which plays a significant role in financing elite sport (and is not included in the report). Also, Hungary has implemented a successful tax relief system for companies that wish to support elite sport. This system has led to significant funding being allocated for the development of elite sport infrastructure, the construction and renovation of elite sport facilities, and the support of both international and domestic sporting events.

5.1.3 Winter vs. Summer Sports

As noted earlier, it is important to separate investments by winter and summer sports, as certain nations allocate a significant portion of their budget to winter sports due to their geographical and climatic conditions. Figure 14 summarises the distribution of elite sport funding in the sample nations across all funded Olympic Summer, Olympic Winter, and Non-Olympic sports in 2023 from 10 nations. These data are not available for Belgium (Flanders & Wallonia), Canada, Denmark, Estonia, Hungary, Japan, and Spain. Additionally, for Brazil, the amount of elite sport expenditures allocated to non-Olympic sports is unknown. When interpreting the data, it is crucial to note that the allocation between winter and summer sports does not align with the total elite sport expenditures, as a significant portion of the funding transcends these categories. The presented data specifically reflects the financial allocations allocated to various sports disciplines or federations.

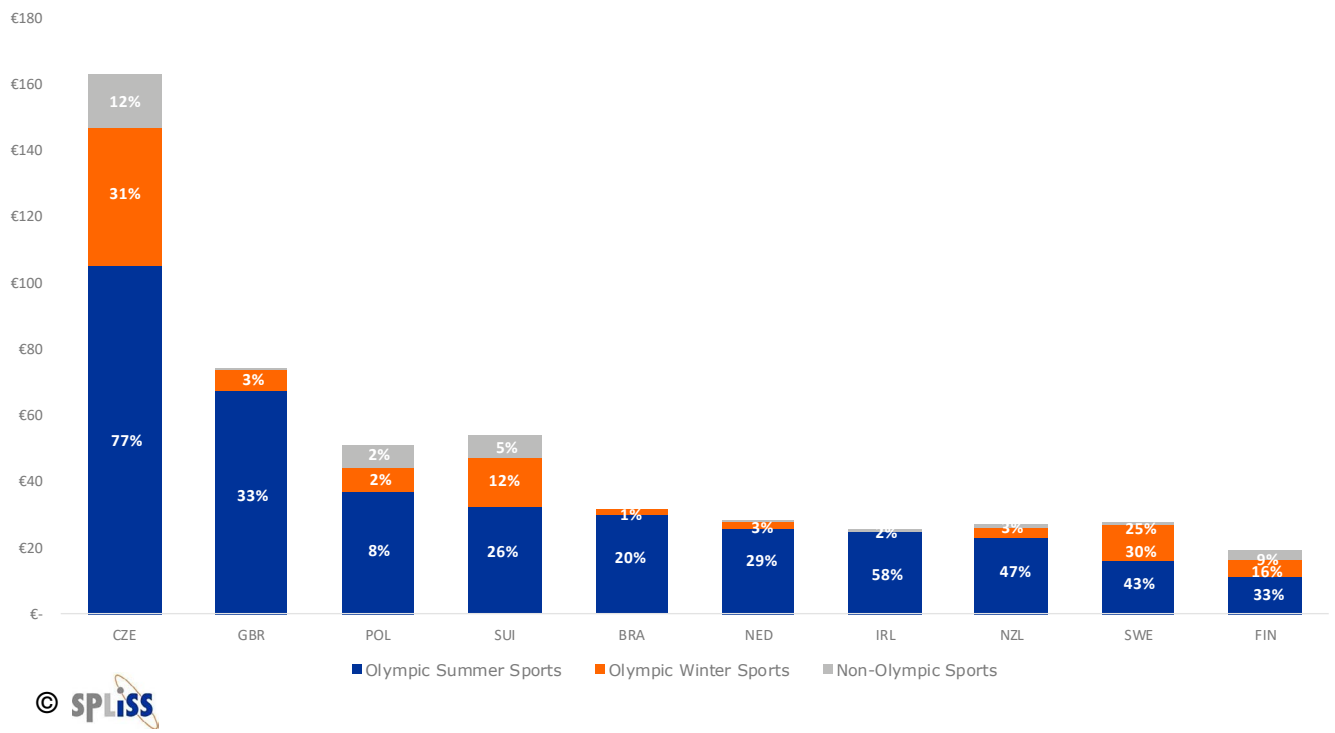


Figure 14. Distribution of elite sport funding (in millions) across all funded Olympic Summer, Olympic Winter, and Non-Olympic sports in 2023 (10 nations)

Most nations' investments remain primarily focused on the Summer Olympics, with a maximum of 31% of the budget spent on winter sports across all data points.

Despite substantial changes in scale and funding for the Winter Olympics over recent years - including the addition of more sports, disciplines and events to the programme as well as increases in the number of participating and medal-winning countries[26]– data from ten nations in Figure 14 show that most nations' investments remain primarily focused on the Summer Olympics.

Across all available data points, nations spend a maximum of 31% of their budget on Olympic Winter Sports. Ireland, Brazil, Poland, the Netherlands, and the United Kingdom invest very little in Winter Sports, allocating between 0.2% and 3% of their budgets, which is below the median of 4.6%.

Czech Republic, Switzerland and Sweden can be seen as nations that prioritise winter sports, as a nearly one-third of their budget is allocated to such sports. Similarly, although to a lesser extent, Finland invests about one-tenth of its funding in winter sports. Those countries that invest more in the Winter Olympic Games are typically those with a high number of days with snow and frost (a proxy for cold climate), which has been shown to be a significant determinant for a nation's sporting success in Winter Games. Producing athletes who are successful at the Winter Olympics is arguably easier in Switzerland than Spain because of its natural Alpine conditions.

As illustrated in Table 10 the top ten funded sports in most countries are predominantly summer sports in most nations. Exceptions are Finland and Switzerland, with 3 and 4 winter sports respectively featuring among the top ten most funded sports. Appendix 1 provides an overview of the top 10 sports in which each nation invests its funding.

Countries investing more in the Winter Olympic Games are Czech Republic, Switzerland and Sweden; nations that typically have a high number of days with snow and frost.

Delving deeper into the data, Table 10 shows that Czech Republic and Poland respectively invest 27% and 22% of their funding in just one summer sport (Soccer and Athletics respectively). By contrast, this top-1-sport funding is only 12% in Switzerland and 11% in Sweden, the lowest concentration of all sample nations. The figures for the top 4 Summer Sports are reasonably balanced between most of the sample nations at around 47% to 59%, with Sweden (33%) and Switzerland (41%), two typical winter sports nations, again having the lowest values.

26 Source: Kempf et al., 2014

	BRA	CZE	DEN	ESP	EST	FIN	HUN	IRE	NED	POL	SUI	SWE	UK	WAL
#	10	8	8	9	9	7	9	8	10	8	6	6	10	10
CR1	14%	27%	15%	16%	17%	21%	18%	15%	14%	22%	12%	11%	16%	15%
CR4	47%	54%	54%	54%	59%	49%	57%	49%	51%	58%	41%	33%	54%	50%

CR1: concentration ratio of the top-1 funded summer sports
CR4: concentration ratio of the top-4 funded summer sports

Table 10. Number of summer sports in top 10 funding

5.1.4 Change in funding: Tokyo versus Paris Olympic Cycle

Since Olympic cycles are typically funded over a four-year period, a more reliable figure for investment is the total expenditure over the entire Olympic cycle (see Figure 15). Four-year data points for Canada, Czech Republic, and Japan are unavailable, resulting in 15 data points shown. Additionally, not all nations were able to provide complete annual datasets covering government funding, lottery funding and NOC funding over an extended period. Consequently, only total expenditure figures are presented. Data for 2024 were not available at the time of data collection for Poland, Switzerland, New Zealand, and Wallonia. Therefore, we used the 2023[27] data as an approximation for 2024 in these countries. In Spain, the financial data provided covers the funding for all sports, leading to an overestimation as it is unclear what portion of this budget is for elite sport relative to grassroots sport. Appendix 2 provides an overview of the longitudinal data for each country.

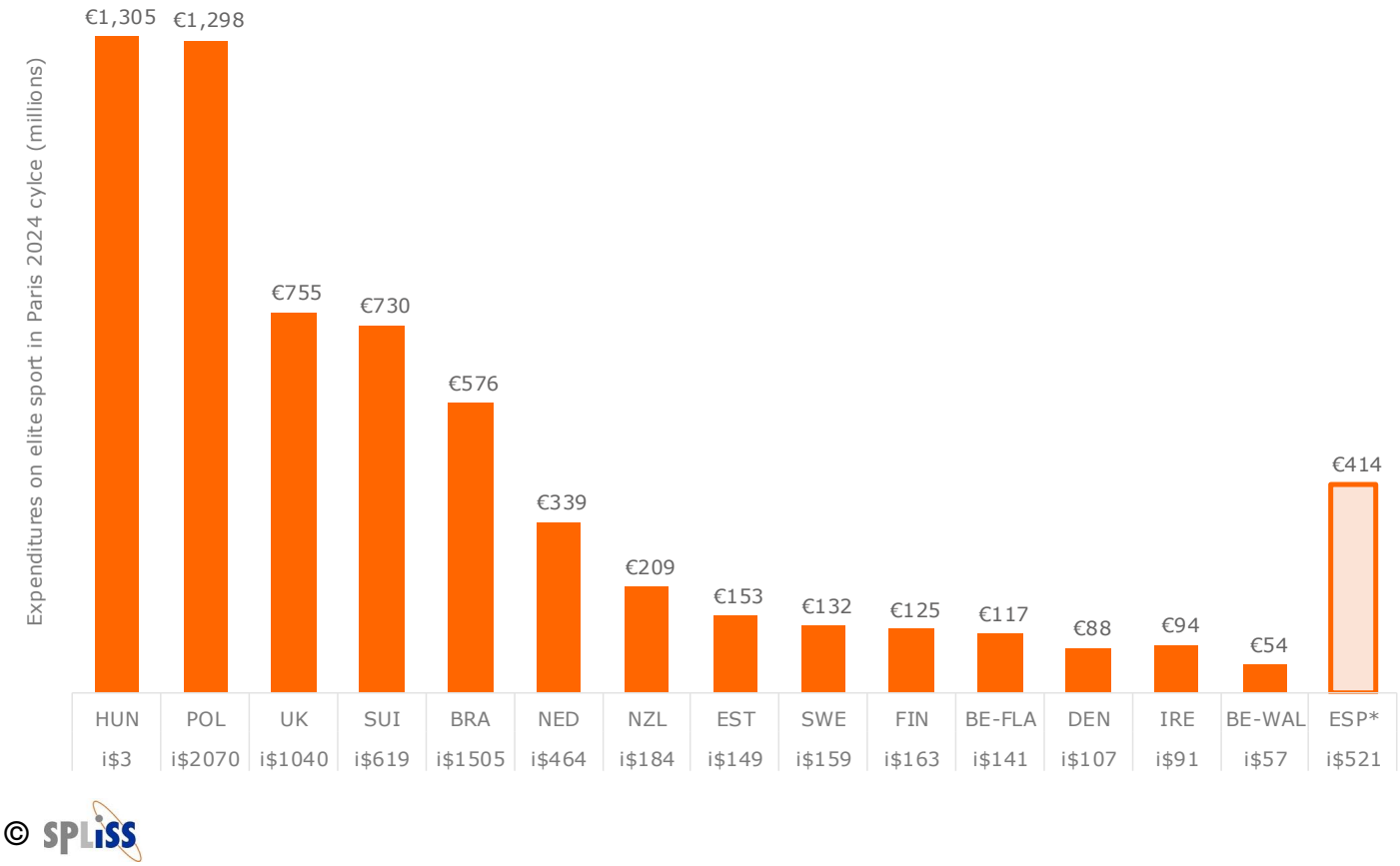


Figure 15. Investment in the 4-year Olympic cycle for Paris 2024 (including Paralympics)

27 For Switzerland, 2022 was used as the reference year.

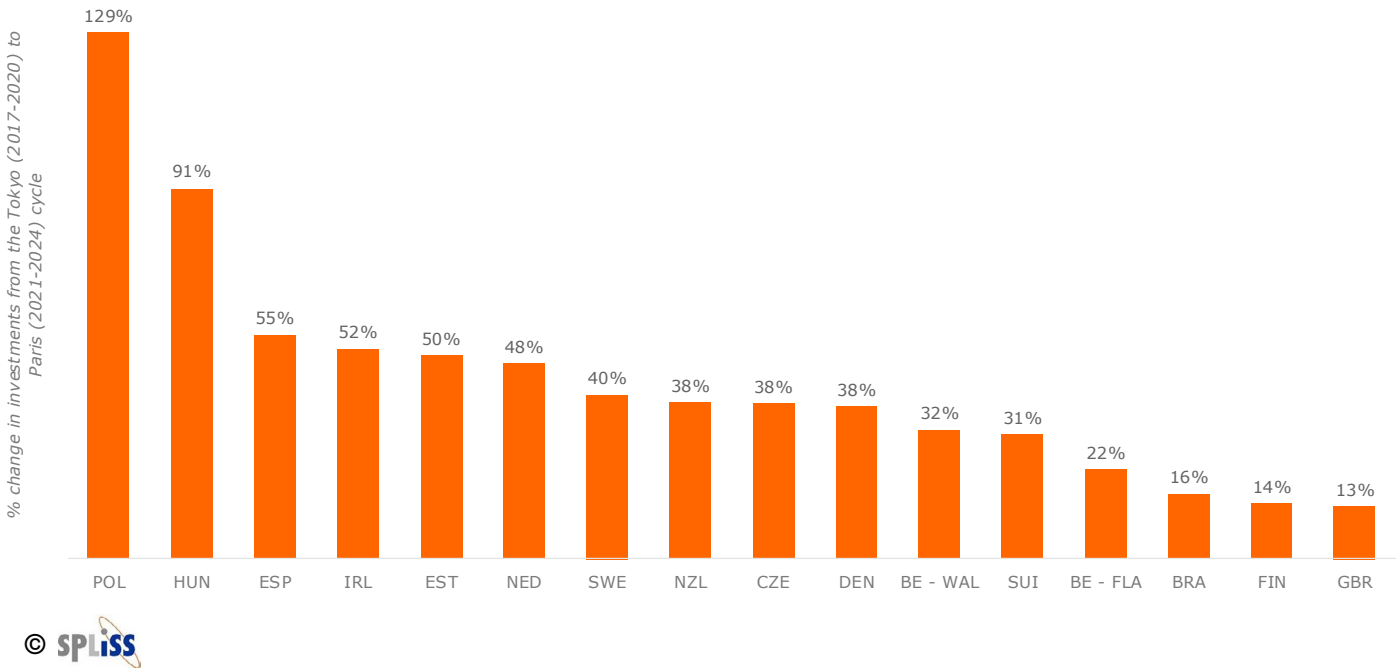


Figure 16. Change in investments from the Tokyo (2017-2020) to Paris (2021-2024) cycle

All nations increased their budget for elite sport in the Paris cycle (2021-2024) compared with the Tokyo cycle (2017-2020), with Hungary and Poland exceeding over 90% increase.

