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ARTICLE

A Conceptual Framework for Analysing Sports Policy Factors Leading to International Sporting Success

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ABSTRACT Although an increasing number of nations invest large amounts of money in sport in order to compete against other nations, there is no clear evidence that demonstrates how sports policies can influence international sporting success. This paper provides an overview of important determinants that can lead to nations enjoying international sporting success. The literature reveals that more than 50% of the determinants of success are macro-level variables that are beyond the control of politicians. The meso-level contains factors that can be influenced by sports policies. An empirically founded theory on the policy factors that determine elite sporting success has not yet been developed. In this paper a conceptual framework will be presented that can be used for making trans-national comparisons of elite sports policies. Nine policy areas, or 'pillars', that are thought to have an important influence on international sporting success are logically derived from the literature.

Introduction

Competition between nations has always been a feature of the Olympic Games. Medal-counting has been used by politicians and the media to compare international success despite the International Olympic Committee's protestation that the Olympic medal table is not an order of merit. As a consequence of the continuous escalating standards in international sport, competition has become a competition between 'systems' (Heinilä, 1982).

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The success of an athlete or team depends increasingly on the performance capacity of the national system and its effectiveness in using all relevant resources for the benefit of elite sport. Some nations, such as the former communist states of eastern Europe, were very successful in international sports as a result of making high-level investment in overall national sport systems. Some nations do not have this option, as they are compelled by more basic needs, and others simply establish different priorities. Various studies have tried to explain differences in the Olympic success of nations by using socio-economic determinants such as wealth, population, land mass and politics. However, these factors are out of the control of sports policies in the short term. By contrast, there are only a few references in the literature concerning the efficiency and effectiveness of (elite) sports policies and investments. This is, no doubt, in part due to the difficulty of measuring these effects objectively. Governments and their agencies invest large sums of money in elite sport to compete against other nations and to achieve improved performance in sport. However, it is not known precisely how sports policies can influence improved sporting performance. This in turn makes it particularly difficult for politicians to select the right priorities for their sports policy. Although many attempts have been made to explain why certain countries are more successful than others, the relationship between policies and success is not clear. In this regard, a comprehensive model on sports policy factors leading to international sporting success has not yet been developed. As a first step in addressing this information deficiency, this paper serves two functions. First, a comprehensive literature review of the determinants that are important contributors for international sporting success is provided. Second, as a logical extension of the literature review, we propose a conceptual model of the determinants of success in elite sport policy by clustering measurable criteria into a few policy areas that can be compared on a trans-national basis.

Classification of Factors Leading to International Success in Top-level Sports

There is a range of factors that lead to international sporting success. Classifying these factors is a complicated task. Performances in top-level sports are a combination of genetic qualities and the environmental and physical circumstances in which people live (Seppänen, 1981). Genetic qualities can explain differences between men and women, between young people and old people, between tall people and small people and even between races. They cannot however explain why Norwegians are more active skiers than Italians and why African-Americans perform better in athletics than people from Nigeria or Mozambique.

With these points in mind, we classify below factors determining top-level success in sports into three levels (see Figure 1):

1. Macro-level: the social and cultural context in which people live: economic welfare, population, geographic and climatic variation, degree of urbanisation, political system, and cultural system.

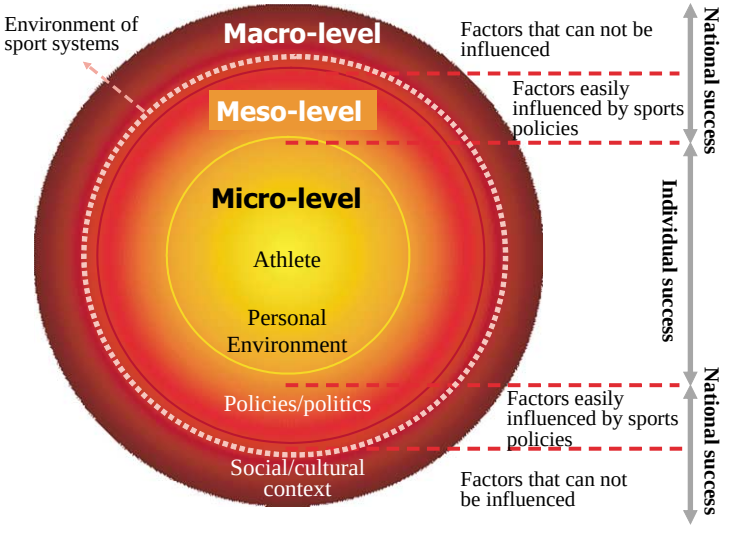

Figure 1. Model showing the relationship between factors determining individual and national success (De Bosscher & De Knop, 2003)

2. Meso-level: sports policies and politics. This is the level where well-considered sports policies may influence long-term performance.
3. Micro-level: the individual athletes (genetic qualities) and their close environment (e.g., parents, friends, coaches). At the micro-level some factors can be controlled (such as training techniques or tactics) and others cannot be controlled (such as genetics).

In this study, only the overall success of nations will be analysed, not the individual success of athletes. Therefore, we now proceed with an analysis of factors at *macro*-level and *meso*-level and, to a lesser extent, factors that can be controlled by sports policies at micro-level. Inevitably these three levels interact and no factor can be totally isolated from the social and cultural contexts within nations. Consequently, there is an overlap between the meso-level and the macro-level. This grey zone between the meso- and macro-levels is termed by the Sport Industry Research Centre (SIRC) as the environment of the sport system as a resource of world-class performance in sport (SIRC, 2002). This includes, among other factors: the role of the education system; the private sector as a partner in sport; the elite sports culture and the tradition of certain sports in a country; the mass media as promoter of interest in sport; and the audience as a sounding board for world-class performances. These factors potentially have a huge effect on elite sport development. However, as they cannot be influenced directly by sports policies, they are not further discussed in this paper.

