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ORIGINAL

IMPACT ANALYSIS OF ADO PROGRAMME ON SPANISH OLYMPIC RESULTS

ANÁLISIS DEL IMPACTO DEL PLAN ADO EN LOS RESULTADOS OLÍMPICOS ESPAÑOLES

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ABSTRACT

In this article, Spanish sport policies and their influence on performance in the Olympic Games are analysed, focusing on the Olympic athlete support programme (ADO Programme, as per the acronym in Spanish). The distribution of ADO scholarships and the evolution of Spanish Olympic participation under this support programme to specialisation and professionalisation of national elite sport is described. The study continues with the analysis of Spanish athletes' performance in the different Olympic Games editions during the programme implementation. Special attention was paid to the period 2005-2016, emphasising the relationship between the global economic support through scholarships from ADO Programme and the results obtained. In conclusion, it has been proved that ADO Programme has been one of the key factors to sport transformation in Spain and successful international results since Barcelona 1992.

KEY WORDS: ADO Programme, Olympism, Olympic Games, ADO scholarships.

RESUMEN

En el presente artículo se analizan las políticas deportivas españolas y su influencia en el rendimiento olímpico, poniendo el foco de atención en el programa de Apoyo a los Deportistas Olímpicos (Plan ADO). Se describe posteriormente cómo se han distribuido las becas ADO y cuál ha sido la evolución de la participación olímpica española bajo este programa de apoyo a la tecnificación y profesionalización del deporte de élite nacional. El estudio continúa con el análisis del rendimiento de los deportistas españoles en las distintas ediciones de los Juegos dentro del desarrollo de este programa, con especial atención al periodo 2005-2016, enfatizando la relación entre la aportación económica global del Plan ADO en forma de becas y los resultados obtenidos. Como conclusión, se constata que el Plan ADO ha sido uno de los factores claves de la transformación deportiva en España y de los éxitos internacionales desde Barcelona 1992.

PALABRAS CLAVE: Plan ADO, Olimpismo, Juegos Olímpicos, Becas ADO.

INTRODUCTION

Despite the fact that modern Olympic Games were conceived by Baron Pierre de Coubertin as a project for bond and harmony to show sport greatness (Pérez-Aragón & Gallardo-Pérez, 2017), many countries currently invest large amounts of money on their best athletes to make them more competitive and help them achieve success in the various sport events (Johnson & Ali, 2004; Humphreys et al., 2018; Haut et al., 2017).

Since elite sport acquired the relevance of nowadays, many researchers have investigated the most important aspects on which success in international competition, especially the Olympic Games (OG), is based (Castejón et al., 1973; Kiviaho & Makelä, 1978; Douyin, 1988; Greenleaf, Gould & Diefen, 2001; Morton, 2002; Conzelmann & Nagel, 2003; Gibbons et al., 2003; Bernard & Megan, 2004; Green & Houlihan, 2005; De Bosscher et al., 2008; Funahashi et al., 2015; Robles-Rodríguez et al., 2019).

Doubtlessly, there are many variables that may affect the victories (medals or titles) a country achieves in the OG, World Championships (WC) or big international competitions where they compete against other countries, leaving aside the analyses of the old Eastern Bloc sport (Krüger, 1984; Riordan, 1989; Semotiouk, 1990), where other factors may have been decisive.

Gómez et al. (2011) analysed and grouped them into nine categories: public or private funding; elite athlete development; country's level of practice; introduction to sport and participation at national level; search, identification and

development of sport talents; athlete professionalisation through economic support; specialised trainers, as well as incentives for their sport merits; high-level sport facilities for elite athletes; trainers' education and professionalisation; participation in international competition; and research and technology applied to high performance. Nevertheless, as pointed out by De Bosscher et al. (2009), no matter how many variables are introduced into the equation, the magic formula is almost impossible to find.

Anyway, it has been proved that well-designed sport policies are the foundations that support the achievement of good results in elite sport (Green & Houlihan, 2005; De Bosscher, et al., 2006; Bergsgard et al., 2007; Houlihan & Green, 2008; Barker-Ruchti et al., 2018). In some authors' opinion (De Bosscher et al., 2008; De Bosscher et al., 2015; Reiche, 2016), this idea is not close to the ideal model either.

In Spain, governmental policies to support Olympic sport have been scarce. During the Francoist dictatorship (1936-1975), the support to Olympism was influenced by clear political intention, focusing more on improving the regime's image towards its international relations than on developing a stable structure to support professional sport (Santacama, 2011). This forced many Olympic athletes to defray the expenses derived from their own sport education and specialisation (Calle-Molina & Martínez-Gorroño, 2019). During the political transition occurred in our country after Franco's decease in autumn 1975, social changes happened rapidly and, surprisingly, in a peaceful manner. Public authorities, and in particular city councils after 1979 local elections, assumed the responsibility of bringing sport practice to all population sectors (Puig et al., 2010). Nevertheless, the responsibility regarding elite sport was assigned to the Directorate general for physical education and sports (Dirección General de Educación Física y Deportes, Royal Decree 596/1977, April 1977), substituting the former National sport delegation (Delegación Nacional de Deportes) and mainly to the national sport federations and the Spanish Olympic Committee (Comité Olímpico Español, COE). It must be remembered that the directorate general for physical education and sports soon changed its name into Higher centre for physical education and sport (Centro Superior de Educación Física y Deportes, Decree 1119/1977, May 1977) and, finally, into High Council for Sport (Consejo Superior de Deportes, CSD, Decree 2258/1977 of 27th August, 1977).