Figure 16 shows that all nations increased their budget for elite sport in the Paris cycle (2021-2024) compared with the Tokyo cycle (2017-2020). This observation supports the notion that nations continue to invest incrementally in elite sport to win medals, a phenomenon referred to previously as 'the global sporting arms race'[28].

Notable increases (> 90%) in elite sport funding were observed in Poland (129%) and Hungary (91%). The significant rise in Poland's budget for elite sport can be attributed to several factors. Since 2020, there has been a 50% increase in the overall government budget, driven by heavy tax policies and high inflation (over 20% due to COVID-19-related economic inactivity) which were among the highest in the Eurozone. This surge in government spending affected all sectors positively, including sports. Additionally, Poland's GDP has grown by over 10% in the past five years, which has contributed to increased funding. Changes in government, including a period when the Minister of Sport was also responsible for culture, led to negotiations for increased elite sport funding. Further, significant investments were made in sports infrastructure, including a programme to build 1,000 new sports halls next to schools, with an allocation of 450-500 million euros over two years. In addition, hosting the 2023 European Games and taking over elite sport events from Russia and Ukraine contributed to further additional expenditure on elite sport. Note that funding for elite sport facilities or the 2023 European Games were not included in the dataset, for as explained in the caveats above. Lastly, previous government programmes aimed at boosting sports participation as a political strategy positively influenced funding increases. In Hungary, the tax relief system has caused the sponsorship market to nearly disappear, leading to significantly higher funding from nationally coordinated systems in the Paris 2024 cycle. Additionally, facility rents have increased substantially, prompting government support for sports that do not benefit from the tax relief system. Furthermore, the financial situation of the Hungarian population requires increased involvement in sports financing. Despite a substantial budget increase, Hungary would benefit from more efficient and transparent resource allocation, according to Hungarian researchers.

In Estonia, despite lottery support for elite sport being frozen in 2020, the budget for elite sport increased with 50% for the Paris cycle. This can be attributed to the establishment of Team Estonia, the country's elite sport system, in 2019, which brought additional government funding. However, the financial situation in Estonia is perceived as complex, partly due to the need to increase defence spending, suggesting that elite sport is unlikely to receive additional funding in the coming years.

In Sweden, government-provided COVID-19 funding led to a 40% increase in elite sport funding for the Paris cycle compared to the Tokyo cycle. In Switzerland, similar funding

28 See De Bosscher et al., 2015 for more information.

also contributed to an increase for the Paris cycle compared to the Tokyo cycle.

In Finland, the 14% increase in elite sport funding has been primarily directed towards investment in elite sport experts, such as psychologists, nutritionists, medical professionals, and physiotherapists. A strategy proven effective in Switzerland, where the importance of research-based policy is recognised through the intertwined collaboration between research institutes and sports policy. In contrast, Hungary has identified a lack of scientific support as a significant gap in developing its approach to elite sport. Despite the increase, Finnish researchers are concerned about plans to reduce sports funding in 2025. While the exact details have not yet been published, this situation illustrates how a change in political leadership can significantly impact elite sport funding—a concern also raised by Hungarian researchers. In the Netherlands, the change of government resulted in a positive outcome, with an increase in the elite sport budget due to a minister supportive of elite sport. However, with recent elections, the continuation of this budget increase is now uncertain.

In Brazil, the percentage of funds allocated to the Paralympic Committee has risen, sourced from national lottery proceeds. The number of bets and the amount wagered on each bet have increased annually since the pandemic, contributing to this 2% rise in funding.

No complete cycle data are available for Canada and Japan. Consequently, data analysis focused exclusively on changes in elite sport budgets between 2020 and 2023 for these countries. Using this pragmatic approach the data show a decrease of Japan's budget for elite sport. Given that increasing investments by nations prior to hosting the Olympic Games is a well-known phenomenon in the literature, it is unsurprising that Japan's budget for elite sport in 2023 decreased compared with 2020, in the aftermath of hosting Tokyo 2020.

29 Source used for data of 2020: De Bosscher et al. (2021)

6. INPUTS VS. OUTPUTS: DOES MORE MONEY IN EQUALS MORE MEDALS OUT?

6.1 MEDALS WON AT PARIS 2024 VS. ELITE SPORT INVESTMENT IN 2023

A consistent finding across all SPLISS studies is that the funding of elite sport in most sample nations is heavily reliant upon public funding sources. These might be government funds or the proceeds from lotteries, but either way it is something of a tradition that elite sport development systems are underwritten from public funding sources. As demand for public funding invariably outstrips supply, there has to be a degree of accountability for the use of such funding. Some simplistic, but easily understood, measures that are in relatively common use include: cost per medal; inputs (investment) versus outputs (medals); and the change in output relative to any change in input. In this section we examine and comment on these three measures.

6.2 INDICATIVE COST PER MEDAL

In Figure 17 the cost per medal values for 13 sport systems is presented. Canada and Japan are excluded as their data is missing; Estonia and Finland are also missing because they won no medals and thus their cost per medal is infinity; and Belgium is broken down by its two autonomous jurisdictions of Flanders (7 medals) and Wallonia (3 medals).

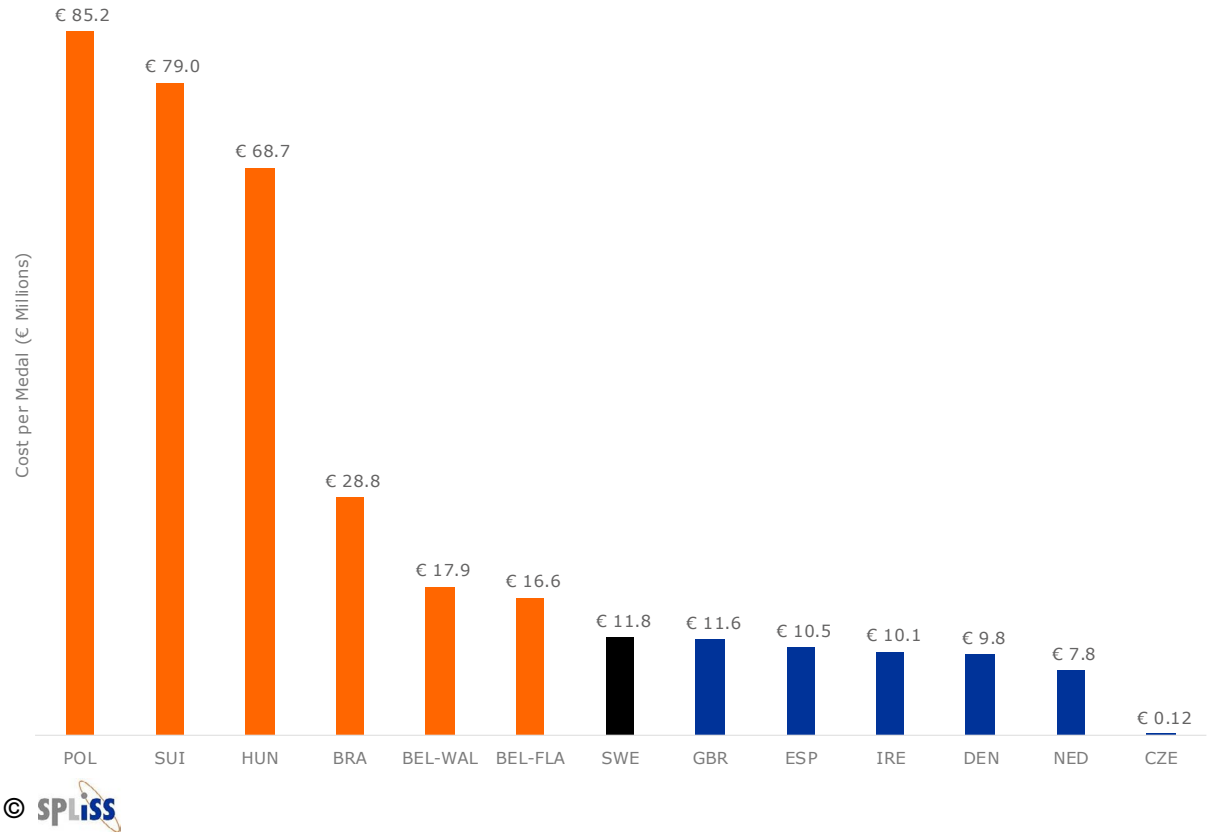


Figure 17. Paris 2024 cost per medal for the sample nations

Poland, Switzerland, Hungary and Brazil have the top four highest cost per medal, driven by both a reduction in medals won and an increase in funding.

The median cost per medal (black bar) is €11.8 million as shown by the value for Sweden. Poland, Switzerland, Hungary and Brazil have the top four highest cost per medal, which in all cases was driven by both a reduction in medals won (POL -4; SUI -4; HUN -1; and BRA -1) and an increase in funding. In the Paris 2024 cycle Hungary invested €1.3 billion in elite sport, a 91% increase on the Tokyo 2020 cycle, and yet won one medal fewer (19 v 20) than it did in Tokyo. Hungary was identified as an over-achieving nation in terms of its relative success, taking population, wealth and politics into account, nevertheless performances may be below the expectations of policymakers and funders. Cost per medal was particularly high in Poland at €85.2m. Poland won four fewer medals than it did in Tokyo (10 v 14) and underachieved relative to its population, wealth and political system, winning 13 medal points fewer than expected.

The two other 'nations' above the median, Flanders and Wallonia had contrasting fortunes. Flanders increased its investment marginally (+2%) and increased its medal success from 2 to 5, whereas Wallonia decreased its investment (-5%) and decreased its medals won from 5 to 3.

From the median to Denmark are five nations with cost per medal scores ranging from €11.8m to €9.8m. In four of the five cases (not Spain) funding increased and in four of the five cases (not Denmark) medals won increased.

Although the cost per medal for The Netherlands is well below the median, it was an increase of €1.4m per medal caused by an increase in funding and a reduction in medals. However, as noted earlier in the report, The Netherlands did enjoy an increase in the quality of the medals that its athletes won (+5 gold).

The Czech Republic is new to the SPLISS analysis process and its nationally coordinated investment into elite sport of €0.6m and its output of five medals, returns a cost per medal of around €120,000.

Whilst cost per medal data provides a snapshot of each nation's relative efficiency, the reality is that investments in a current cycle may have a lagged effect as expenditure in previous years may yet bear medals in future editions of the Olympic Games. In the UK, Flanders and the Netherlands for example funding is made in athletes who are likely to achieve podium success in the next four years and the next eight years. In addition, investment is made in 'world class potential' that is even more than eight years away from the podium.

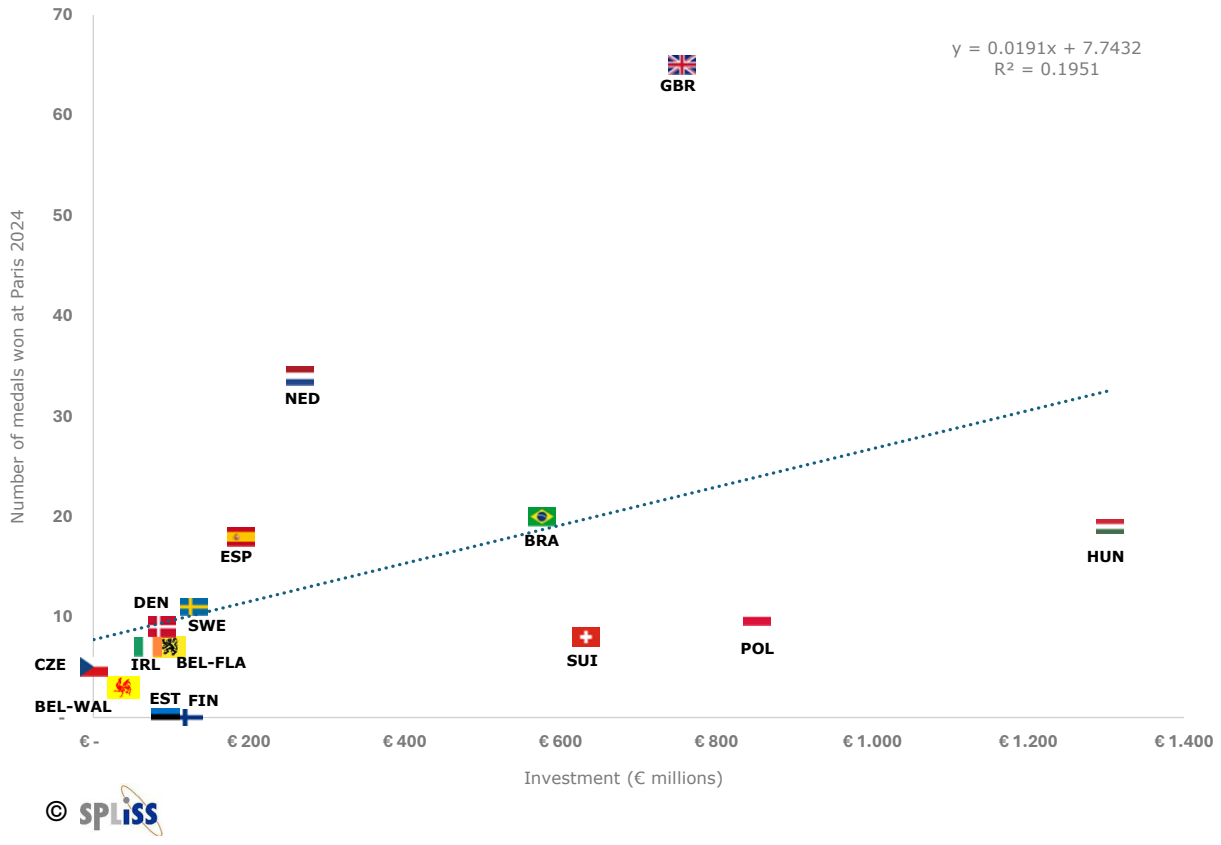


Figure 18. Medals won at Paris 2024 versus elite sport investment in the Paris cycle

6.3 MONEY IN VERSUS MEDALS OUT

To test the relationship between inputs and outputs, it is informative to look at the relationship between the two measures. In Figure 18, we plot investment against medals and compute the correlation between them. Again, we find that some nations have problems compiling reliable data for the full cycle and hence our analysis is based on 15 data points.