Factors Leading to International Sporting Success: the Macro-level

Factors determining international success have been discussed in many studies on the Olympic Games. Predictions and evaluations of performance in the Olympic Games were largely based on macro-level factors. Some studies tried to find an economic explanation for success, while others took a more sociological approach. Data at the macro-level are readily available in the public domain and this is perhaps why there are so many studies in this field. By contrast, at the meso-level data are often not readily available and are difficult to quantify. This makes it particularly difficult to analyse and compare sport policies. Consequently, studies at the meso-level are relatively scarce.

Table 1 gives an overview of the main studies conducted at the macro-level. The table shows for each study which independent variables were correlated to success and in which events. Most studies use simple correlations or regression analysis. During the last decade, some authors have tried to improve the methodology of these studies (see, for example, Baimbridge, 1998; Bernard & Busse, 2000; De Bosscher *et al.*, 2003a, b; De Koning & Olieman, 1996; Den Butter & Van der Tak, 1995; Johnson & Ali, 2002; Tcha & Perchin, 2003).

The assumption underlying macro-level studies is that there is an equal distribution of sporting talent throughout the world. Every nation has equal opportunities to produce competitive elite athletes (Grimes *et al.*, 1974; Levine, 1974; Kiviaho & Mäkelä, 1978; Morton, 2002). Many studies exclude the distribution of talent argument and highlight the impact of two independent macro-economic variables: the gross national product (per capita) of a nation and its population (Bernard & Busse, 2000; De Bosscher *et al.*, 2003a, 3b; Jokl, 1964; Johnson & Ali, 2002; Kiviaho & Mäkelä, 1978; Levine, 1974; Morton, 2002; Novikov & Maximenko, 1972; Suen, 1992; Van Bottenburg, 2000). These two variables consistently explain over 50% of the total variance of international sporting success. Fewer consensuses exist on the influence of other factors, such as land mass, the political system, religion, the degree of urbanisation, and cultural factors. Johnson and Ali (2002) undertook the same analysis on the macro-variables with the number of athletes participating in the Olympics instead of medals won. From this they concluded that these macro-variables explain the number of participants just as much as the number of medals won. Shaw and Pooley (1976) discovered that economic factors are more important determinants of sporting success in developing nations (they suggest 94%) than in western nations (64%) and socialist nations (32%). According to Bernard and Busse (2000) and Stamm and Lamprecht (2000, 2001) the importance of factors at the macro-level has decreased during the last two decades. In the latter study, for example, the authors found they could explain 57% of international sporting success using macro-level factors in the period 1964–1980; whereas, they could only explain 45% of sporting success using these factors post-1980. Nevertheless, the impact of these macro-level factors on elite sporting success remains high. None of these macro-level variables can be influenced by sports policies in the short term;

Table 1. Overview of important studies on the factors leading to international success: macro level

Author	Independent variable	Event
Jokl *et al.,* 1956	Transcultural analysis: geographic origin, population, climatic zone, nourishment, demographic characteristics and economic system	OG, Helsinki 1952
Jokl, 1964	Socio-economic factors: – mortality – wealth (GNP per capita)	OG, Helsinki 1952 and Rome 1960
Ibrahim, 1969 (cited by Colwell, 1981)	– health – economic factors – social factors	Not known
Seppänen, 1970, 1981	– religious orientation: Protestant, Catholic, Orthodox, Islamic – socialism versus Protestant, mixed, Protestant/Catholic and Catholic	1896–1968: summer Games 1942–1968: winter and summer Games
Ball, 1972	Correlation of 55 national indicators with success, divided into demographic, ecological, economic and political factors	OG: Tokyo 1964
Novikov & Maximenko, 1972	Socio-economic variables: – wealth (GNP per capita) – calorific consumption – average life expectancy – percentage of illiterate competitors – percentage from urban background – population of country political system: compares communist and capitalist countries	OG: Tokyo 1964 and Mexico 1988
Levine, 1974	15 variables used: – demographic variables (population, urbanisation, area) – economic variables (GDP, GDP per capita, industrialised and socialist countries) – resources (percentage literacy, percentage of completion of primary and secondary education, higher education students, expenditure on education, newspaper circulation)	OG: Munich 1972
Grimes *et al.*, 1974	– population – GNP (as indicator of nutrition, possibilities of training and salaries of professional athletes)	OG: Munich 1972

Table 1 (*Continued*)

Author	Independent variable	Event
	– political system: communism (as indicator of systematic recruitment, training, subsidising of athletes)	
Shaw & Pooley 1976	– military expenditures – wealth (GDP) – number of Olympic sports in schools	OG: Munich 1972
Kiviaho & Mäkelä, 1978	Material factors: – demographic (population and population density) – social (health care) – economic development (GNP per capita) Non-material factors: – economic/political system (socialist economy) – religion (personal asceticism)	OG: Tokyo 1964
Gillis, 1980	– wealth (GNP per capita) – religion before and after war (Protestant, Catholic, Protestant/Catholic, Muslim, Orthodox, Buddhist, Hindu, Jewish	All summer Games: 1896–1976
Colwell, 1981	– economic dimension – political dimension – social dimension	OG: Montreal 1976
Colwell, 1982	– 'Extent of involvement'—number of events	OG: Montreal 1976
Gärtner, 1989	– wealth (GDP and GDP per capita) – population – political system: socialist countries versus Western cultures	OG: Sapporo, 1972, Munich, 1972, Innsbruck, 1976, Montreal, 1976, Calgary, 1988 Success in tennis and football
Suen, 1992	– population (devided by sum of total population of all nations) – GDP (devided by sum of total GDP of all nations) – Communist nations excluded	OG time series 1952–1988
Suen, 1994	– population – GDP – Communist nations (dummy variable) – Continental influences	OG Barcelona 1992