The current Spanish Constitution of 1978 already emphasised the importance of sport by stating in article 43.3 that public authorities would foster health education, physical education and sport. Likewise, they would facilitate appropriate use of leisure.

During this period, the most responsible political officer from these institutions was Benito Castejón y Paz-Pardo. Career officer and lawyer, he possessed a large and productive curriculum as sport manager that we deem necessary to highlight for what it meant by creating of the foundations of later ADO Programme (Plan ADO). He was the National Delegate for Physical Education and Sport from September 1976 to April 1977 and, later, Secretary of State for Sport (25th January, 1980) and President of the Spanish Olympic Committee since that date until 1980 (12th May, 1980). It must be born in mind that, since

the end of the Spanish civil war both institutions were joined under state control and they continued in this abnormal situation until 1984, when Alfonso de Borbón y Dampierre, Duke of Cadiz and King Juan Carlos I's cousin, was appointed as 12th President of the COE.

Spain, since the Constitution of 1977 (Title I, chapter III, art. 43.3) had incorporated sport as a state obligation, this being reinforced by the general law for physical culture and sport (Ley General de la Cultura Física y del Deporte, Law 13/1980 of 31st March) and, especially, by the law for sport of 1990 (Ley del Deporte, Law 10/1990). In this law reform, the figure of the high level athlete first appeared as legal concept. The law specifies that elite sport is of national interest, contributing to increase sport practice levels in the country and to create a sport reserve fund, necessary to successfully face international sport competitions where athletes and national teams participate. Title V of this law (articles 48 and 49) regulates COE's organisation and functions in the democratic Spain.

In 1995 (Royal Decree 1856/1995) it was legally established who could be considered a high level athlete. To do so, the commission for the evaluation of high level sport (Comisión de Evaluación del Deporte de Alto Nivel) and the technical subcomissions for monitorisation and planning (Subcomisiones Técnicas de Seguimiento y Planificación) were created. Nonetheless, this first document was modified in 2007 (Royal Decree 971/2007) to include relevant aspects that regulate the benefits that this group of athletes must receive.

Another key milestone in the history of Spanish sport is the appointment of Barcelona as the host city of the XXVth edition of the summer Olympic Games. It was the fourth attempt of our country to achieve such a prestigious designation (Barcelona: 1924, 1936 and 1940, and Madrid: 1972). The initiative of Barcelona to bid for 1992 Olympic Games arose from the mayor Narcís Serra, who brought the proposal to the city council's plenary session on 30th June, 1981. It was then leaded by Pasqual Maragall (mayor of the city between 1982 and 1997). Its victory with 47 votes over the cities of Paris (29 votes), Belgrade, Brisbane, Birmingham and Amsterdam was announced and previously supported by Juan Antonio Samaranch (IOC President) on 17th October, 1986 in the Swiss city of Lausanne.

RESEARCH DEVELOPMENT

The research presented in this manuscript aims to achieve a two-fold goal. Firstly, it aims to analyse ADO Programme's structure, since its creation to our days, analysing the main lines that have guided the support policies to elite sport in our country and promoted by this programme. Subsequently, it aims to describe the influence that this programme has had on Spanish sport scene (expressed in number of scholarships granted), examining the participation figures and results of Spanish Olympic athletes, paying special attention to the period between 2005 and 2016. Additionally, the study will focus on the economic impact that this programme has had on national high-level sport. The data used have been collected from various sources accessed by the authors at the High Council for Sport and the Spanish Olympic Committee.

The Olympic athlete support programme (Programa de Apoyo a los Deportistas Olímpicos, ADO)

The implementation of efficient sport models is not feasible without appropriate legal support and sufficient economic resources to put them into practice. This is especially complex in a country like Spain, which presents severe difficulties as regards the responsibilities of each region (self-governing regions), when it comes to evaluating and interpreting why and how athletes achieve the highest international level. We should not forget that, it is mainly CSD, COE and national federations, but also the self-governing regions, island and province councils and even some city councils which participate in elite athletes' education process and support them.

The difficult enterprise of leading the sport transformation since the end of the dictatorship during the first years of the political transition was assigned to Benito Castejón Paz, first CSD president between 1977 and 1980. He completed a Master in Laws and served in the military, in the aviation legal corps (Cuerpo Jurídico de Aviación). He was one of the first politicians who tried to rationalise and evaluate high performance sport, as well as to create sport structures (centres for specialised technical training and centres for sport introduction [Centros de Iniciación Técnicos, Deportiva], centres for advanced training [Centros de Perfeccionamiento] and high performance centres [Centros de Alto Rendimiento]) that allowed for Spanish elite athletes to compete properly in international competitions. All these ideas are included in the work *Rationalising Sports Policies* (1973), in collaboration with Juan de Dios García-Martínez and José Rodríguez Carballada. The main purpose of this study, presented in Strasbourg to the Council of Europe, was to design a model to rationalise governmental sport policies, defining the basic concepts that should be inherent to any sport policy, regardless of modern sport diversity. In the second and third parts of their work, a mathematical model is developed in order to optimise and rationalise decision making in sport policies. One of the most relevant characteristics of this work is the well-documented and well-explained use of several statistical instruments to implement the model proposed by the authors.