The UK, the Netherlands and Spain can be seen as efficient, with more medals won than what their funding spent on elite sport would predict. Switzerland, Hungary, and Poland under-performed.

Previous SPLISS studies[30] have identified that the absolute amount of funding was the strongest predictor of international sporting success, with correlations above 0.9 in Summer sports. In this study, Poland and Hungary, are outliers in their elite sport expenditures and clearly skew the data. The cost per medal in these nations was high and medals won was low compared with other nations with smaller elite sport budgets. Consequently, correlations[31] are lower than before, as shown in Table 11 A Spearman's rank correlation (based on the ranking of nations) of 0.68 is still significant but lower than previous studies. However, if we exclude Poland and Hungary (n=13), correlations[31] are higher and significant at 0.699** and 0.67* for Pearson's and Spearman's rank correlation respectively.

The relationship between elite sport expenditures and success has decreased

Pearson's correlation (n=15)	.442 (sig. .099)
Spearman's rank correlation (n=15)	.680** (sig. .005)
Pearson's correlation (n=13) – without HUN/POL	.699** (sig. <0.008)
Spearman's rank correlation (n=13) – without HUN/POL	.672* (sig. .012)

Table 11. Pearson's and Spearman's rank correlations between the absolute amount of funding (2023) and medals in Paris 2024

In Figure 18 above we can see that the United Kingdom, the Netherlands and Spain are all placed above the trendline, which means that they won more medals than their investment in elite sport over the Paris cycle would otherwise predict. If we refer to the analysis of 'over achievers' and 'under achievers' in Section 4.2, we can see that these three nations are all 'over achievers' and won more medal points than their population, wealth and political systems would otherwise predict.

By contrast if we look below the trendline in Figure 18 we find Switzerland, Czech Republic, Poland, Estonia and Finland, who were also identified as 'under achievers'.

Hungary is an interesting anomaly because its macro data diagnoses it as an 'over achiever', whereas its absolute level of elite sport expenditure relative to its medals won places it below the trendline. This finding tells us that Hungary maybe overachieving in terms of its success at macro level but at the meso level its cost per medal is disproportionately high relative to other nations. In the case of Hungary, it is likely that its huge increase in funding for elite sport was not solely for the Paris 2024 cycle and there may be lagged effects in future editions of the Olympic Games when the investment begins to pay off more efficiently.

Denmark and Ireland are also interesting cases in the sense that they achieve more or less in line with macro level expectations and their elite sport expenditure relative to medals is on or very close to the trendline.

6.4 TIME SERIES ANALYSIS

The relationship between investment and success or 'money in equals medals out', although strong, has diminished in our samples over time. However, it has been shown in the SPLISS light Tokyo 2020 report that 'MORE money in equals more medals out'. Over the short term, a reasonable comparison is the change in a nation's market share percentage and its percentage change in funding. Figure 19 provides this analysis for 15 data points between the Paris 2024 and Tokyo 2020 cycles.

The relationship between investment and success or 'money in equals medals out', although strong, has diminished in our samples over time.

30 See De Bosscher et al., 2008 (comparison in 8 nations); 2015 (comparison in 15 nations); SPLISS light, 2021 (comparison in 17 nations)
31 Correlations vary between 0 (if there is no relationship) and 1 (if there is a high relationship). Spearman's rank correlations are used when data contain outliers or with small data sets.

Figure 19 presents a clear picture that for the sample nations there is no short-term relationship between the change in funding and the change in success (r^2=-0.0162). We therefore need to look for general patterns. On the left-hand side of the graph (increasing funding and decreasing or static market share) are 9 of the 16 nations in the sample. At the extremes, we see Estonia and Finland losing 100% of their market share despite an increase in funding, whilst Hungary enjoyed a 91% increase in funding for no gain in market share. By contrast in winning one more medal than in Tokyo, the United Kingdom experienced a modest fall in market share (-7%) despite a 13% increase in funding.

Spain is an unusual case as it achieved an increase in market share despite a decrease in funding. The standout cases are Flanders with a 148% increase in market share in response to a 5% increase in funding and Ireland with a 94% increase in market share in response to a 14% increase in income. The case of Flanders needs to be seen within the wider context of Belgium as a whole, which enjoyed a 25% increase in market share following a 4% increase in funding. Although, there was a significant variation in the performances of Flanders (+5% funding, +148% market share) and Wallonia (-2% decrease in funding, -43% decrease in market share), the reality is that the main effects are one region's gain compensating for the other one's loss, as well as being one of the few nations in the sample to achieve an overall increase in market share.

Sweden and the Netherland also enjoyed relatively modest increases in market share in return for higher levels of funding.

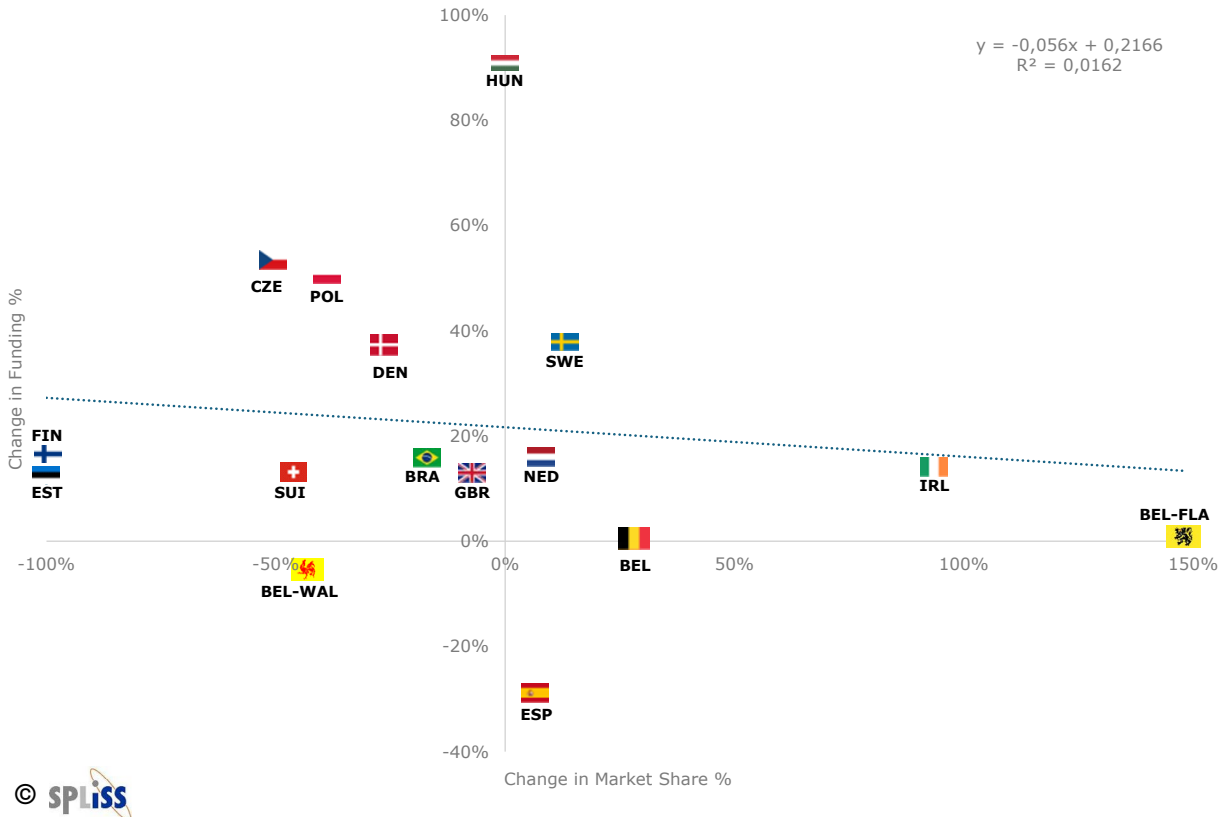


Figure 19. Change in market share % versus Change in funding % (Paris 2024 v Tokyo 2020)

Investment takes time to yield returns on its principal. There will be a lag between making an investment and achieving success.

Our key conclusion is that looking at short term relationships in changes to funding and success over one Olympic cycle is likely to be a poor guide to performance. We say this because investment takes time to pay back on its principal, which means that it is likely that there will be a lagged effect between making an investment and it leading to success. In the UK for example, the amount spent in the Paris 2024 cycle includes money spent on those who could achieve podium performance in Paris as well as those who have potential to achieve success in the next two cycles. Taking a longer-term view over multiple Olympic cycles is likely to show stronger relationships but is notoriously difficult to do in practice.

7. CONCLUSIONS

More nations than ever are interested in the relationship between investing in elite sport and the output of that investment as demonstrated by 17 nations and 18 sports systems taking part in this study.

Collecting data on the investment into elite sport at national level continues to be challenging. Despite our best efforts to measure on a like for like basis, there are still compromises to be made over data availability, data quality, and data comparability.

The context of the Olympic Games is constantly changing. Internal changes include the number of events, the range of sports contested, and policies such as increased gender equality. Externally, geopolitics such as the exclusion of Russia and Belarus can alter the competitive balance of the Olympic Games.

A particularly striking finding about Paris 2024 is the considerable reduction in the explanatory powers of the significant macroeconomic variables of population, wealth and political system. After hovering around the 50% mark since the 1960s, Paris 2024 has seen a significant reduction to 40%. Further research is needed to identify the possible causes, which we believe could include decreasing significance of specific variables; and the increased significance of meso-level variable such as elite sport policy interventions.

The Paris 2024 has helped to raise the helpful question of what is meant by 'over' and under' achievement and we believe that it has three dimensions. Achievement relative to natural resources; achievement relative to the absolute investment in elite sport; and achievement relative to expectations or perceptions.

In terms of a nation's natural resources (population, wealth, politics), Great Britain, Japan, the Netherlands, Canada and New Zealand performed at least three times better in Paris 2024 than would be otherwise expected. This raises questions on the role of elite sport policy in creating such an over-achievement. Poland, Czech Republic were the biggest under-achievers.

In terms of the absolute investment in elite sport, the high elite sport investments of Poland, Hungary and Switzerland did not pay off with medal success in 2024. By contrast, Great Britain, the Netherlands and Spain were most efficient, winning more medals than their investment would otherwise suggest. The findings of our Paris 2024 study have reinforced the conclusion that funding alone is not enough to develop success. What counts now is how nations invest their money efficiently and effectively throughout the other eight pillars of the SPLISS model and the near 100 critical success factors that underpin them. In addition, the analysis requires the input of key stakeholders in elite sport systems such as the athletes, coaches and performance directors.

Regardless of statistical analyses of achievement, ultimately what is deemed over or under achievement can be qualitative in terms of how performance is perceived by governments, policy makers and public opinion. For example, although statistically Japan did worse in Paris 2024 than in Tokyo 2020, this decline was anticipated. Japan's performance was its second best ever and policymakers are content with the outcome.

Over time, we have noticed small changes throughout the SPLISS comparative studies (2008; 2015; 2021; 20241 in the funding of elite sport. The assumption that more money in equals more medals out (Hogan and Norton, 2000) has not held to be true since the beginning of the 21st century. Enhanced international competition has made it increasingly difficult for nations to increase their share of success, thereby fuelling the 'global sporting arms race'. The conundrum inherent in this discussion is that the rules of the game are not dictated by what a country is doing compared with what it did in the past, but by what its rival nations are doing now.

Strategies evident in the sample nations are those of prioritisation, by targeting resources on a small number of sports with a real chance of success at world level; or diversification whereby nations aim to achieve success across a wide portfolio of sports. These strategies depend on the respective nation's specific resources and capabilities within its national elite sport systems (i.e. resource-based view) as well as its strategic approach to identifying and targeting those sports within the Olympic programme, where its chances of success against the other competing nations are greatest (i.e. market-based view). The optimal combination of this information provides a nation with the basis for creating a competitive advantage, similar to businesses competing in economic markets[32].

The post-Tokyo era has also triggered many other challenges for national elite sport policy organisations, not least of all the evolution of strategy. Worldwide scandals on transgressive behaviour such as alleged abuse in gymnastics, cycling and swimming have raised serious ethical questions. Policies may evolve from a vision that is not about winning but about how we win. In the future, it is likely that attention will less exclusively be paid to the number of medals won, but rather to emerging issues such as environmental sustainability; decreasing pressure on athletes; and delaying the age at which elite athletes begin to specialise. The net effect might be some nations winning fewer medals but doing so with a more humane elite sport climate.