Table 1 (*Continued*)

Author	Independent variable	Event
Den Butter & Van der Tak, 1995	– population – standard of living: GDP and GDP per capita, human development index, quality of life index – political system: communism	OG: Seoul, 1988 and Barcelona, 1992
De Koning & Olieman 1996	– population – wealth: income per capita – political system: communism – female participation rate	OG: Atlanta, 1996
Nevill *et al.*, 1997	Logarithmic regression analysis – home nations and away nations Compares the regression lines for 'home' and 'away' using a standard analysis of variance mtehod	Tennis and golf, world rankings 1993
Baimbridge 1998	– number of competitors per event and per nation – political controversies: capitalist, communist and developing nations – trend: ratio of medal winning to participating nations over the Olympics 100 year history	OG: 1896–1996
Condon *et al.*, 1999	17 variables: area, population, population growth rate, birth and death rate, infant mortality, life expectancy, number of airports, length of rail track, length of (un)paved highways, GNP, GNP per capita, value of exported and imported goods, electricity production and consumption per capita	OG: Atlanta 1996
Bernard & Busse, 2000	– population – wealth: GDP and GDP per capita – host country boycotts OG 1980 and 1984, success in the past, political system: communism	OG: Atlanta 1996 Time Series summer Games, 1960–1996
Van Bottenburg, 2000	– wealth: GNP – population – degree of urbanisation – area	OG: 2 summer Games: Barcelona 1992 and Atlanta 1996, 2 winter Games: Lillehammer 1994 and Nagano 1998
Stamm & Lamprecht 2000, 2001	– economic development: GDP per capita – social development: secondary enrolment	All summer and winter Games 1964–2000

Table 1 (*Continued*)

Author	Independent variable	Event
	– political development: extent of political and civil liberties – population size (general demographic conditions and prominence of talent) – degree of institutionalisation of elite sports: year, duration of IOC membership – political system: effect of authoritarian model of sport promotion (socialism)	
Hoffmann *et al.*, 2002a	– climatic circumstances: temperature, humidity and climate – wealth: (GNP per capita) – population – political system: current/previously socialist government – host nations	OG: Sydney 2000
Balmer *et al.*, 2001	Non-parametric statistics: (1) Wilcoxon signed-rank test, (2) Kruskal–Wallis test and (3) regression analysis (parametric): lineair, quadratic and exponential – home advantage: medals or points won by a hosting nations (home) compared with the medals or points won by the same nations when visiting other Olympic Games (away) – only nations who have ever hosted the Games	OG: Winter Games, 1908–1998
Hoffmann *et al.,* 2002b	– population – wealth (GDP per capita) – cultural influences: – host nations for the world cup football (since 1930) – Romanic speaking countries – Latin (dummy) – geographical setting: average annual temperature of 14 degrees Celsius in capital cities	Football: world ranking points in FIFA/Coca Cola 2001
Johnson & Ali, 2002	– wealth (GDP per capita) – population – host country and neighbouring countries – climatic conditions – political system: communism, military, monarchy, other – time trend	All Games 1952–2000 (26 editions)

Table 1 (*Continued*)

Author	Independent variable	Event
Morton, 2002	– population – GDP	OG: Sydney 2000
Kuper en Sterken, 2003	– wealth (GDP per capita) – population – host country – political system and national culture – media (television)	All Games from 1896 (24 editions)
Tcha & Perchin, 2003	Patterns of specialising in sports by using the revealed comparative advantage (RCA), in line with neoclassical trade models (swimming, athletics, weight games, ball games, gymnastics and other) – economic variables: GNP per capita, GNP and population – natural environment (land mass, coast length, altitude, temperature) – dummy variables for African and Asian countries and former socialist countries	OG: Seoul 1988, Barcelona 1992 and Atlanta 1996
De Bosscher *et al.*, 2003a, b	– wealth (GDP per capita) – population – degree of urbanisation – area – religion	OG: Sydney (2000)

OG: Olympic Games

nonetheless they should be taken into account when international comparisons are made. In this respect De Bosscher *et al.* (2003a, b) demonstrate a method to measure the relative success of nations by controlling for these macro-economic determinants.

Despite the consistency with which the rich and populous countries dominate the Olympic medal tables, there is a constant need for their governments to ensure the continued availability of the basic resource, namely athletes (Green & Houlihan, 2005). This leads logically to closer investigation of the meso-level in the following section.

Factors Leading to International Sporting Success: The Meso Level

Factors at the meso level are fully or partially determined by sports policies and politics. All things being equal, elite athletes will have a greater chance of success subject to the effectiveness of policy and investment decisions made in elite sport. Taking into account all the various factors that determine elite sports success, meso-level factors are the only ones that can be influenced and changed. Surprisingly, however, only a few studies have focused on

organisational factors at this level (Eising, 1996; Stamm & Lamprecht, 2000, 2001; van Bottenburg, 2000). National sports organisations worldwide spend large sums of money in the quest for superior sport performance, although little is known about the reasons why some nations excel in specific sporting events. As it is our aim to create a framework containing a categorisation of policy areas that should be compared as drivers of international sporting success, we provide below an overview of literature at the meso level. These studies can be classified into three broad types. In addition to reviewing these meso-level studies, Flemish athletes, coaches and performing directors working for federations have been surveyed in order to involve primary stakeholders in elite sport in the determination of the policy areas. These results are compared to similar research studies conducted in other nations.

The first type of study consists of those focusing on a description or comparison of the organisational context of nations. A key characteristic of these studies is their search for similarities and differences among nations' elite sport systems. In this regard, considerable research has been conducted on various aspects of practice in the former communist states (see, for example, Broom, 1986, 1991; Buggel, 1986; Douyin, 1988; Krüger, 1984; Riordan, 1989, 1991; Sedlacek *et al.,* 1994; Semotiuk, 1990). Common characteristics of these elite sport systems were found by these authors to be:

1. recognition of physical education and sport within constitutional law
2. early talent spotting through schools
3. high training frequency embedded in the school system
4. training and qualification systems of professional coaches
5. financial support programmes
6. high priority of applied scientific research
7. a network of sports medicine.