Created on 24th December, 1987 by the Olympic sports association (Asociación de Deportes Olímpicos) (Spanish Olympic Committee, High Council for Sport and Spanish Radio and Television), the Olympic athlete support programme was born as a non-profit institution. Its main purpose was to support, help develop and promote high-level national athletes who could become part of the Spanish Olympic team to participate in Barcelona 1992 and later Olympic Games. Its organisation and function has evolved along these years to adapt to the needs and, sometimes, problems of every moment. One of the most important moments happened in September 2005, when the ADO company consortium (Consorcio de Empresas ADO*)* was created including the Ministry of Economy and Finance, Spanish Olympic Committee, Olympic sports association and High Council for Sport.

Due to its significance and efficacy, it has been extended after every Olympic cycle until Tokyo 2020 OG (8 cycles including summer and winter OG of each cycle). Thus, for example, the current Olympic cycle (Rio de Janeiro 2016 to Tokyo 2020) includes the preparation programmes for the Winter OG to be held in Pyeongchang (2018) and Beijing (2022) and for Tokyo 2020 Summer OG.

This means to establish strategies related to very different aspects, such as:

- Developing and promoting all Olympic sport modalities as much as possible.

- Detecting the best sport talents, who can perform at high level and classify for the OG.

- Preparing the selected athletes efficiently and with the best technical and material resources possible.

- Searching for (public and private) economic resources to defray the attendance to competitions and to sustain athletes and trainers' professional careers.

- Ensuring the appropriate development of the program created for every Olympiad.

Since 2004, there is also an ADOP programme, which provides support to athletes with disabilities in their preparation for the Paralympic Games.

ADO plan has two representative bodies (General Assembly and Executive Board) in which representatives from all constituent members participate. The General Assembly meets ordinarily twice a year, while the Executive Board is presided by two co-presidents, one vice-president, one secretary and managers divided into two commissions, technical and economic. The co-presidents alternate yearly in the position, odd years corresponding to the CSD president and even years to the COE president.

It includes different types of support programmes established in every Olympic cycle with specific criteria, resources and regulations. There are three types of programme:

1. *Scholarships to the best athletes* and with possibilities to achieve relevant results during the corresponding OG. To this end, they are provided with adequate economic resources for appropriate preparation.

2. *Incentives to the trainers* responsible for the selected athletes' preparation. This includes personal trainers (belonging or not to the federation technical staff), who receive a scholarship similar to the athlete's. It also includes individuals who bear direct responsibility in these athletes' preparation.

3. *Special Programmes* that complement the selected athletes' preparation. These programmes are coordinated by the corresponding sport federations and include, but are not limited to: acquisition of specialized, last-generation equipment, promotion of women's sport, hiring of trainers, permanent or temporary stages, attendance to high-level competitions, technological research programmes, international monitoring of potential opponents, and psychological, biomedical and recovery control and support.

The scholarships to athletes probably constitute the most specific programme. It must be highlighted that total resources may vary every season based on the funding provided by the participating institutions and the contributing partners. The scholarship amount and the eligibility criteria may also vary upon prior agreement of the Executive Board depending on several technical criteria (sport results obtained). There are three types of scholarships, depending on the characteristics of every sport modality:

- ***Group I:*** Athletes who practise individual sports, including relay events (swimming and athletics), and team sports with less than four athletes per team (badminton doubles, table tennis doubles, synchronised swimming duet, team pursuit in track cycling, etc.).

- ***Group II:*** Athletes who participate in team sports with more than four athletes per team simultaneously (synchronised swimming team, rhythmic gymnastics team or eight rowing).

- ***Group III***: Athletes participating in team sports (basketball, handball, football, ice hockey, field hockey, volleyball or waterpolo).

There are five types of scholarships for these athletes (M: Medal scholarship; D: Diploma scholarship; R: Result scholarship; S: Special scholarship; and C: Classification scholarship), whose amount is determined by two factors: the group to which the sport modality belongs and the results obtained in the most relevant international competitions of the previous year (Olympic Games-OG, World Championships-WC, European Championships-EC or World Ranking-WR). The amount of M and D scholarships is composed of a fix part and a variable part, corresponding to 60% and 40%, respectively, of the amount assigned to every level.

In Groups I and II, except some specific considerations that are not relevant to this study, Medal scholarships (M) are divided into three levels depending on the place reached by the athlete in the OG or WC (M1: Gold; M2: Silver; M3: Bronze). This type of scholarship is not granted for European Championships. Result scholarships (R) are divided into five levels (D1: 4^{th} place; D2: 5^{th} place; D3: 6^{th} place; D4: 7^{th} place; and D5: 8^{th} place in OG or WC). Diploma scholarships are granted to the best classified athletes in EC (D1: 1^{st} place; D2: 2^{nd} and 3^{rd} place; D3: 4^{th} place; D4: 5^{th} place; and D5: 6^{th} place). Result scholarships vary slightly depending on whether the athlete belongs to Group I or II. In the first case, they are granted to athletes classified 9^{th} to 12^{th} in the OG

or WC, or among the first ten in the sport modality WR. Athletes from Group II receive an R scholarship when they finish 9th or 10th in the OG or WC.