A clear shift in funding policies has been observed across several sample nations, in which funding is increasingly linked to the wider societal impact of elite sport. This trend emphasises the growing importance of using sport as a tool for societal outcomes. For example the Netherlands will be integrating societal impact into its funding decisions from 2025. Similar approaches are found in the UK as UK Sport's Strategic Plan 2021-2031 is called Powering Success Inspiring Impact. We anticipate that the social impact of elite sport will become an increasingly important area of research related to elite sport policy.

This SPLISS Paris 2024 study should not be confined to Pillar 1 as there are eight other Pillars which are integral to assessing the health of the elite sport climate in nations. We therefore invite interested nations to join us in taking a more holistic view of elite sport development systems and their wider social impacts.

32 Weber, et al., 2019

APPENDICES

APPENDIX 1: TOKYO INFORMATION

8.1 NATIONAL SUPPORT FOR ELITE SPORT BY FUNDING SOURCE IN 2023 (€)[33]

	National government	Lotteries	National Olympic Committee	Paralympics
BE-FLA	27.729.500	Included in NOC budget.	4.260.000	1.108.500
BE-WAL	11.927.000	Included in NOC budget.	1.740.000	505.000
BRA	30.647.648	88.876.357	7.639	35.149.854
CAN	167.352.110		41.294.710	3.270.099
CZE	133.079.900		79.987	3.237.583
DEN	31.090.724		3.612.650	330.988
ESP	108.493.050		2.400.000	1.376.000
EST	26.905.349	1.089.850	3.886.320	1.150.937
FIN	30.273.330		1.740.960	1.000.000
GBR	90.051.372	81.947.598	9.301.968	21.071.894
HUN	533.668.409		1.401.985	1.522.218
IRL	24.000.000		1.555.556	Included in government budget
JPN	159.949.568	44.591.983		Included in government budget
NED	69.236.000	9.934.000	9.386.000	Included in NOC budget.
NZL	39.281.736		7.211.773	2.112.228
POL	434.722.045			11.261.150
SWE	25.646.835		8.295.016	2.685.673
SUI	56.335.224	61.112.770	5.971.932	1.393.451

Nations which won a medal in Tokyo 2020 but did not in Rio 2016

8.2 DATA FROM INDIVIDUAL NATIONS

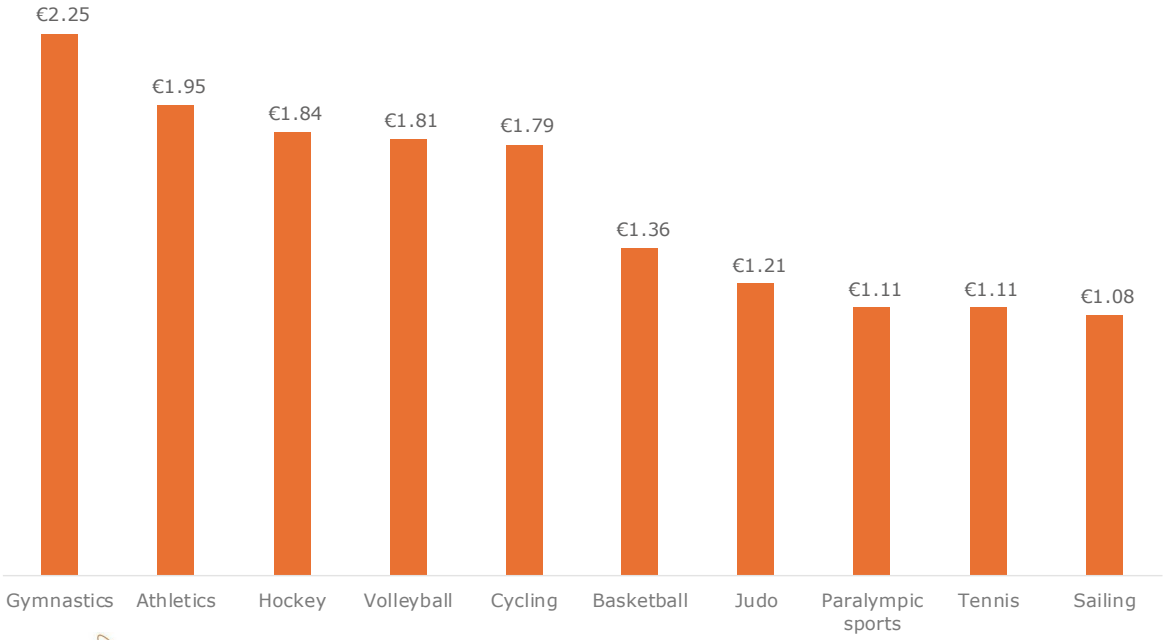
If certain graphs are not provided for a country, the data were not available. Numbers are provided in millions.

8.2.1 Top ten prioritised funded sports for elite sport

Canada: Since the exact amounts for Canada are not known, a concrete graph is not included. The top-funded sports include athletics, alpine skiing, basketball, cycling, and swimming. Each of these sports receives over €4 million (CAD 6 million) in funding, with a significant gap between them and the next group of sports. Please note that while these sports receive the most funding, they are not necessarily the highest priority.

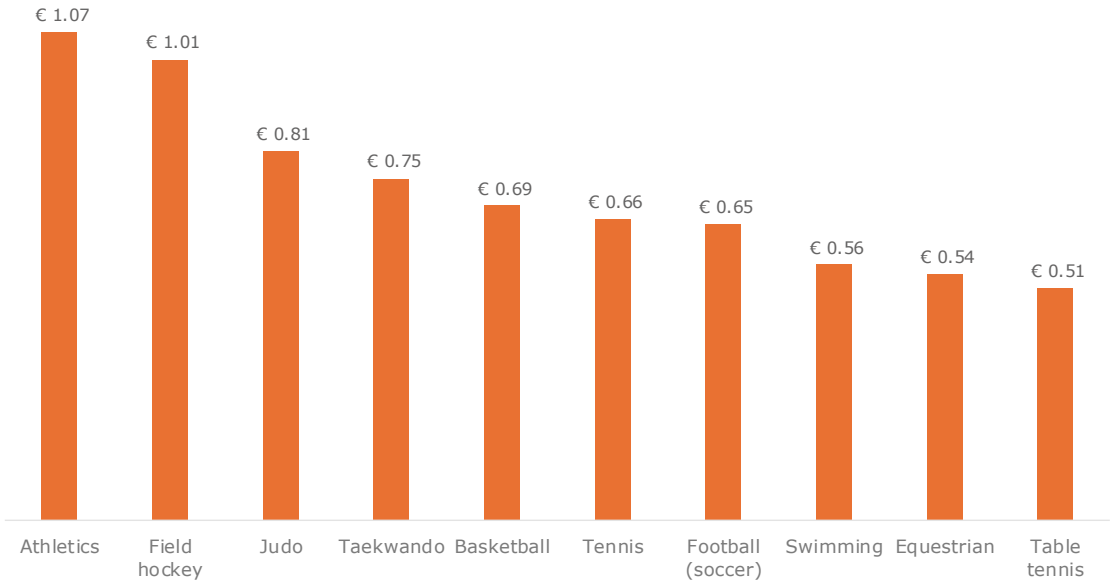
33 Please refer to Table 10 for detailed information on discrepancies between the numbers in appendix 8.1 and totals provided in Figure 13