The former eastern bloc countries have undoubtedly played an important role in the current developments of elite sport. As Houlihan (1997) notes, 'countries like Australia and Canada have both adopted policies of elite squad development which are very close to the Soviet model in a number of key respects . . .' (p. 6). This phenomenon can be illustrated by a general globalisation process identified by Oakley and Green (2001) who analysed elite sport development systems in five nations: Australia, Canada, France, Spain and the United Kingdom. Their key finding was the discovery of an increasing tendency to develop common sporting strategies in those nations. However, despite the broad homogeneity of sport strategies, there is room for diversity and increasing variation (Green and Oakley, 2001). Digel (2001) compared the system of talent detection and talent development in China, Russia, the United States, Italy and France. Currently, a large-scale research project on elite sports systems in eight countries is being finalised in Germany by Helmut Digel *et al*. (2003, 2004). The countries are: China, Russia, Italy, the United States, the United Kingdom and Northern Ireland, France, Austria and Germany. Digel *et al*'s study is likely to provide

interesting new insights into how elite sport structures operate in relation to international sporting success. Pioneering research in the field of elite sport policies was recently published by Green and Houlihan (2005). They explored the process of elite sport policy change in three sports (swimming, athletics and yachting) and three nations (Canada, the United Kingdom and Australia). They used the Advocacy Coalition Framework[1] (ACF) as a tool for understanding the rise in the political priority given to elite sport. Although different in focus from this paper, the Green and Houlihan (*op. cit.*) study looks for similarities among the nations and offers in-depth analysis in four areas of elite sport policy: (1) development of elite-level facilities, (2) emergence of 'full-time' athletes, (3) developments in coaching, sports science and sports medicine, and (4) competition opportunities for elite level athletes.

Only a few studies give an overview of pre-requisites for international success (Clumpner, 1994; Larose & Haggerty, 1996; Oakley & Green, 2001). This second type of study makes use of the previous research on sport systems to define the key factors factors required to achieve international sporting success. Larose and Haggerty (1996) found nine categories of important factors thought to determine success and presented these to 15 Canadian experts, who concluded that a single model of factors leading to success does not exist. There was certainly no model that would cover all nations, nor one that would cover all sports. Clumpner (1994) used Broom's (1991) work as a foundation and suggested three major factors responsible for international success: (1) financial support for training centres and personnel, (2) an ongoing integrated Olympic sport system and (3) athletic talent. He goes on to expand these three major factors with subsidiary factors which can be found at micro level (motivated athletes), macro level (large diverse population) and meso level: time for training, well trained full-time coaches, sports medicine back up, international competition, early spotting of talent, access for all, a good communication network and an unbroken line up through the system.

Finally, Oakley and Green (2001) identified ten items that could be regarded as uniform in the nations mentioned above, namely:

1. A clear understanding about the role of the different agencies involved and an effective communication network that maintains the system.
2. Simplicity of administration through common sporting and political boundaries.
3. An effective system for the statistical identification and monitoring of the progress of talented and elite athletes.
4. Provision of sports services to create an excellence culture in which all members of the team (athletes, coaches, managers, scientists) can interact with one another in a formal and informal way.
5. Well structured competitive programmes with ongoing international exposure.
6. Well developed and specific facilities with priority access for elite athletes.

7. The targeting of resources on a relatively small number of sports through identifying those that have a real chance of success at world level.
8. Comprehensive planning for each sports needs.
9. A recognition that developing excellence has costs, with appropriate funding for infrastructure and people.
10. Lifestyle support and preparation for life after sport.

These three studies (Larose & Haggerty, 1996; Clumpner, 1994; Oakley & Green, 2001) provide a basis for the creation of a universal model of factors explaining international sporting success. However, none of these authors has worked up this information into a theoretical model with coherent factors put into operational criteria that can be empirically tested. According to Oakley and Green (2001) 'further research is required to better understand "how" and "why" this tendency occurs' (2001, p. 100). Nevertheless, they recognise that this is complicated and that a long-term study is required. This latter point is one of the main characteristics of Green and Houlihan's study (2005) as they analysed policy changes over more than ten years.

The one crucial element missing in all of the previous attempts to model sport policy influences on success has been the involvement of athletes and coaches, as the key stakeholders responsible for delivering success for their nation. This third type of study is situated at the micro-level. Although studies situated at the microlevel focus on personal genetic qualities, they give interesting information on some of the main responsibilities of sports policies in an athlete's pathway to reaching the top. It is also less complex to question athletes and coaches than it is to compare nations at the meso-level. A number of surveys attempt to understand factors that influence the individual success of athletes, both positively and negatively (Conzelmann & Nagel, 2003; De Bosscher & De Knop, 2003 & 2004; Duffy *et al*., 2001; Gibbons *et al*., 2003; Greenleaf *et al.*, 2001; Nys *et al*., 2002; Unierzyski *et al.*, 2003; Van Bottenburg, 2000; Van Bottenburg *et al.*, 2004). As stated by Chelladurai (1987) and Chelladurai and Chang (2000), one should focus on the group for whose benefit an organisation primarily exists. This approach, known as the multiple-constituency model of the effectiveness of organisations, endorses measures based on the preferences and values of internal and external organisational participants (Papadimitriou, 2001). As a sound theory on sports policy, factors leading to international sporting success has not yet been devised, the opportunity was taken to use a broader but related Flemish study on the elite sport climate[2] to identify the determinants of success according to the main stakeholders in elite sport. In total, 140 Flemish athletes, 119 coaches and 26 performance directors from federations were asked to state the five most important internal and external factors that have had the greatest influence on the personal success of athletes. An inductive analysis led to the identification of ten areas, of which eight can be categorised as sport policy areas (De Bosscher & De Knop, 2004). The results were broadly comparable with two similar micro-level studies in other nations, also using open-ended questions to identify

what athletes themselves considered to be the determinants of success. In Gibbons *et al*. (2003), 760 US Olympic athletes were surveyed and in Duffy *et al*. (2001) the research was based on the views of 207 Irish athletes. These latter two studies, both developed from a micro-level perspective, did not distinguish internal from external factors. The results of these three studies are presented in Table 2.