In Group III, the eligibility criteria to obtain a scholarship change ostensibly due to the sport characteristics. M1, M2 and M3 are granted to the 1st, 2nd and 3rd places in the OG or WC, while D scholarships include results in EC (D1: 4th in OG or WC or 1st, 2nd and 3rd in EC; D2: 5th and 6th in OG or WC or 4th in EC; D3: 5th and 6th in EC). In this group, the total scholarship amount is received by the respective federations, who must subsequently determine which athletes will receive support and which amount.

To enhance motivation and ensure as much transparency as possible, the Olympic sports association yearly publishes a list with the amount that the athlete should receive in every case. Thus, an athlete who became World Champion the previous year will receive a greater amount than another athlete who finished third or another one who became European Champion. The amounts corresponding to the present Olympic cycle (Tokyo 2020) are displayed in tables 1 (GI), 2 (GII) and 3 (GIII).

Table 1. ADO Programme scholarships, Group I (amount in euros).

SPORT	SCHOLAR-SHIP	FIX PART	VARIABLE PART	TOTAL AMOUNT	CRITERION
Athletics	M1	36,000	24,000	60,000	1st OG
Badminton					1st WC
Basketball (3x3)	M2	30,300	20,200	50,500	2nd OG
Boxing					2nd WC
Cycling	M3	27,000	18,000	45,000	3rd OG
Winter sports					3rd WC
Ice sports (not hockey)	D1	20,400	13,600	34,000	4th OG
Climbing					4th WC
Fencing					1st EC
Artistic gymnastics (individual)	D2	18,300	12,200	30,500	5th OG
Rhythmic gymnastics (individual)					5th WC
Golf					2nd-3rd EC
Weightlifting	D3	16,200	10,800	27,000	6th OG
Equestrian					6th WC
Judo					4th EC
Karate	D4	14,400	9,600	24,000	7th OG
Wrestling					7th WC
Swimming (not synchronised or waterpolo)					5th EC
Modern pentathlon	D5	12,300	8,200	20,500	8th OG
Canoe					8th WC
Rowing (except 8+)					6th EC
Surf	R	10,000		10,000	9th-12th OG
Skateboarding					9th-12th WC
Taekwondo					1st-10th WR
Tennis	S	10,000		10,000	Except OG years
Table tennis					
Archery	C	8,000		10,000	Classified for 2018-2020 OG with no scholarship
Shooting					
Triathlon					
Sailing					
Beach volleyball					

Source: prepared by the authors

Table 2. ADO Programme scholarships, Group II (amount in euros).

SPORT	SCHOLAR-SHIP	FIX PART	VARIABLE PART	TOTAL AMOUNT	CRITERION
	M1	24,000	16,000	40,000	1st OG
					1st WC
	M2	20,220	13,480	33,750	2nd OG
					2nd WC
	M3	18,000	12,000	30,000	3rd OG
					3rd WC
Rhythmic gymnastics (team)	D1	13,620	9,000	22,700	4th OG
					4th WC
					1st EC
Synchronised swimming (team)	D2	12,240	8,160	20,400	5th OG
					5th WC
					2nd-3rd EC
8+ rowing	D3	10,800	7,200	18,000	6th OG
					6th WC
					4th EC
	D4	9,600	6,400	16,000	7th OG
					7th WC
					5th EC
	D5	8,220	5,480	13,700	8th OG
					8th WC
					6th EC
	R	8,000		8,000	9th-10th OG
					9th-10th WC
	S	8,000		8,000	Except OG year
	C	8,000		8,000	Classified for OG and WC

Source: prepared by the authors

Table 3. ADO Programme scholarships, Group III (amount in euros).

SPORT	SCHOLAR-SHIP	FIX PART	VARIABLE PART	TOTAL AMOUNT	CRITERION
	M1	18,000	12,000	30,000	1st OG 1st WC
Basketball Handball	M2	15,000	10,000	25,000	2nd OG 2nd WC
Baseball Football	M3	13,200	8,800	22,000	3rd OG 3rd WC
Hockey Ice hockey Rugby	D1	11,100	7,400	18,500	4th OG 4th WC 1st EC
Softball Volleyball Waterpolo	D2	10,200	6,800	17,000	5th OG 5th WC 2nd-3rd EC
	D3	9,000	6,000	15,000	6th OG 6th WC 4th EC
	S	8,000		8,000	Except OG year
	C	8,000		8,000	Classified for OG and WC

Source: prepared by the authors

Evaluation and impact of ADO Programme

Despite high performance programmes developed by the Spanish government during the political transition being revolutionary with regard to their approach and resource implementation, it was not until the creation of ADO Programme that Spain started to hold a relevant position in the international sport scene. It would be unfair to assume that ADO was the only determining factor, but it was certainly one of the most important aspects in the transformation of the national elite sport. A very simple and useful way to determine its effectiveness is to analyse the number of athletes classified for the Olympic Games and their results. The number of athletes benefitting from the programme has not decreased.