Belgium - Flanders



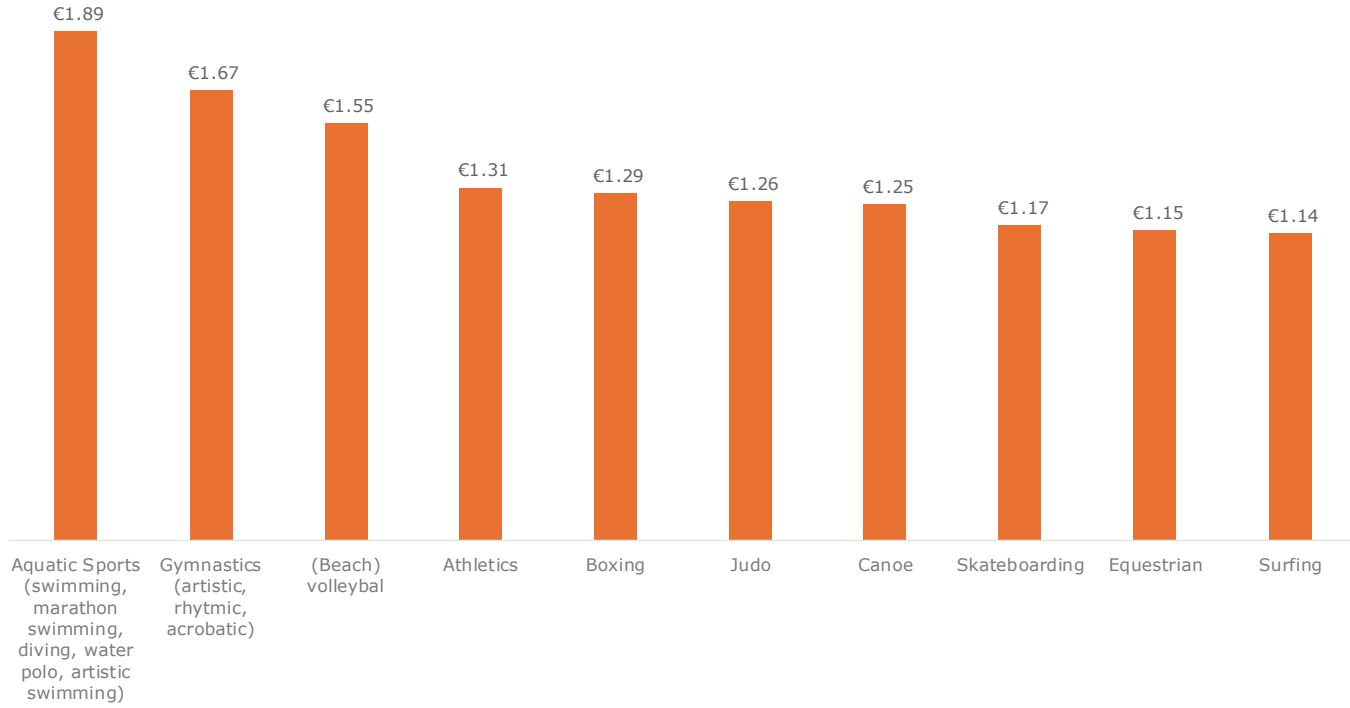
© SPLISS

Belgium - Wallonia

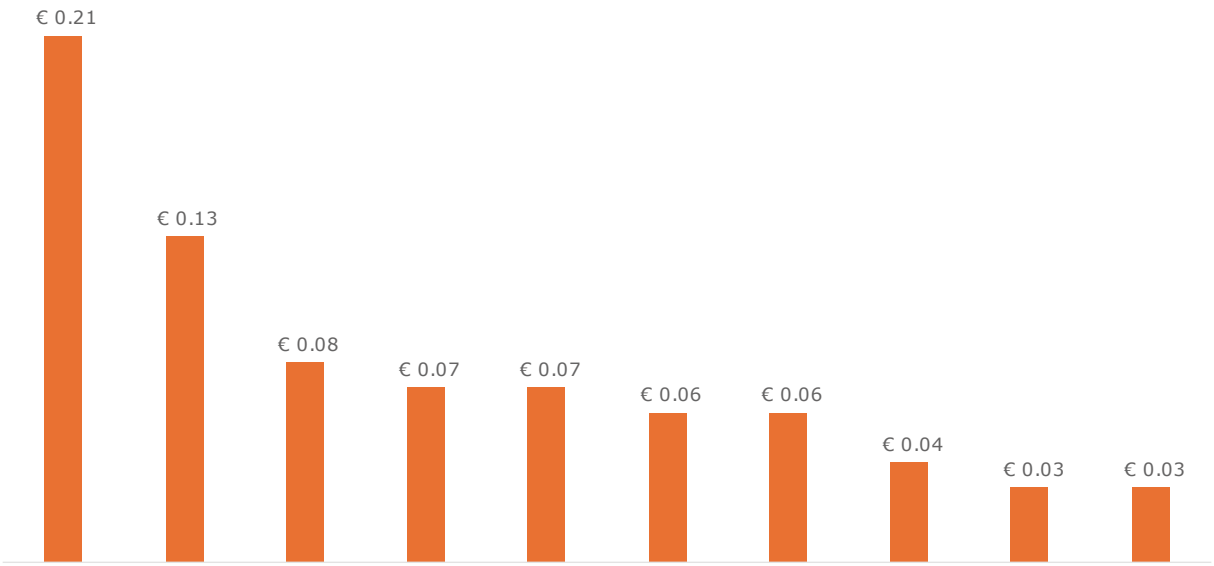


© SPLISS

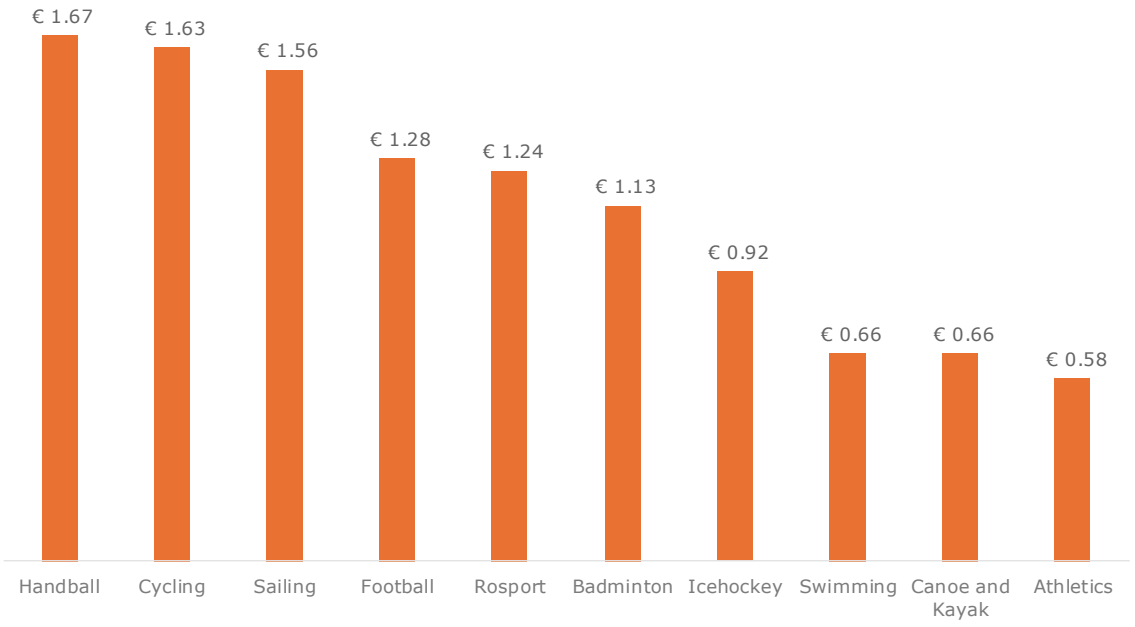
Brazil



Czech Republic

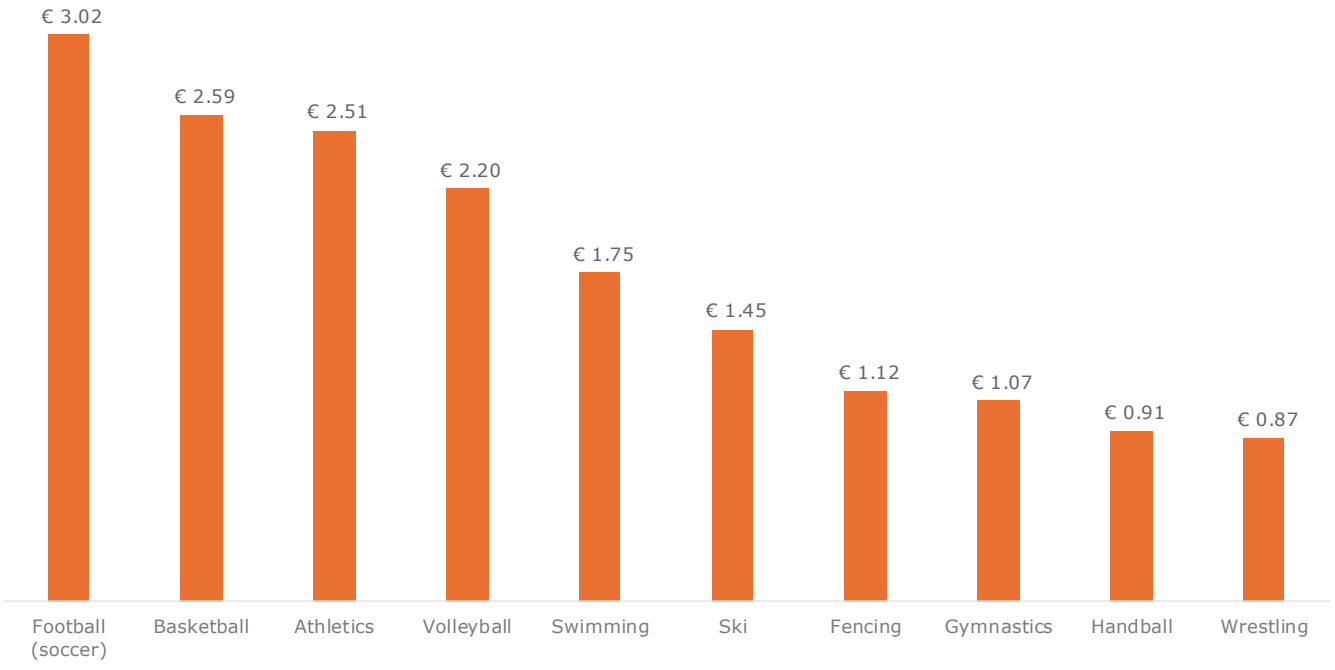


Denmark



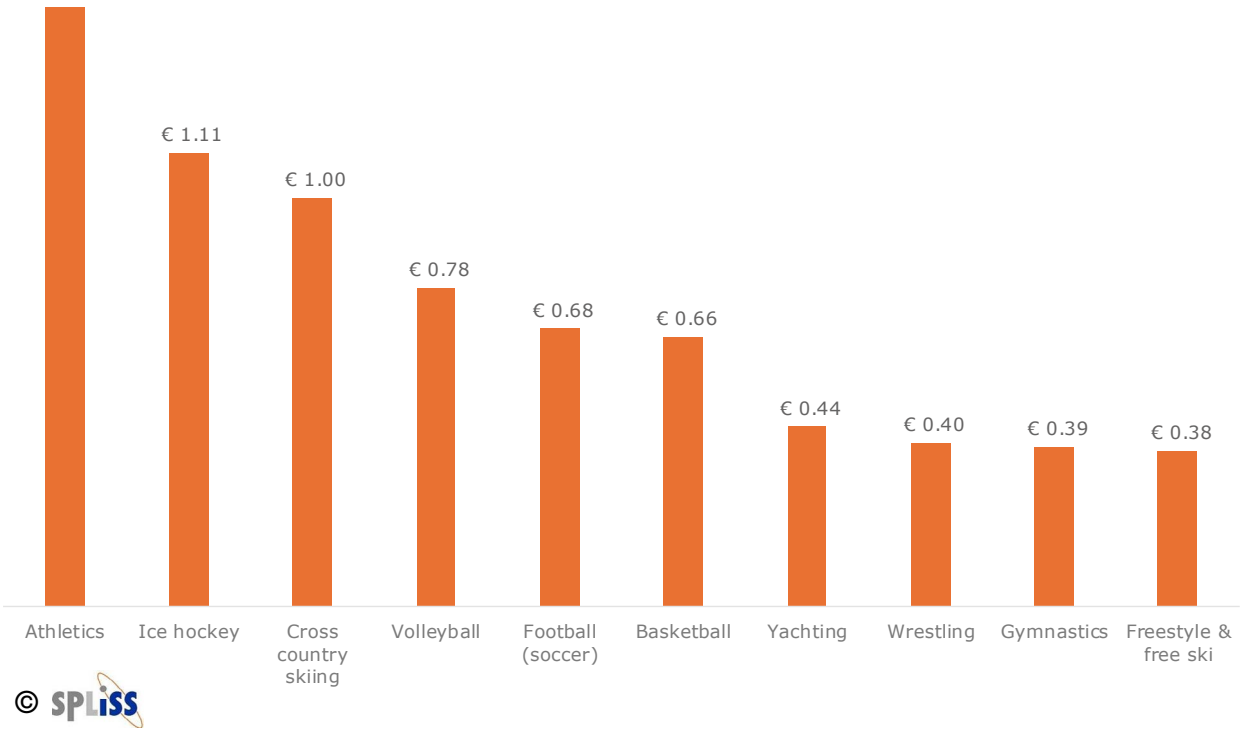
© SPLISS

Estonia



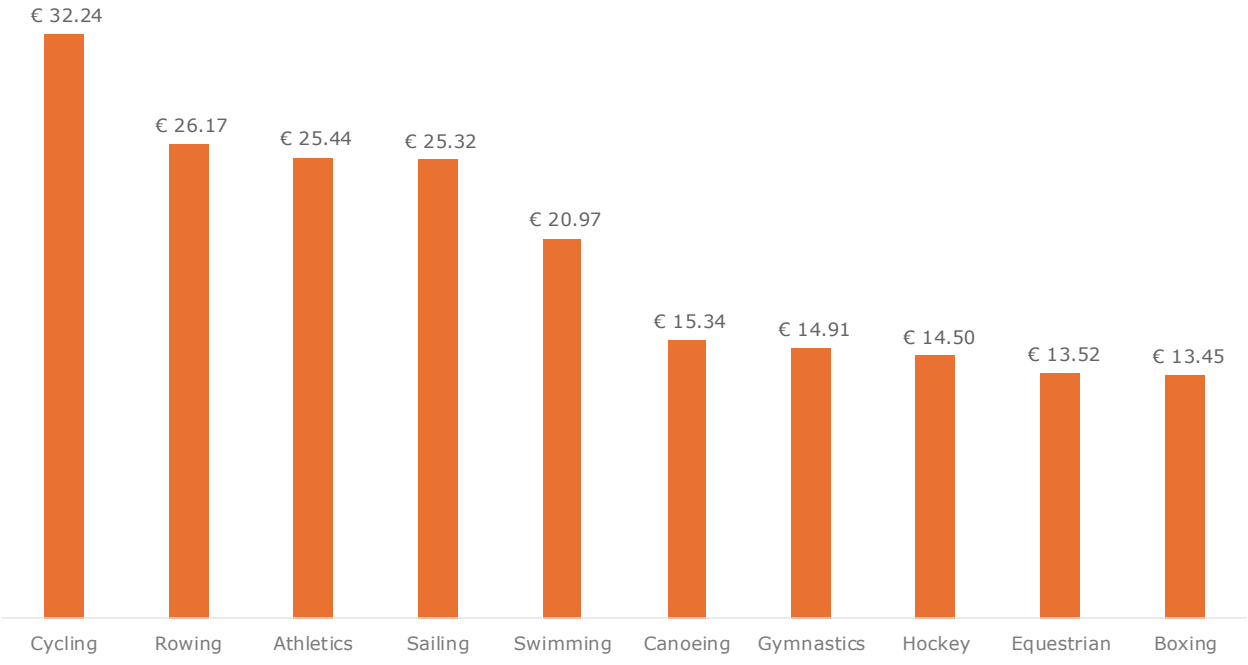
© SPLISS

Finland



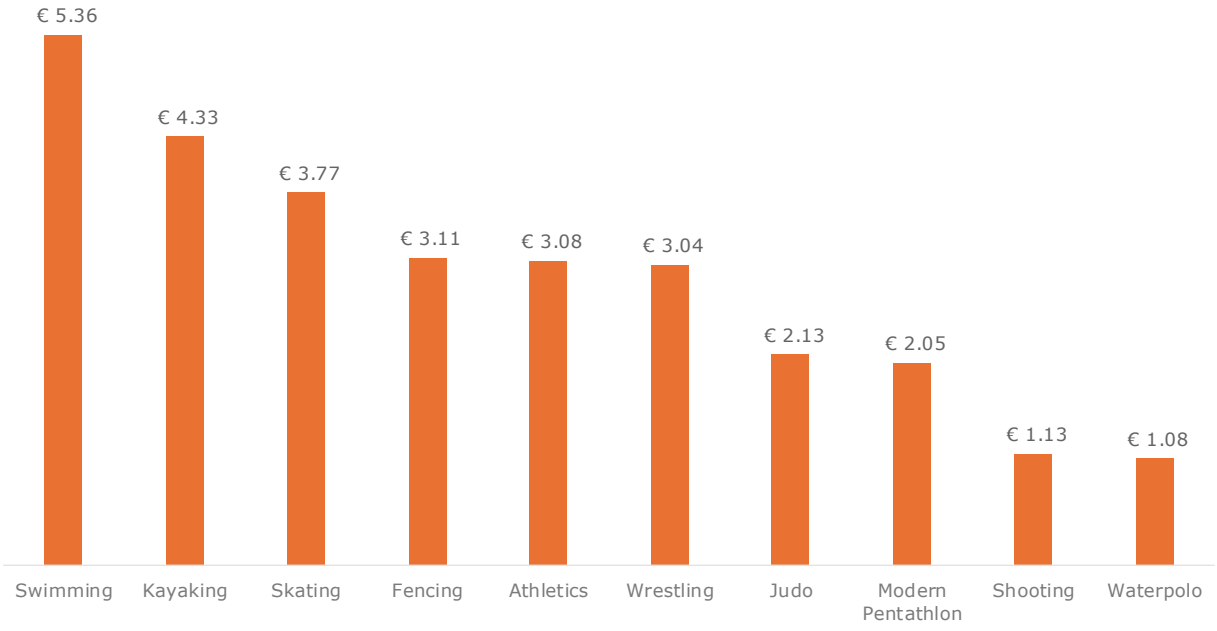