In all of the studies cited in Table 2, the common theme is that the most important and necessary condition for success is the personal dedication and motivation of the athlete. Other consistently cited factors, which can be categorised as'an athlete's personal environment', include variables such as parents, partner and coach. At the meso-level, the quality of coaching exceeded all other factors in terms of its importance. The perceived importance of financial support, structural support and training opportunities, training facilities and competition appears in all studies. Therefore, from a policy perspective, support should be provided to maximise the influence of favourable personal factors. Studies at micro-level are therefore also interesting, because there can be a knock-on effect at the meso-level.

In summary, this literature review at the meso-level from different authors and different perspectives makes it likely that a range of factors have contributed to the elite sporting success of nations and individual athletes. However, none of these studies gives an overview in such a way that the variables are clearly defined and measurable for use in trans-national comparisons. This is the purpose of the next part of the paper. We do not claim to be exhaustive in this overview, nonetheless our main aim is to condense in one place the many, unrelated sources reviewed. This in turn may prevent researchers in the future from having to'reinvent the wheel' when attempting to identify the factors that lead to international sporting success.

A Conceptual Framework for Analysing Sports Policy Factors Leading to International Sporting Success

On the basis of (1) the existing literature and secondary sources on elite sport systems, (2) a few studies on the determinants of success at policy level and (3) prerequisites for success according to athletes and coaches as main stakeholders in elite sport, it is possible to cluster all sources into a few policy areas that have an important influence on international sporting success. Table 3 provides an overview of criteria mentioned in these studies from different authors and different perspectives. Nine clusters of policy areas or 'pillars' can be identified, each containing several sub-criteria that should be compared on a trans national basis in order to explain why nations excel in elite sport.

When we go into greater depth on these nine policy areas, we can see that pillars three, four and five are a logical progression. The sequence starts when an athlete is introduced to a certain sport (initiation phase—pillar 3). If the athlete is subsequently identified as 'talented' he or she may receive special attention during the talent development phase (pillar 4). For those who remain in the system, some may finally reach the top and start to

Table 2. Main factors of success according to elite athletes in three nations (Ireland, USA, Flanders**), using an open ended question.

	Ireland Duffy *et al*. (2001)	N = 207 *Relative%	USA Gibbons *et al*. (2003)	N = 760 *Relative%	Flanders[3] De Knop *et al*. (2004)	N = 140 *Relative%
1	personal/ internal factors	37,2	dedication & persistence	58,1	personal motivation & persistence	97,1
2	social support	36,2	support family and friends	52,0	personal environment (parents, peers)	83,6
3	coaching	31,4	excellent coaches	49,4	expertise and quality of coaches	61,4
4	support system/ financial support and structures	20,7	love of sport	27,1	club level quality & atmosphere	35,0
5	training and competition	20,7	excellent training programmes and facilities	22,3	financial support	25,7
6	facilities	9,6	natural talent	21,9	support systems in athlete's career development	12,9
7	specialist advice	8,7	competitiveness	15,0	international competition	8,6
8	role models	2,4	focus: how much could they focus on training	13,0	training facilities	7,1
9	/		work ethic	11,6	social appreciation for sport	6,0
10	/		financial support	11,5	media and sponsors	1,4

*The percentages represent the proportion of athletes who have mentioned each item**There are slight differences in the Flemish methodology where 'internal factors' (at the micro level) were gathered separately from 'external factors'. This explains the higher percentage of the micro-level factors.

Table 3. A literature overview of success determinants at the meso level, clustered in nine policy areas

Item	Reference	Factor
Financial support programmes for athletes: lifestyle support, funding, grants and sponsorship; financial independence	Broom, 1986, 1991; Buggel, 1986; Riordan, 1989, 1991; Sedlacek *et al.,* 1990; Dufy *et al.,* 2001; Gibbons *et al*., 2003; De Bosscher & De Knop, 2004; De Knop *et al.*, 2004; De Bosscher *et al*., 2004.	Pillar 1 financial support
Financial support for training centres and personnel	Clumpner, 1994	
Financial support for NGBs: overall sport budget and elite sport budget in the National Governing Body (NGB)	De Bosscher & De Knop, 2002, 2004	
Funding over a four-year period with defined targets in mind	Wells, 1991	
Elite sport priorities – recognition that developing excellence has costs, with appropriate funding for infrastructure and people – emphasis on high-performance sport in a country	Oakley & Green, 2001; Green & Oakley, 2001 Larose & Haggerty, 1996	Pilar 2 integrated approach to policy development
Targeting of resources on a relatively small number of sports through identifying those that have a real chance of success at world level; prioritisation of Olympic sports	Clumpner, 1994 Oakley & Green, 2001; Green & Oakley, 2001 Wells, 1991	
An ongoing integrated support system: – a coordinated sport system and coordination of elite sport initiatives – an unbroken line up through the system – a communication network which maintains the system – good communication/relationship with national governing bodies (NGBs) and clubs – comprehensive planning for the needs of each sport	Clumpner, 1994 Dufy *et al*., 2001 De Bosscher & De Knop, 2002, 2004; De Knop *et al.*, 2004; De Bosscher *et al.*, 2004. Wells, 1991 Oakley & Green, 2001; Green & Oakley, 2001	
Simplicity of administration through common sporting and political boundaries	Oakley & Green, 2001; Green & Oakley, 2001 Wells, 1991	