Table 4. Evolution of ADO Programme scholarships (2005-16).

YEAR	Total ADO scholarships	ADO scholarships to men	ADO scholarships to women	M:W Ratio
	OLYMPIC CYCLE 2005-2008			
2005	414	238	174	1.37
2006	434	264	168	1.57
2007	374	213	161	1.32
2008	368	202	163	1.24
	ATHLETES WHO PARTICIPATED IN BEIJING 2008			
	285	164	121	1.36
	OLYMPIC CYCLE 2009-2012			
	Total ADO scholarships	**ADO scholarships to men**	**ADO scholarships to women**	**M:W Ratio**
2009	404	224	182	1.23
2010	355	182	171	1.06
2011	356	193	166	1.16
2012	330	184	141	1.30
	ATHLETES WHO PARTICIPATED IN LONDON 2012			
	281	170	111	1.53
	OLYMPIC CYCLE 2012-2016			
	Total ADO scholarships	**ADO scholarships to men**	**ADO scholarships to women**	**M:W Ratio**
2013	193	114	78	1.46
2014	326	145	180	0.81
2015	399	197	200	0.99
2016	439	245	199	1.23
	ATHLETES WHO PARTICIPATED IN RIO 2016			
	309	165	144	1.15

Source: prepared by the authors

Table 4 shows the evolution of ADO Programme scholarship distribution between 2005 and 2016. There are two noteworthy aspects. Firstly, the reduction in the number of scholarships granted since 2005, reaching the lowest value in 2013 with only 193 athletes benefited. These variations are mainly due to the increase or decrease of private investment by sponsoring companies, aspect that will be discussed later. Secondly, it can be noted that male athletes received a greater number of scholarships than female athletes, except in 2014 and 2015, when the ratio inverted in favour of women, and in 2010 and 2011, when this value was close to 1. It is remarkable that it was in the OG of these two cycles, London 2012 and Rio 2016, where women won for the first time more medals than men and where participation figures per gender were very close to equal (see Tables 5 and 10).

Another interesting fact is that, in spite of the fluctuation in the number of scholarships granted, the number of male athletes who classified for these three Games barely changed (164, 170 and 165), while the number of women rose significantly, 144 having classified for Rio, 111 for London and 121 for Beijing. This increase in female participation coincided, as previously mentioned, with the Olympic cycle in which women received for the first time more ADO scholarships than men.

Participation and result evolution of the Spanish Olympic team

Since the celebration of the first Olympic Games in Athens in 1896 until nowadays, a total of 156,462 athletes (115,771 men and 41,001 women) have participated during 120 years of history of the modern Olympic Movement (Table 5). Spain has participated, until Rio de Janeiro 2016 OG, with a total of 3,649 athletes (2,721 men and 928 women), meaning 2.3% of the total number of Olympic athletes (Leiva-Arcas & Sánchez-Pato, 2019).

Table 5. Evolution of the Spanish Olympic participation (1986-2016**).**

OG	Total Olympic athletes			Spanish men		Spanish women		Spain's total	
	Men	Women	Total	N	%	N	%	N	%
Athens'96	241	0	241						
Paris'00	975	22	997	3	0.31			3	0.30
St. Louis'04	645	6	651						
London'08	1971	37	2008						
Stockholm'12	2359	48	2047						
Antwerp'20	2561	65	2626	56	2.19			56	2.13
Paris'24	2954	135	3089	98	3.32	4	2.96	102	3.30
Amsterdam'28	2606	277	2883	81	3.11			81	2.81
Los Angeles'32	1206	126	1332	6	0.50			6	0.45
Berlin'36	3632	331	3963						
London'48	3714	390	4104	63	1.70			63	1.54
Helsinki'52	4436	519	4955	27	0.61			27	0.54
Melbourne'56	2938	376	3314						
Rome'60	4727	611	5338	134	2.83	11	1.80	145	2.72
Tokyo'64	4473	678	5151	47	1.05	3	0.44	50	0.97
Mexico'68	4735	781	5516	101	2.13	2	0.26	103	1.87
Munich'72	6065	1058	7173	118	1.95	5	0.47	123	1.71
Montreal'76	4824	1260	6084	103	2.14	11	0.87	114	1.87
Moscow'80	4064	1115	5179	147	3.62	9	0.81	156	3.01
Los Angeles'84	5263	1566	6829	164	3.12	16	1.02	180	2.64
Seoul'88	6197	2194	8391	187	3.02	29	1.32	216	2.57
Barcelona'92	6652	2704	9356	296	4.45	125	4.62	421	4.50
Atlanta'96	6806	3512	10318	196	2.88	93	2.65	289	2.80
Sydney' 00	6582	4069	10651	218	3.31	105	2.58	323	3.03
Athens'04	6296	4329	10625	177	2.81	139	3.21	316	2.97
Beijing'08	6526	4802	11328	164	2.51	121	2.52	285	2.52
London'12	6053	4836	10889	170	2.81	111	2.30	281	2.58
Rio'16	6270	5154	11424	165	2.63	144	2.79	309	2.70
Total:	115,771	41,001	156,462	2,721	2.35	928	2.26	3649	2.33

Source: prepared by the authors

Historically, more men (2,721) than women (928) have participated representing Spain. Nonetheless, the percentage of Spanish athletes in the total of world Olympic athletes has been very similar: 2.35% of male athletes and 2.26% of female athletes in the modern OG have been Spanish.