© SPLISS

Great Britain

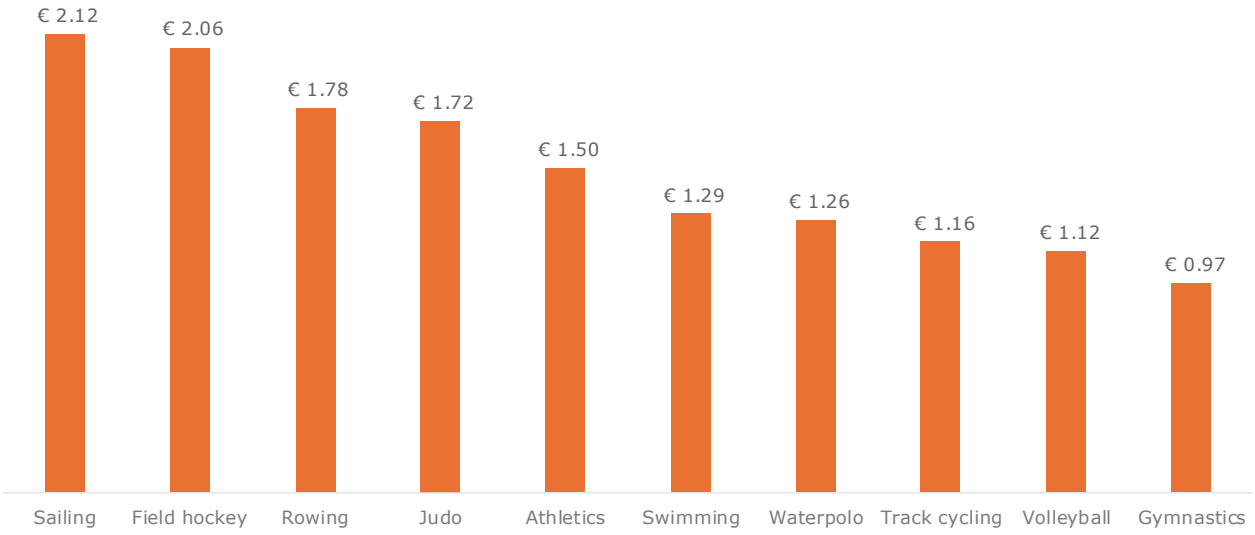


© SPLISS

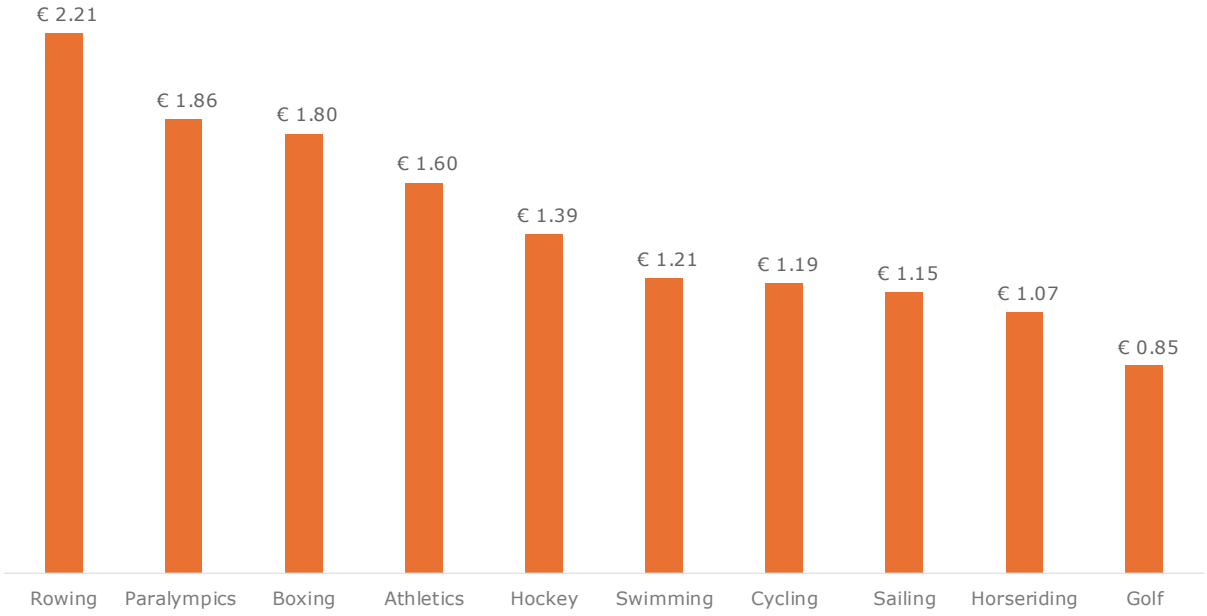
Hungary



The Netherlands

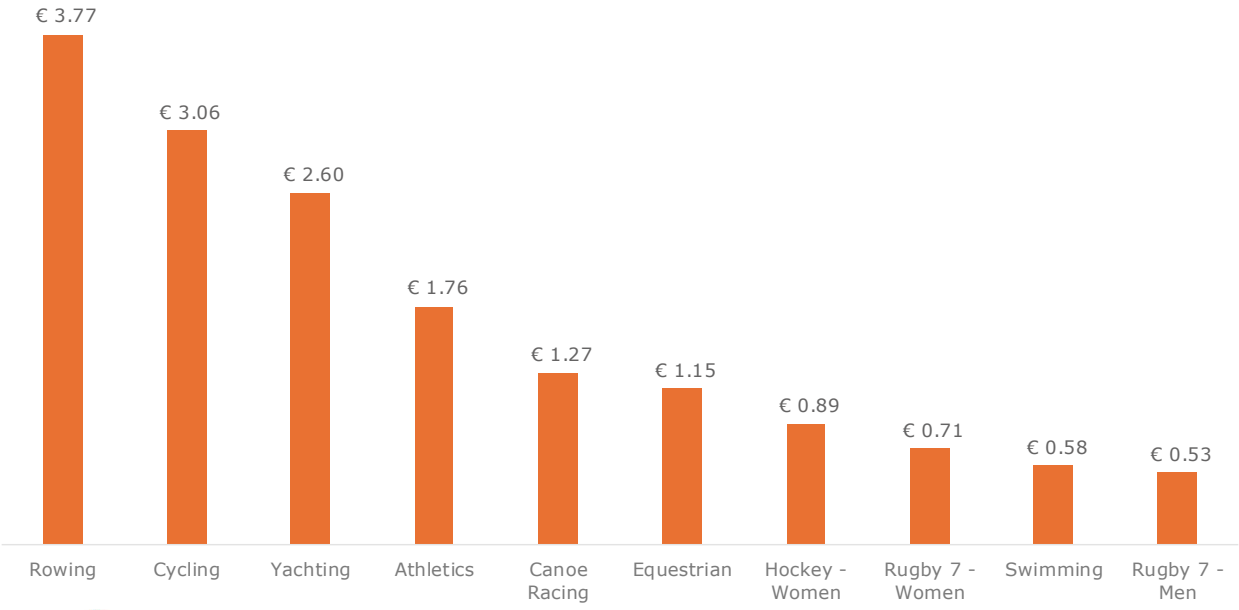


Ireland



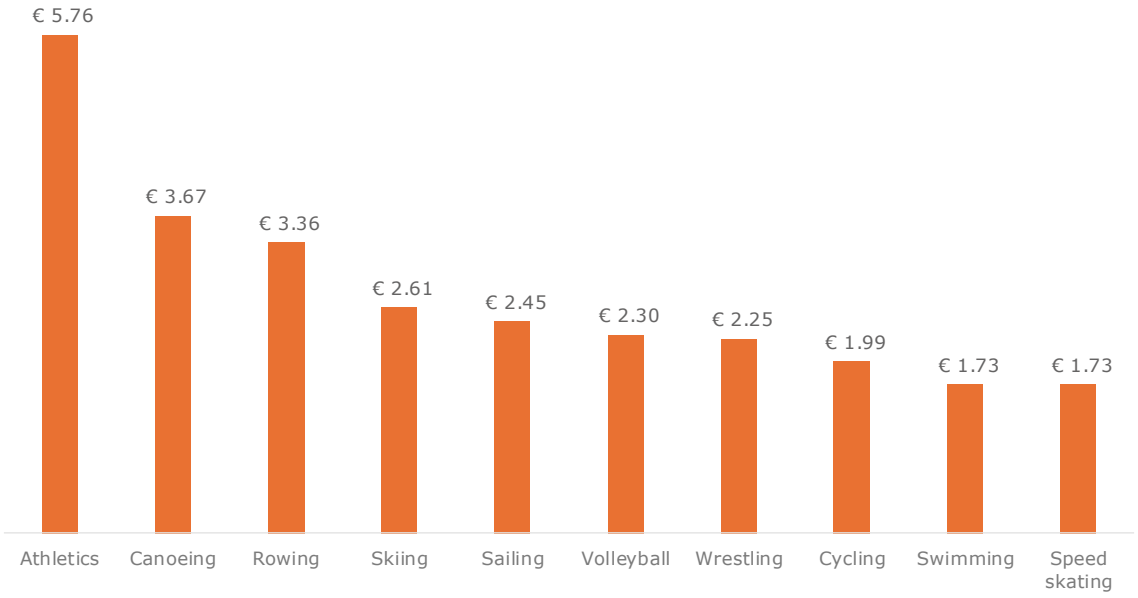
© SPLISS

New Zealand

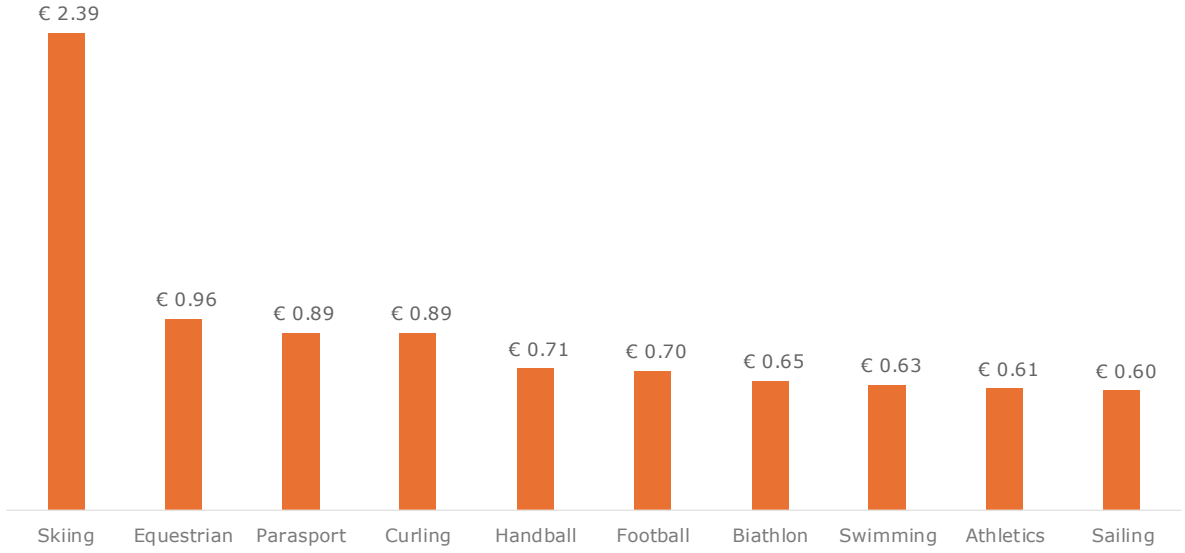


© SPLISS

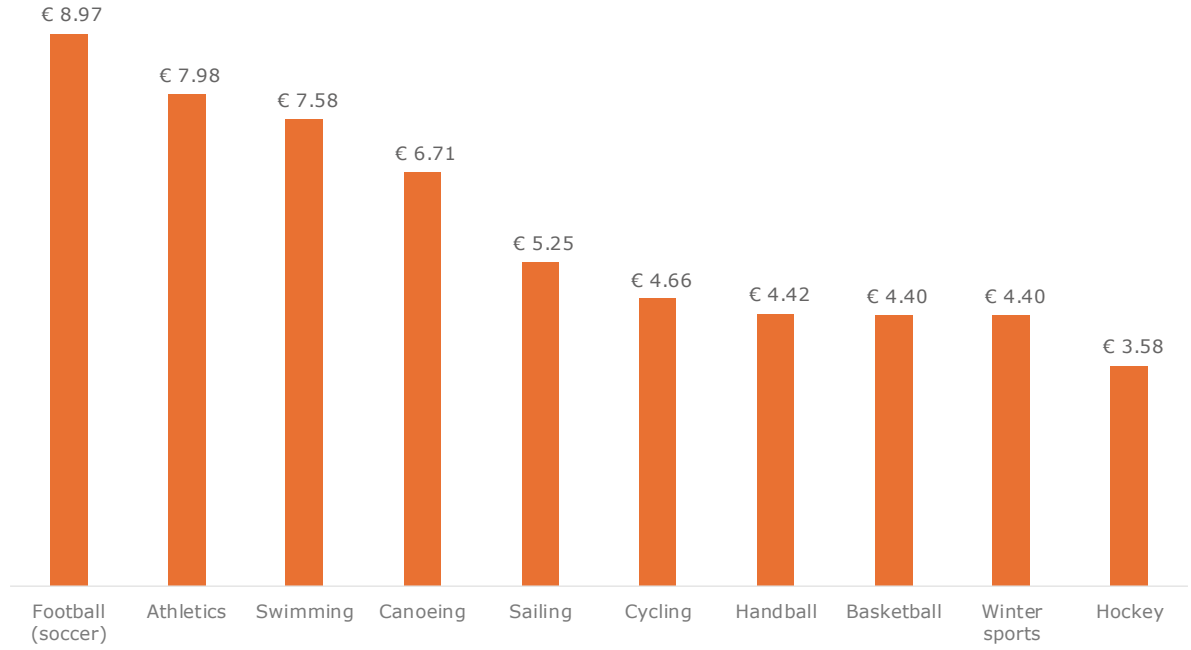
Poland



Sweden



Spain