Table 3 (*Continued*)

Item	Reference	Factor
Development of national governing bodies (NGBs):		
– professionalisation in NGBs		
– rational systems of long-term planning in sports, continuity	Krüger, 1984	
– administration, organisation, information, interest from NGBs	Dufy *et al.*, 2001; De Bosscher & De Knop, 2002	
– good cooperation of NGBs with regional departments and clubs		
Structural support from NGBs and Olympic Committee	Gibbons *et al*., 2003 Greenleaf *et al.*, 2001	
Initiation/foundation level	Broom, 1986; Buggel, 1986; Riordan, 1989, 1991;	Pillar 3 sport participation
– recognition of physical education and sport as a constitutional law; sport in schools, sport in curriculum	Sedlacek *et al*., 1994; Semotiuk, 1990 De Bosscher & De Knop, 2002	
– access to sport for all	Clumpner, 1994	
– accessibility of multiple sport programmes and facilities for children	Gibbons *et al*., 2003	
Participation/club level	Dufy *et al*., 2001; Broom 1991	
– introduction to sport at a young age and not specialising too early—age of entry in sport	De Bosscher & De Knop, 2002, 2004 Nys *et al*., 2002; De Knop *et al.,* 2004;	
– club structure, quality in sports clubs	De Bosscher *et al*., 2004	
– quality and level of club training		
– special attention for young talents at club level		

Table 3 (*Continued*)

Item	Reference	Factor
Talent identification – early talent spotting through schools (as typical in former communist nations) – early talent spotting (with care that burn out and drop out do not occur)-age of talent identification – an effective system for the statistical identification and monitoring of the progress of talented and elite athletes	Broom, 1986; Buggel, 1986; De Knop *et al.*, 2004; De Bosscher *et al*., 2004; Riordan, 1989, 1991; Sedlacek *et al*., 1994; Semotiuk, 1990 Clumpner, 1994; Broom, 1991 Oakley & Green, 2001; Green & Oakley, 2001	Pillar 4 talent identification and development system
Talent development: – high frequency training within the school system (as typical in former communist nations) – programmes combining sport with education/work – training: – sufficient training opportunities at a high level – training camps at club level and with the national squad – specialised training, long-term and systematic from childhood to adulthood – training and competition support during talent development – multidimensional support of young athletes/ staffing	Broom, 1986, 1991; Buggel, 1986; Riordan, 1989, 1991; Sedlacek *et al*., 1994; Semotiuk, 1990 Douyin, 1988; Nys *et al*., 2002 De Bosscher & De Knop, 2002	
Lifestyle (financial) support for athletes – emergence of 'full-time' athletes – amount of money earned, rewards	Green and Houlihan, 2005 Duffy *et al*., 2001; Van Bottenburg, 2000 Krüger, 1984; Wells, 1991 Oakley & Green, 2001, Green & Oakley, 2001; De Knop *et al*., 2004; De Bosscher *et al.*, 2004.	Pillar 5 athletic and post career support

Table 3 (*Continued*)

Item	Reference	Factor
Multidisciplinary support staff and specialist advice from sports science and sports medicine: – (para)medical, exercise physiological, material and environment, social psychological, nutrition and media training; – lifestyle management, time management, career development; – preparation for life after sport;	Sturkenboom & Vervoorn, 1998, cited by Van den Berg, 2001; Duffy *et al*., 2001; Oakley & Green, 2001 and Green & Oakley, 2001 Nys *et al*., 2002; De Bosscher & De Knop, 2002, 2004; Greenleaf *et al*., 2001; Conzelmann & Nagel, 2003	
Training opportunities: – intense training (fulltime) and with athletes of similar/higher standard; – sufficient training camps – providing athletic talent with the necessary time to train—easy access to sport at college (US) – specialised training systems and training methods, long-term and the application of optimal training loads (principles of periodisation, interval training, endurance training, …) – multidisciplinary training: technical, tactical and physical training;	Duffy *et al*., 2001; Broom, 1991; Gibbons *et al*., 2003; Van Bottenburg, 2000 Clumpner, 1994; Douyin, 1988; Krüger, 1984; Nys *et al*., 2002; De Bosscher & De Knop, 2002, 2004	
Development of elite sport facilities – well developed and specific facilities with priority access for elite athletes – existence of adequate facilities for use by elite athletes create centres of sporting excellence on a regional basis – equipment prior for elite sport – development of a national training centre	Green and Houlihan, 2005 Oakley & Green, 2001, Green & Oakley, 2001; Gibbons *et al*., 2003 Larose & Haggerty, 1996; Wells, 1991; Krüger, 1984; De Bosscher & De Knop, 2002, 2004; Clumpner, 1994; Dufy *et al*., 2001; Nis *et al.*, 2002; De Kop *et al.,* 2004; De Bosscher *et al.*, 2004	Pillar 6 training facilities

Table 3 (*Continued*)