As regards the results achieved by Spanish athletes, two periods can be well differentiated: before and after Barcelona 92 OG. The celebration of these OG had determining impact on the subsequent evolution of the Spanish Olympic team's achievements. Spain has won a total of 150 medals (44 gold, 65 silver, 41 bronze), making our country hold the 28th place in the medal table of all OG history.

Nowadays, after Rio 2016 Games, Spain holds the 14th position in the world ranking, significantly improving the place reached in Seoul 1988 OG (25th, together with Finland) and even the best place of all times (20th in Moscow 1980 and Los Angeles 1984), when the two big boycotts to the OG took place (Moscow: 66 countries, Los Angeles: 14 countries). This does not consider the position achieved in the medal table of Paris 1900 Games, whose validity of many events is still under debate. Only three times Spain has ended among the best 15 countries: Barcelona 1992 (6th), Atlanta 1996 (13th) and Beijing 2008 (14th). It must be born in mind that this position is higher than what would correspond according to population (30th: 46,653,000 inhabitants) and equal to what would correspond according to economy size (13th: 1,437,047 millions of GDP), which are two of the most important factors determining countries' sport success.

An interesting way to assess the results obtained in the different OG is to examine the places achieved by the participating athletes. We must remember that the IOC does not provide a classification by National Olympic Committees since, according to the Olympic Charter, the Olympic Games is a competition among athletes and not among countries. Nevertheless, there exists a scoring system (global, men and women) that gives high-to-low values to gold, silver and bronze medals and diplomas. Sometimes medal scores are overrated and sometimes they are not. There is no unanimous or official criterion about the number of places considered, which range between 6 and 8 (Sergeyev, 2015). Therefore, for explanatory purposes, a classification criterion based on the following scoring system will be applied in this study: gold 12 points, silver 9 points, bronze 7 points, 4th place 5 points, 5th place 4 points, 6th place 3 points, 7th place 2 points, and 8th place 1 point, as established by the International Olympic Committee.

Table 6. Spanish athletes classified among the first eight in OG (1992-2016).

OG	G	S	B	4th	5th	6th	7th	8th	Points
Barcelona'92	13	7	2	5	9	6	3	7	320
Atlanta'96	5	6	6	4	9	8	10	4	260
Sydney'00	3	3	5	10	12	7	3	6	185
Athens'04	3	11	6	6	14	3	14	8	322
Beijing'08	5	11	3	5	12	5	7	6	288
London'12	4	10	4	8	6	7	5	4	265
Rio'16	7	4	6	6	15	4	7	7	285

Source: prepared by the authors

Based on the score obtained, there were two key editions when the Spanish team achieved the best results in the OG. The first one, as expected, corresponds to Barcelona 1992 OG; the second was Athens 2004 OG.

In any sport modality, competing at home constitutes an advantage that has been widely studied and documented, but not always well understood (Jones, 2013). There are numerous factors that may affect this phenomenon, and they may vary significantly depending on the country holding the event, the sport characteristics and the influence of external factors on the scoring system. According to previous studies (Legaz-Arrese et al., 2013), there are five major reasons that may explain this advantage: the presence of fans, the familiarity with the environment, the absence of trips, the rule application and the territoriality feeling. These factors may be determining for athletes, trainers or referees' behaviour.

The recovery of Spanish sport in Athens Games was based on the large number of diplomas obtained by the team (51), the highest of all times, and the crucial impact of the female team (6 medals and 25 diplomas).

The impact of ADO Programme on the Spanish Olympic team's results

Barcelona 1992 OG was an absolute turning point for Spain. Twenty-two medals were obtained only in this edition, 13 of them gold, almost the same as in all previous editions together. Since then, Spain's Olympic results have considerably improved, not reaching the success of Barcelona, but with a constant development that has enabled to obtain 123 medals between 1992 and 2006, i.e., 82% of the total, 39 of them being gold medals. It is true that these results were achieved due to a considerable increase in participation, as 61% of the total participation (2,224 athletes) corresponds to the last seven OG. Table 8 reveals that, until 1992, Spanish athletes had won 27 medals (all of them obtained by men), meaning 18% of the total medals won. However, it must be taken into account that participation up to then had been 1,425 athletes, i.e., 39% of the total Spanish Olympic athletes.

Table 8. Results of the Spanish Olympic team in modern OG before and after Barcelona 1992.