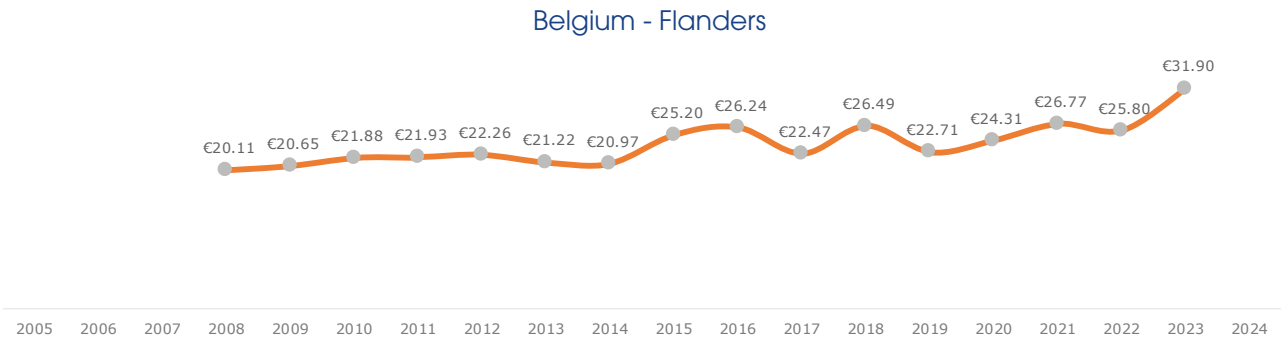


© SPLISS

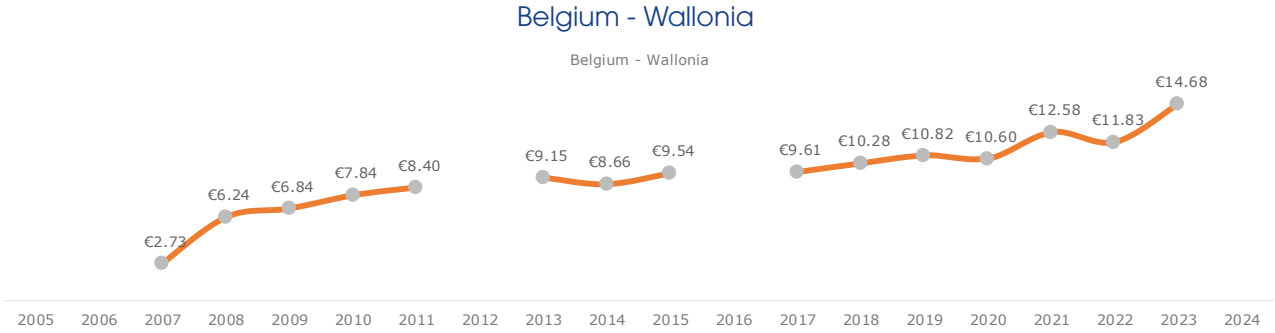
Switzerland

© SPLISS

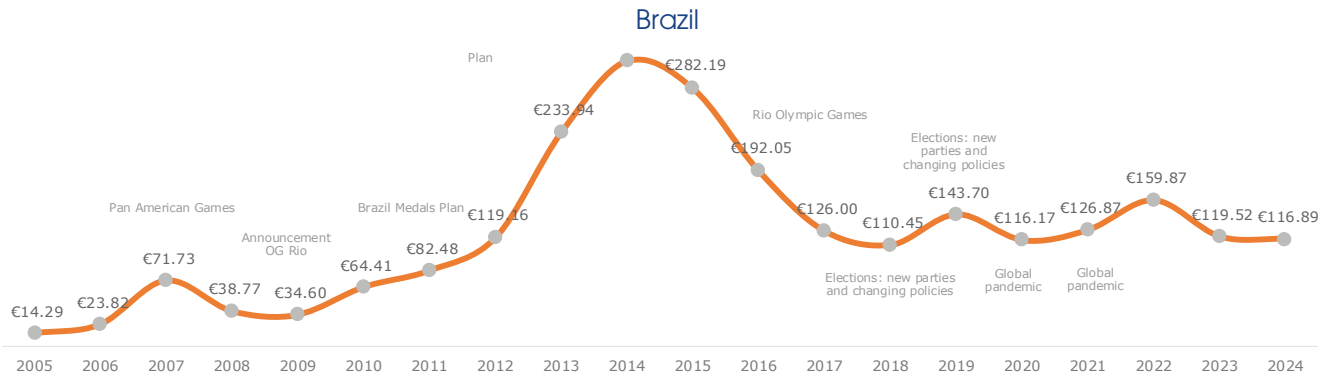
8.2.2 Long-term expenditures for elite sport

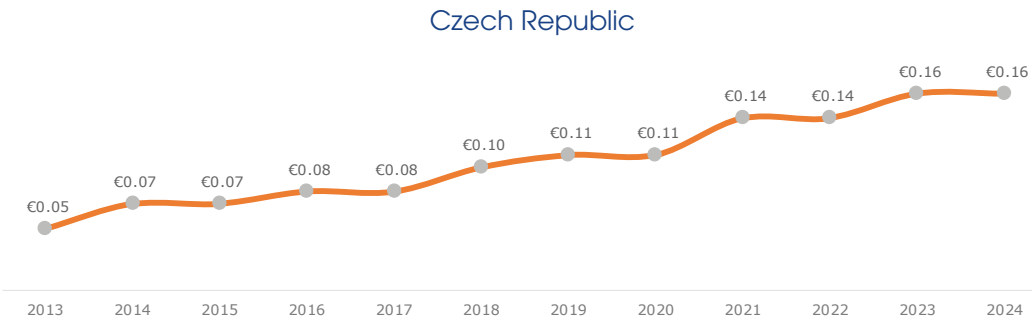


© SPLISS

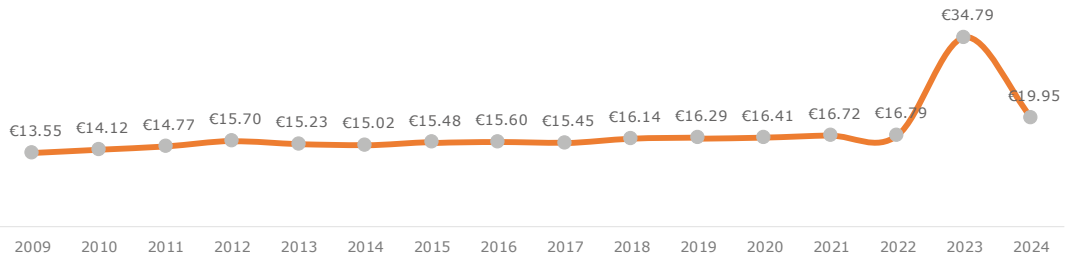


© SPLISS

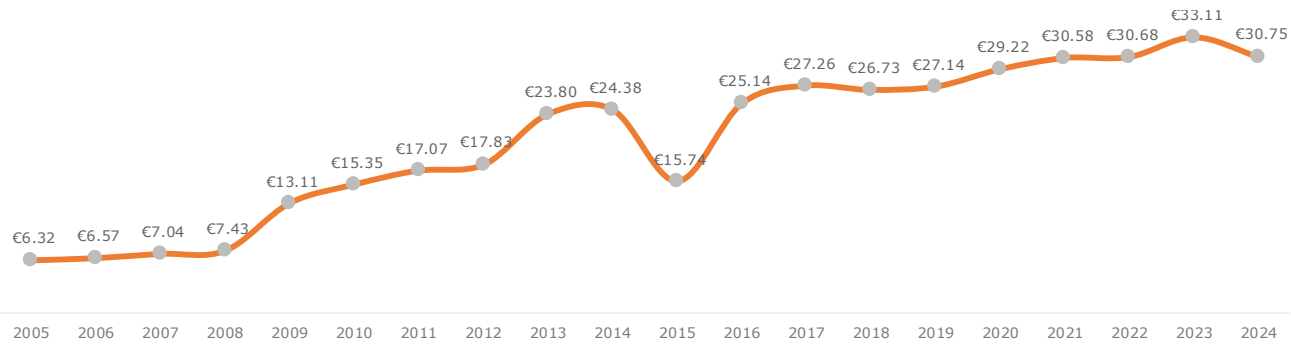




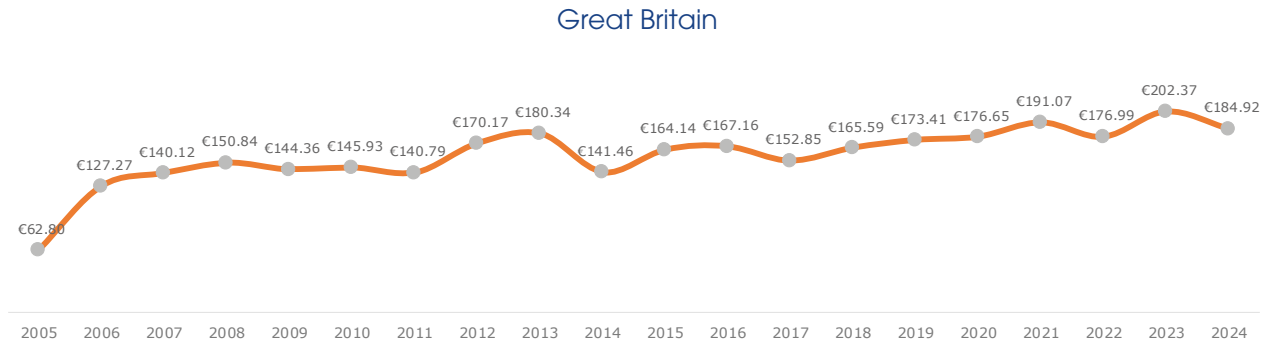
DENMARK (excl. lotteries)