Item	Reference	Factor
– accessibility, availability and quality of training facilities; distance to training facilities and technical support		
Development of sport for all facilities – Number of sport for all facilities	De Bosscher & De Knop, 2002; Dufy *et al*., 2001; Nys *et al.*, 2002; van Bottenburg, 2003	
Coaching expertise in high-performance sport – quantity and quality of coaches: level and number of experts available – knowledgeable coaches, dedication; – good athlete-coach relations – training and qualification systems for elite coaches-sufficient career development opportunities at the elite level – professional coaches (as typical in former communist nations) – set up a coaching commission to develop an accreditation system – coaching expertise in NGB and regional departments for the provision of selection training	Larose & Haggerty, 1996 Broom, 1986; Buggel, 1986; Riordan, 1989, 1991; Sedlacek *et al.*, 1994; Semotiuk, 1990; Clumpner, 1994; Green & Houlihan, 2005 Duffy *et al*., 2001; Wells, 1991; Krüger, 1984; Nys *et al,*, 2002, 2004; Greenleaf *et al.*, 2001; De Knop *et al*., 2004; De Bosscher *et al*., 2004	Pillar 7 coaching provision and coach development
Coaching expertise in developmental sport – quantity and quality of youth coaches to avoid athletes' burn out: sufficient dedicated, committed, knowledgeable, motivating coaches at all levels-qualified coaches – training and qualification systems-coaches education	Larose & Haggerty, 1996 Gibbons *et al*., 2003 Greenleaf *et al.,* 2001 De Bosscher & De Knop, 2002, 2004; Bloom, 1985; De Knop *et al.*, 2004; De Bosscher *et al*., 2004	

Table 3 (*Continued*)

Item	Reference	Factor
Coaching provision – provision of full time coaches (with a low athlete to coach ratio) – coaching support structure	Clumpner, 1994 Dufy *et al*., 2001; De Bosscher & De Knop, 2002, 2004; Green & Houlihan, 2005	
Organisation of international events in own nation	Bernard & Busse, 2000; Clarke, 2002; Johnson & Ali, 2002; Kuper & Sterken, 2003	Pillar 8 national and international competitions
Participation in international competition – sufficient international competition opportunities for elite level athletes – competition support (financial)	Green and Houlihan, 2005; Clumpner, 1994 Duffy *et al*., 2001; Gibbons *et al*., 2003; Van Bottenburg, 2000; Nys *et al.*, 2002; De Knop *et al.*, 2004; De Bosscher *et al.*, 2004	
Participation in national competition – access to high quality competition in own nation – professional tournament structure (tennis); well structured competitive programmes – opportunities to participate in competition at each level: club level, provincial, national and international level	Larose & Haggerty, 1996 Crespo *et al*., 2001; Crespo *et al*., 2002; Oakley & Green, 2001, Green & Oakley, 2001 Van Bottenburg, 2000; Nys *et al.,* 2002	
Developments in coaching, sports science and sports medicine – high priority to applied scientific research – information on sports science and medical support: – sport science: monitoring and testing, psychological advice, nutritional advice, carding scheme – sport medicine: physiotherapy, kinesiologist – a network of sports medicine—medical support	Broom, 1986; Buggel, 1986; Riordan, 1989, 1991; Sedlacek *et al*., 1994; Semotiuk, 1990; Green and Houlihan, 2005; Clumpner, 1994; Krüger, 1984 Duffy *et al*., 2001; Larose & Haggerty, 1996 Wells, 1991 De Bosscher & De Knop, 2002, 2004	Pillar 9 Scientific research and sports medicine support

Table 3 (*Continued*)

Item	Reference	Factor
– develop a research programme linked to the objectives stated: use of scientific methods to seek talent; scientific organisation of training programmes; applied research geared to specific sports; the development of techniques in particular sports and the perfection of sporting equipment and facilities – communication towards coaches of scientific research results		
Media and sponsorship		Environment of elite sport
– Quality of media attention – Quantity of media attention	Nys *et al.*, 2002; Van Bottenburg, 2000	
Sport culture and elite sports culture	Larose & Haggerty, 1996	
– a nation's tradition in a particular sport – the social position of sport outside the schools	Kruger, 1984; Van Bottenburg, 2000	
Spreading and development of sport around the world—increasing competition	Krüger, 1984	

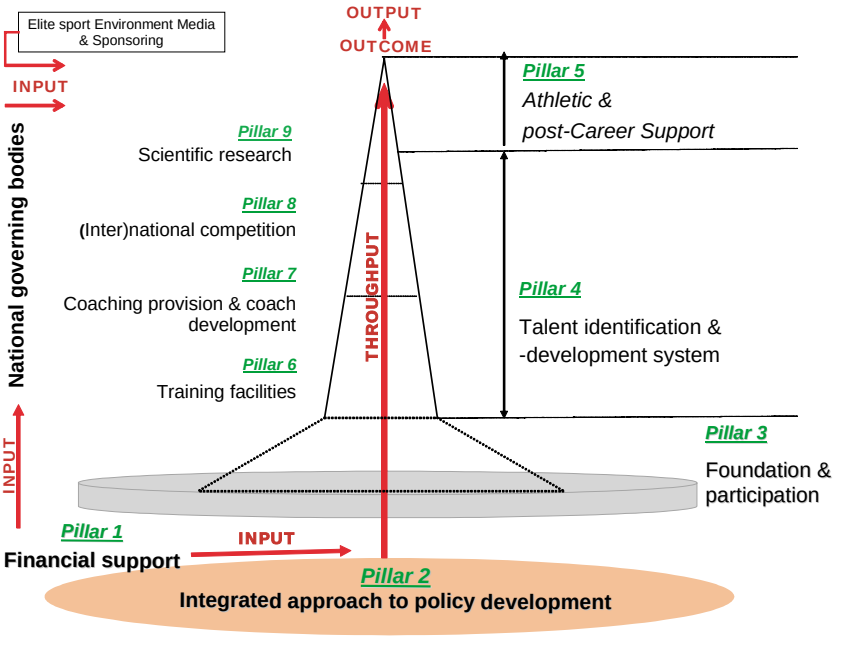

Figure 2. The nine pillars of sports policy factors influencing international success

perform at international level (perfection phase—pillar 5). This career path has the form of a pyramid because many athletes drop out during these stages (pillars 3, 4, and 5) and only few reach the very top (De Smedt, 2001). Although this pyramid theory is often criticised, as some talents are not selected from a sport's participant base, and we acknowledge there are exceptions, most athletes tend to find their roots in sport for all. This is presented graphically in Figure 2. The three phases of athlete development, as defined by Bloom (1985) are similar in sports, arts and science. Wylleman *et al.* (1998) add a fourth stage, the discontinuation phase, which is reached when the athletic career comes to an end. These transitions in the sporting career of an athlete are often accompanied by psychological, social and academic transitions all taking place at different times (Wylleman & Lavallee, 2003). The cumulative effect of these transitions often creates tensions for athletes and therefore strong support structures are required to develop an optimal micro climate in which the athlete can develop effectively (De Smedt, 2001). The athlete has a central place in elite sport development and all the other pillars focus on what is best for the athlete's development. The key question to answer is:

> 'How should elite sports policies function so that elite athletes can train and perform in optimal circumstances at each stage of their careers, with access to good facilities, surrounded by high quality coaches and medical and paramedical support?'