OG	Athletes	Gold	Silver	Bronze	Total	Ranking
Athens'96						
Paris'00	3	1	1		2	14
St. Louis'04						
London'08						
Stockholm'12						
Antwerp'20	56		2		2	17
Paris'24	102					28
Amsterdam'28	81	1			1	24
Los Angeles'32	6			1	1	26
Berlin'36						
London'48	63		1		1	28
Helsinki'52	27		1		1	34
Melbourne'56						
Rome'60	145			1	1	41
Tokyo'64	50					42
Mexico'68	103					45
Munich'72	123			1	1	43
Montreal'76	114		2		2	30
Moscow'80	156	1	3	2	6	20
Los Angeles'84	180	1	2	2	5	20
Seoul'88	216	1	1	2	4	25
Total	1,425	5	13	9	27	
Barcelona'92	421	13	7	2	22	6
Atlanta'96	289	5	6	6	17	13
Sydney'00	323	3	3	5	11	25
Athens'04	316	3	11	6	20	20
Beijing'08	285	5	11	3	19	14
London'12	281	3	10	4	17	21
Rio'16	309	7	4	6	17	14
Total:	2,224	39	52	32	123	

Source: prepared by the authors

Of those 27 medals, only 5 were gold (11.3% of the total). Winning gold medals is important, not only due to the obvious fact of the winner becoming Olympic champion, but also because it is one of the main criteria to determine a country's position in the final medal table.

Olympic diplomas (Olympic finalists)

Spain's improvement of the past decades in the Olympic context is not limited to the number of participants or medals. Since London 1948 Olympic Games, athletes who have finished in the fourth, fifth and sixth places in their respective disciplines have received a diploma, officially known as Olympic diploma. In 1984 the diplomas were extended to athletes ending in places seventh and eighth as well.

The number of diplomas obtained also reveals a significant change in the Spanish Olympic participation. From the 374 diplomas obtained over the years, 270 (72.2% - 7 OG editions) correspond to the period after Barcelona and only 104 (27.8% - 21 OG editions) to the previous period.

By summing medals and diplomas we can see that the average number of athletes before Barcelona 92 was 178 (8.0 athletes per medal and finalist), while it was 497 athletes (4.5 athletes per medal and finalist) in the last seven Games. This means an extraordinary cost/benefit change in which, with no doubt, ADO Programme has been decisive (Table 9).

Table 9. Diplomas obtained by the Spanish Olympic team

	4th place	5th place	6th place	7th place	8th place	Total
Athens'96						
Paris'00						
St. Louis'04						
London'08						
Stockholm'12						
Antwerp'20						
Paris'24						
Amsterdam'28						
Los Angeles'32						
Berlin'36						
London'48	1	4	1			6
Helsinki'52						
Melbourne'56						
Rome'60			1			1
Tokyo'64	1		1			2
Mexico'68		1	1			2
Munich'72	1	1				2
Montreal'76	2	2	3			7
Moscow'80	4	5	3			12
Los Angeles'84	3	1	8	7	3	22
Seoul'88	2	4	1	4	2	13
Barcelona'92	5	9	6	9	7	36
Atlanta'96	4	9	8	10	4	35
Sydney' 00	10	12	7	9	6	44
Athens'04	6	14	9	14	8	51
Beijing'08	5	12	5	7	6	35
London'12	9	6	7	5	4	31
Rio'16	6	15	4	7	7	39
Total:	59	95	65	72	47	338

Source: prepared by the authors

ADO Programme in the period 2005-2016

Although ADO Programme started in the 1988-1992 Olympic cycle, we focused on the period between 2005 and 2016 in this study, i.e. the period including Beijing, London and Rio de Janeiro Olympic Games.

According to data from the Spanish Olympic Committee, 54 medals (men: 28 medals; women: 26 medals) and 104 diplomas (men: 62 diplomas; women: 42 diplomas) were won during this period (Table 10). The significant improvement achieved by female athletes is really interesting.

Table 10. Evolution of Spanish medallists in the OG (1992-2016)

OG	OLYMPIC MEDALS			
YEAR	TOTAL	MEN	WOMEN	M-W %
1992	22	14	8	36.4
1996	17	11	6	35.3
2000	11	7	4	36.4
2004	20	14	6	30.0
2008	19	14	5	26.3
2012	18	6	12	66.7
2016	17	8	9	52.9
OG	DIPLOMAS - PLACES 4th TO 8th			
YEAR	TOTAL	MEN	WOMEN	M-W %
1992	36	25	11	30.6
1996	35	25	10	28.6
2000	44	24	20	45.5
2004	51	26	25	49.0
2008	35	21	14	40.0
2012	30	21	9	30.0
2016	39	20	19	48.7

Source: prepared by the authors

Global economic support and investment on scholarships

Since its creation, ADO Programme has been funded with 335.5 million euro, 137 million corresponding to the period under study (2005-2016). Part of this amount was devoted to management, promotion and representing costs, while the largest part was devoted to athlete support scholarships. The amount invested on scholarships was 81,628,774 euro, 46,697,523 of which were invested on male athletes and 34,918,874 on female athletes (Table 11). This funding was provided by partners (Coca-Cola, La Caixa, Estrella Damm, Danone, El Corte Inglés, Repsol, Telefónica and Loterías y Apuestas del Estado) and sponsoring companies (Allianz, Pascual, Cola Cao, Correos and Barceló Viajes). From the point of view of ADO Programme's sport profitability, the price of every medal was 1,511,644 euro (men: 1,667,769 euro; women: 1,343,034 euro).