Finland

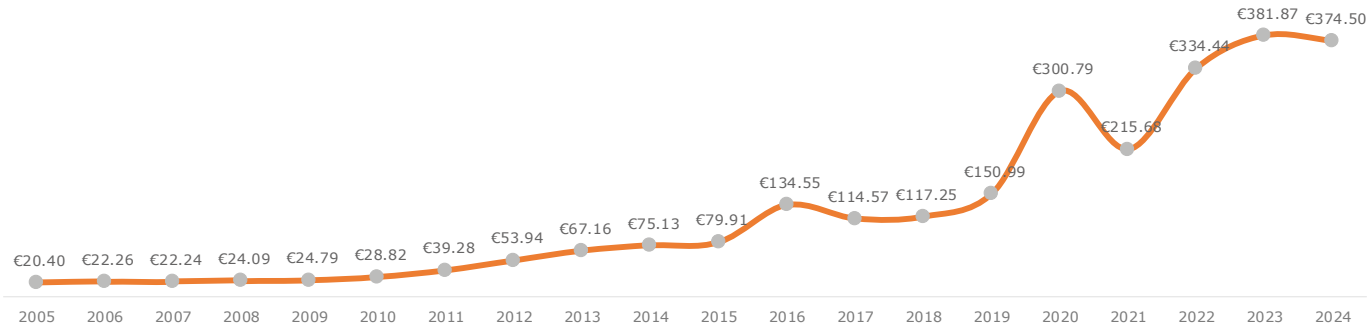


© SPLISS



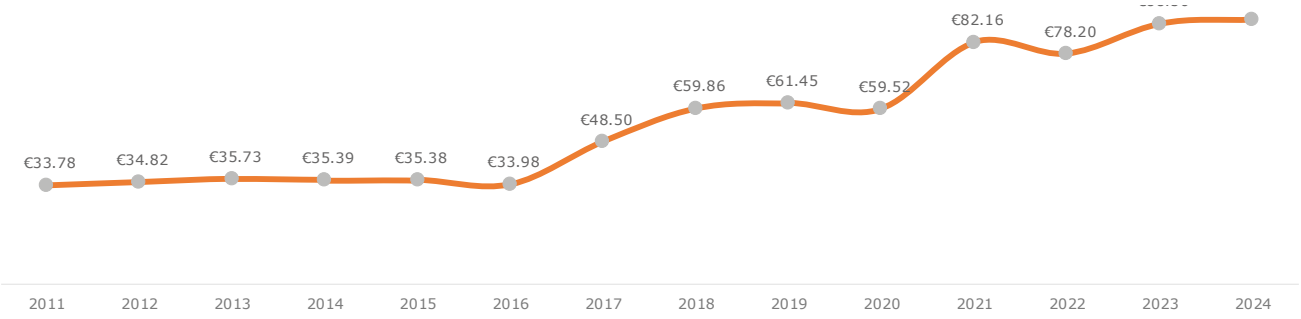
© SPLISS

Hungary

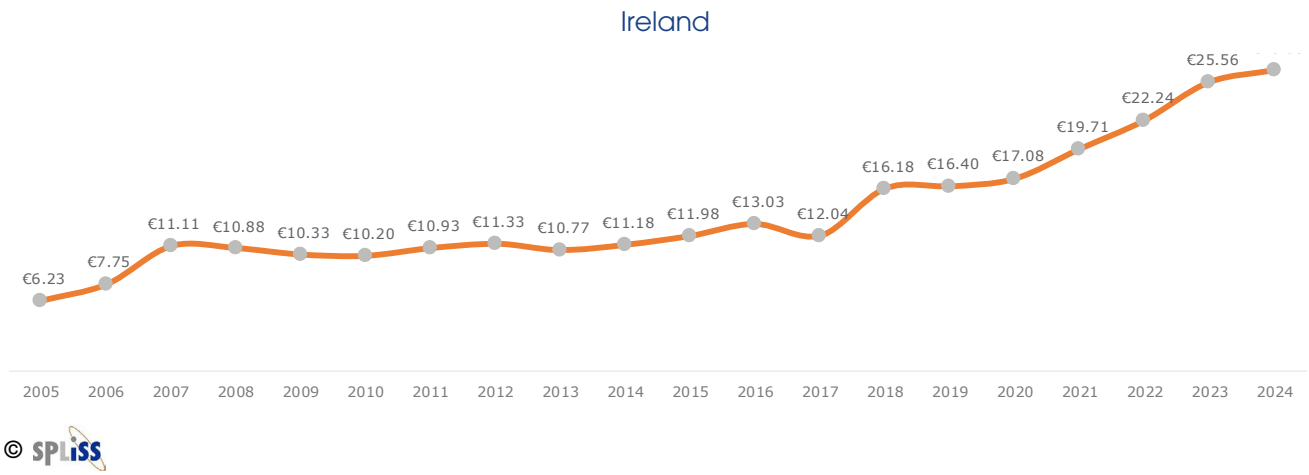


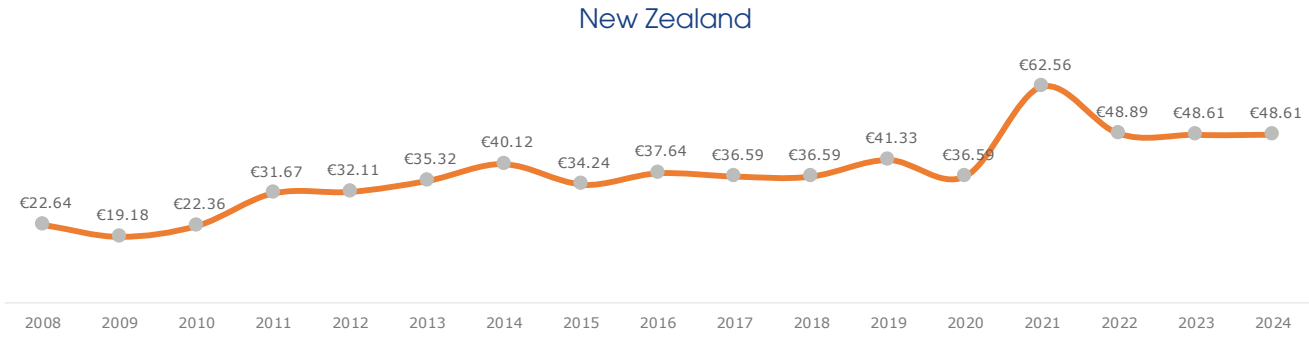
© SPLISS

The Netherlands

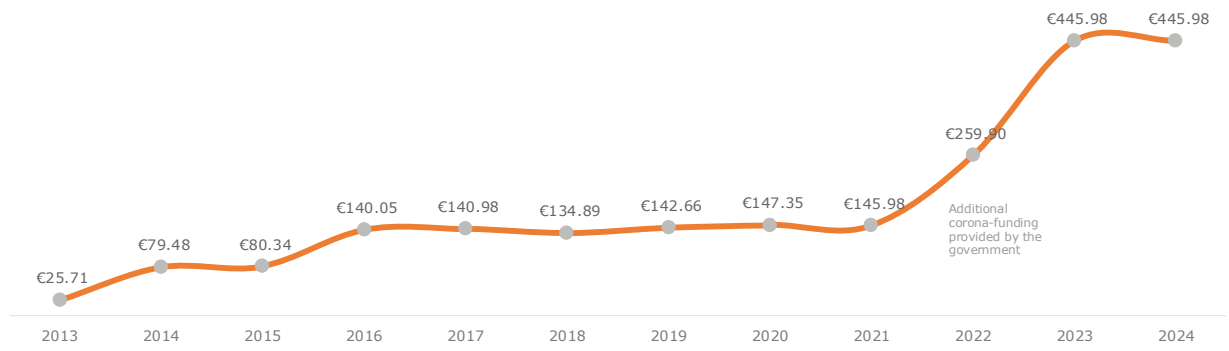


© SPLISS



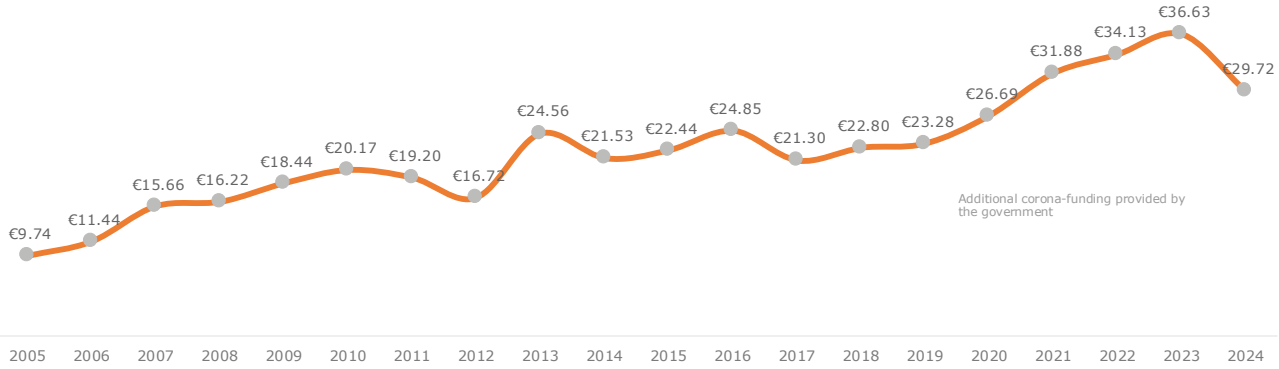


Poland



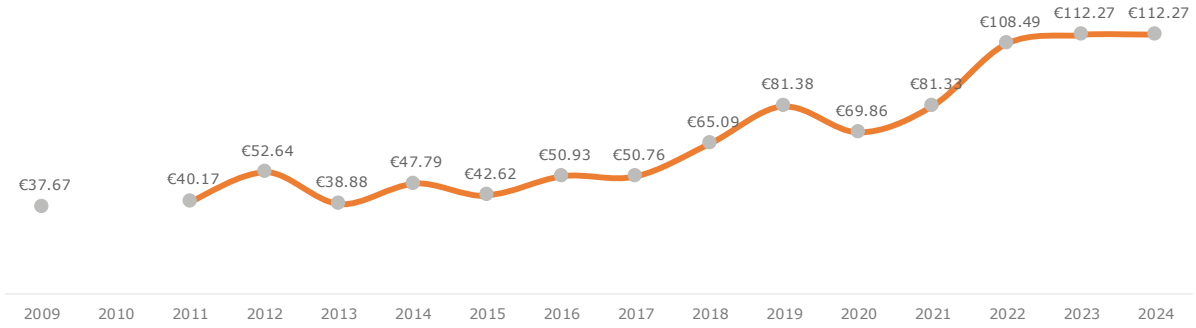
© SPLISS

Sweden



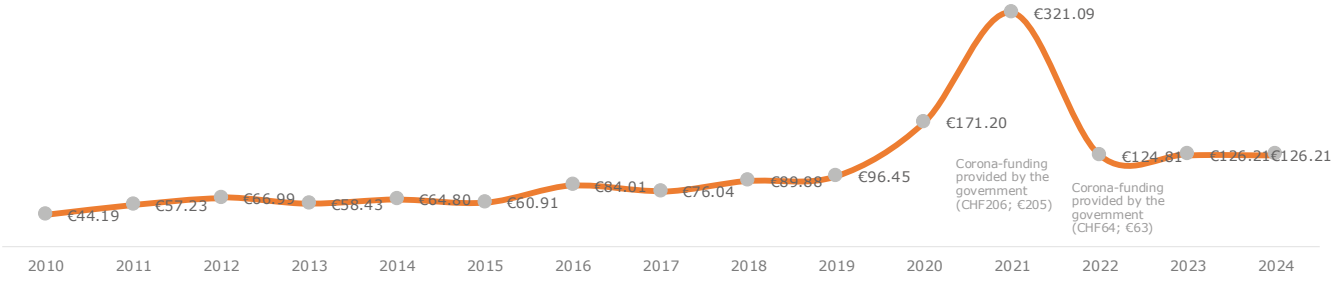
© SPLISS

Spain



© SPLISS

Switzerland



© SPLISS

8.3 EXCHANGE RATES

Country	Currency exchange to €	Exchange to i$ (PPP)
Belgium (Flanders)	1	0.69
Belgium (Wallonia)	1	0.69
Brazil	6.35	2.58
Canada	1.56	1.17
Czech Republic	26.25	12.3
Denmark	7.44	6.11
Estonia	1	0.77
Finland	1	0.77
Hungary	362.63	156.94
Ireland	1	0.77
Japan	126.19	94.94
Netherlands	1	0.73
New Zealand	1.70	1.46
Poland	4.57	1.88
Spain	1	0.58
Sweden	10.04	8.36
Switzerland	1.08	0.98
United Kingdom	0.89	0.65

8.4 NATIONS OR TEAMS WINNING MEDALS IN PARIS 2024 BUT NOT IN TOKYO 2020

Nation / Team	Gold	Silver	Bronze	Total
Individual Neutral Athletes	1	3	1	5
Chile	1	1	0	2
Saint Lucia	1	1	0	2
Guatemala	1	0	1	2
Dominica	1	0	0	1
Pakistan	1	0	0	1
North Korea	0	2	4	6
Cyprus	0	1	0	1
Panama	0	1	0	1
Tajikistan	0	0	3	3
Albania	0	0	2	2
Cape Verde	0	0	1	1
Peru	0	0	1	1
Zambia	0	0	1	1
Singapore	0	0	1	1
Totals	**6**	**9**	**16**	**31**

Variances	Nations/ Teams	Gold	Silver	Bronze	Totals
Paris 2024	16	6	9	16	31
Tokyo 2020	15	4	8	10	22
Change	+1	+2	+1	+6	+9


NIKE

8.5 NATIONS OR TEAMS WINNING MEDALS IN TOKYO 2020 BUT NOT IN PARIS 2024

Nation	Gold	Silver	Bronze	Total
Russian Olympic Committee	20	28	23	71
Bahamas	2	0	0	2
Belarus	1	3	3	7
Estonia	1	0	1	2
Latvia	1	0	1	2
Bermuda	1	0	0	1
San Marino	0	1	2	3
Namibia	0	1	0	1
North Macedonia	0	1	0	1
Saudi Arabia	0	1	0	1
Turkmenistan	0	1	0	1
Finland	0	0	2	2
Burkina Faso	0	0	1	1
Ghana	0	0	1	1
Kuwait	0	0	1	1
Syria	0	0	1	1
Totals	**26**	**36**	**36**	**98**

Note: all nations listed won 0 medals in Paris 2024 and what is shown in the table is the number of medals lost relative to Tokyo 2020.

Variances	Nations / Teams	Gold	Silver	Bronze	Totals
Paris 2024	16	26	36	36	98
Tokyo 2020	10	6	8	5	19
Change	+6	+20	+28	+31	+79

The number of medals lost relative to Tokyo 2020 was 98 primarily due to the exclusion of Russia (-71) and Belarus (-7). The observation that new nations winning medals at Paris 2024 won 31 medals in total (a net gain of +9) relative to Tokyo 2020, tells us the principal effect of excluding Russia and Belarus must have been to increase the dominance of existing medal winning nations.

9. REFERENCES

Andersen, S.S., Hansen, P.Ø. and Houlihan, B. (2021) *Embedded Multi-Level leadership in Elite Sport, Routledge eBooks.* https://doi.org/10.4324/9781003092728.

Bernard, A.B. and Busse, M.R. (2004) 'Who wins the Olympic Games: economic resources and medal totals,' *The Review of Economics and Statistics*, 86(1), pp. 413–417. https://doi.org/10.1162/003465304774201824.

De Bosscher, V. et al. (2006) 'A conceptual framework for analysing sports policy factors leading to international sporting success,' *European Sport Management Quarterly, 6*(2), pp. 185–215. https://doi.org/10.1080/16184740600955087.

De Bosscher, V. et al. (2008) *The Global Sporting Arms Race: An international comparative study on sports policy factors leading to international sporting success.* https://dspace.library.uu.nl/bitstream/1874/305729/1/De_Bosscher_Bingham_Shibli_Van_Bottenburg_De_Knop_The_Global_Sporting_Arms_Race_2008_.pdf.

De Bosscher, V., De Knop, P., Heyndels, B.(2003). Comparing relative sporting success among countries: create equal opportunities in sport. *Journal for Comparative Physical Education and Sport, 3* (3), 109-120.

De Bosscher, V. et al. (2015) *Successful elite sport policies : an international comparison of the sports Policy Factors Leading to International Sporting Success (SPLISS 2.0) in 15 nations, Meyer & Meyer Sport eBooks.* http://shura.shu.ac.uk/11180/.

De Bosscher, V., Shibli, S. and De Rycke, J. (2021) 'The societal impact of elite sport: positives and negatives: introduction to ESMQ special issue,' *European Sport Management Quarterly*, 21(5), pp. 625–635. https://doi.org/10.1080/16184742.2021.1955944.

Field, A. (2013).Discovering Statistics using IBM SPSS Statistics. Fourth Edition london: SAGE Publications, Inc.

Hogan, K., & Norton, K. (2000). *The 'price'of Olympic gold. Journal of science and medicine in sport, 3*(2), 203-218.

Johnson, D.K.N. and Ali, A. (2004) 'A tale of two seasons: participation and medal counts at the summer and winter Olympic Games*,' *Social Science Quarterly*, 85(4), pp. 974–993. https://doi.org/10.1111/j.0038-4941.2004.00254.x.

Kempf, H. et al. (2014) Elite Sport in Switzerland: Snapshot SPLISS-CH 2011. https://arbor.bfh.ch/10394/.

Oakley, B. and Green, M. (2001) 'The Production of Olympic Champions: International Perspectives on Elite Sport Development Systems,' *European Journal for Sport Management, 8,* pp. 83–105. http://oro.open.ac.uk/41510/.

Olympics.Com (2024) '#GenderEqualOlympics: Paris 2024 making history on the field of play,' 28 July. https://olympics.com/ioc/news/genderequalolympics-paris-2024-making-history-on-the-field-of-play.

Weber, A., De Bosscher, V. and Kempf, H. (2017) 'Prioritization of winter sports in eight nations: Analysing distribution of funding and success,' *European Sport Management Quarterly*, 18(1), pp. 8–24.

Weber, A. Ch., De Bosscher, V. & Kempf, H. (2019). Positioning at the Olympic Winter Games: Examining the targeting of Olympic winter sports by medal-winning nations. Sport, Business and Management: An International Journal. 9(5), 417-442. DOI: https://www.emerald.com/insight/content/doi/ 10.1108/SBM-01-2018-0002/full/html

CONTRIBUTORS

SPLISS

Idrættens Analyseinstitut
Danish Institute for Sports Studies

inefc Generalitat de Catalunya

TEAM ESTONIA

KIHU

HUNGARIAN UNIVERSITY OF SPORTS SCIENCE
BUDAPEST

中京大学
CHUKYO UNIVERSITY

AUT SPORTS PERFORMANCE RESEARCH INSTITUTE NEW ZEALAND

INSTITUTE for Sport Governance

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

VUB

Sheffield Hallam University

Universiteit Utrecht

SPORT. VLAANDEREN

FÉDÉRATION WALLONIE-BRUXELLES | Adeps

UNICAMP

MOUNT ROYAL UNIVERSITY
1910

ČESKÝ OLYMPIJSKÝ VÝBOR