It is true that 2008 economic crisis was clearly reflected on the resources available to sustain high-level sport, especially for the least professionalised sports. Although the crisis is considered to have started in 2008 after the collapse of the American bank Lehman Brothers, the first symptoms already appeared in August 2007 with the bankruptcy of several less relevant investment banks. This forced governments, especially in developed countries, to conduct numerous bailouts to prevent eminent bankruptcy. This, together with a steep fall in tax income made these countries adopt strict financial austerity policies that entailed large cuts in social services and public investment.

Table 11. Evolution of the investment on Spanish Olympic scholarships (2005-2016)

YEAR	Total investment (millions)	Investment on male athletes (millions)	Investment on female athletes (millions)	M:F Ratio
2005	7,414,030	4,441,625	2,980,400	1.49
2006	8,713,656	5,529,750	3,182,400	1.74
2007	7,971,714	4,816,707	3,153,500	1.53
2008	6,810,183	3,956,125	2,852,300	1.39
2009	6,839,209	3,914,500	2,923,200	1.34
2010	7,282,660	4,163,875	3,116,775	1.34
2011	7,460,536	4,257,175	3,201,350	1.33
2012	6,094,262	3,909,500	2,182,750	1.79
2013	3,748,365	2,007,752	1,738,600	1.15
2014	6,476,654	3,086,700	3,387,940	0.91
2015	6,705,239	3,433,614	3,269,609	1.05
2016	6,112,266	3,180,200	2,930,050	1.09

Source: prepared by the authors

Table 11 shows a noteworthy budget decrease in the last few years, which is partially due to the different sport modalities that are included in the budget every year. The scholarship amount of season 2013 was especially low, not reaching 4 million euro. Nine federations did not receive economic support (badminton, boxing, fencing, football, golf, modern pentathlon, rowing, rugby and archery). For Beijing, London and Rio de Janeiro Olympic Games the programme consisted in 147.5 million euro, meaning a significant and steep fall in those Olympic cycles. The funding was reduced from 30,909,583 euro for Beijing to 27,676,667 for London (10.5% decrease) and 19,668,994 euro for the last Games in Rio (31.4% decrease).

Despite this severe economic reduction, sport profitability was not significantly affected. The cost of medals fell to 1,537,593 euro in London, 1,626,820 euro in Beijing and 1,157,000 euro in Rio. This means a reduction of 28.9% in the cost of every medal.

But what happened with women is even more interesting. While medal cost in Beijing was 2,433,760 euro, it was 1,904,013 euro in London (21.8% decrease) and 1,258,467 euro (48.3% decrease) in the last Games analysed (Rio 16). This is clear evidence of the growth of Spanish female sport and its development in number of athletes and performance level.

Until a few decades ago, men have generally been more involved in sport practice than women (Guttmann, 1986). Numerous studies in the last years have aimed to assess the number of men and women involved in sport (Stamatakis & Chaudhury, 2008; Ferrar, Olds & Walters, 2012; Deaner & Smith, 2013). They all agreed that there exists a clear and consistent difference between sexes. These studies stated that men practise sport with higher frequency than women, generally at least double in terms of duration or frequence (Deaner et al., 2012). Nevertheless, these figures seem to be inverting in the new generations and, very prominently, among Spanish youth.

Sport practice levels may not have increased significantly, but performance level and competitiveness have, so much so that many Spanish female athletes have become real social icons.

CONCLUSIONS

Different authors suggest that, although an increasing number of nations invest considerable amounts of money on high-level sport to guarantee success in the main international competitions, there is no clear evidence that confirms and explains how governmental sport policies may affect international sport success. Nonetheless, the creation of an investment rationalising system could increase the possibilities of achieving good results. Despite the fact that a national sport system is something very complex and affects differently to society and a high number of public bodies and institutions, very few would question that taking special care of the best athletes and the technical staff involved in their preparation is one of the most important aspects.

In the case of Spain, undoubtedly, and in light of the results shown, ADO Programme has been one of the key factors to sport transformation and to its international sport success since Barcelona 92 Olympic Games, contributing to promote and consolidate Spanish Olympic sport. In this study, it has been proved how Spanish high-level sport has experienced large quantitative and qualitative progress since the establishment of this programme. Since then and until Rio de Janeiro edition, 61% of all Spanish Olympic athletes classified for an OG, winning 82% of the medals and receiving 72% of the diplomas. These figures reveal the direct relationship between financial investment on high-level sport and success achieved in the Olympic Games.

Despite the fluctuations suffered by ADO Programme funding, especially due to its partial dependence on private company investment, which has decreased significantly since 2008, the truth is that participation figures have not been considerably affected.

It is true that, since its establishment, ADO scholarships have been mostly granted to men. Nevertheless, we have observed that the number of scholarships and the total amount granted to women have increased in the last two Olympic cycles, being even higher than those granted to men in some specific years. This has coincided with the historic fact that Spanish women won for the first time more medals than men in London and Rio OG. These data suggest that the increased support to female sport from ADO Programme could explain the recent improvement in Spanish female athletes' results, and reveal that scholarship profitability was higher in women than in men.

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