Financial resources, as reflected in pillar 1, and an integrated approach to policy development (pillar 2) are necessary conditions for the development of sport and athletic careers within a given sport. The financial and human resources (pillar 1) are the *inputs* of sport policy. Nations that invest more in (elite) sport can create more opportunities for athletes to train under ideal circumstances. There are many examples of nations that have improved sporting performance after increasing investment in elite sports. This has occurred often after failure at important international events. As Chalip (1995) points out, these events focus policy makers' attention on proposals towards improved elite sports plans. Having the means may enhance the chances of success but it certainly does not guarantee it. The processes behind policy, or the *throughput*, refer to the efficiency of sports policies, that is, the optimum way that inputs can be managed to produce the required *outputs*. Thus a strong organisational structure is necessary. This is reflected in the second pillar, the umbrella of the model. There is no consensus or preference for the necessity of centralisation or high government intervention in elite sport policies (Houlihan, 1997). Nonetheless, a coordination of elite sport initiatives is necessary. As Clumpner (1994) notes, a good communication system and clear task descriptions are more important than the precise nature of the delivery vehicle. Furthermore, Oakley and Green (2001) indicate the importance of simplicity of administration through common sporting and political boundaries as another important item.

Investments in four other pillars in the throughput stage are essential for the development of elite athletes: training facilities (pillar 6), the provision and development of coaches (pillar 7), national and international competition structures (pillar 8), and, scientific research and sports medicine support (pillar 9). As stated in the literature review in Table 3, pillars 6, 7 and 8 require special attention both at the development level (sport for all) and the elite level, as noted in Green and Houlihan's (2005) research. Sufficient facilities of high-quality, sufficient qualified coaches at club level and a good national competition structure will allow young talents to become skilled in their sport, to train and compete at their own level, and to develop their skills in the period before or during the time they are identified as being talented. Once athletes perform at a higher level and train regularly, there is a need for more specialised equipment and facilities with appropriate accessibility, coaches with expertise and knowledge at the elite level, and sufficient opportunities for athletes to participate in international competition. In addition, many authors noted that the staging of international sporting events (pillar 8) has a positive effect on the success of the host nation (see, among others, Bernard & Busse, 2001, 2004; Clarke, 2002; Johnson & Ali, 2002; Kuper & Sterken, 2003). Therefore, a proactive approach to hosting international sports events can also be regarded as a factor which influences international sporting success. Applied research and a network of sports medicine (pillar 9) are crucial factors for nations who want to outperform others, as pointed out by Shibli (2003), who suggests that as competition for success increases the'price' of such success rises.

Pillar 1 is an indicator of the input, pillars 2–9 are indicators of throughput. As revealed in the effectiveness literature, in a multidimensional approach, criteria should be measured at each stage of the input, throughput and output cycle (Chelladurai, 2001). *Outputs* in elite sport can be clearly defined, for example the number of medals won during the Olympic Games or other events, top six or eight places, the relative success or even the number of participants qualifying to take part.

The model generally shows that the development of more athletes with medal winning capabilities (outcome) requires a holistic approach to elite sport. Elite athletes are increasingly the product of a long-term strategic planning process. It is a rule of thumb that eight to ten years and 10,000 training hours are necessary to become an expert in either music or sports (Bloom, 1985; Grimbel, 1976; Starkes, 2000). Nations might not increase their chances of success by investing in a few pillars; rather they need to find the most suitable blend of all pillars for their specific circumstances. As stated by Marcel Sturkenboom, Director of the Dutch National Sport Federation and Olympic Committee (NOC*NSF):

> 'If you have the ingredients, you still don't have a good recipe; how you bring the ingredients together is what counts.'

Finally, as is also stated in the literature review in Table 3, some less controllable variables are also important indicators for success. This is the environment within which elite sport exists and includes issues such as sponsorships, media portrayal of sport, the tradition of sport in a nation, the tradition of success, sport culture generally and elite sport culture specifically. These issues can only be impacted on by sport policies to a limited extent and therefore do not belong to the meso-level of our classification.

Discussion and Conclusions

It was the aim of this paper to present a composite performance model of sports policy factors that are important for international success. Literature in this area is scarce, particularly when it comes to the creation of a model regarding elite sports policies, yet paradoxically many governments seem to have a considerable interest in trying to outperform rival nations. Much research has been conducted on the elite sport systems in successful nations, but little is known on the relationship between systems and success. In this paper we have proposed a model that categorises the literature into nine pillars of important policy determinants. Financial inputs (pillar 1) are important, but it is the way the resources are used via the throughput (pillars 2–9) that might lead to increased production of athletes with medal winning capability. The model is characterised by a focus on the athlete as a central stakeholder in elite sport systems. Each pillar can be operationalised into clearly defined, measurable criteria, based on the overview shown in Table 3.

Although this pillar framework aims to give an overview of main sports policy areas that are important for international success, its function is not

deterministic: rather it aims to identify pivotal issues and to generate crucial questions in a benchmark study of elite sport systems. It can be assumed that all the conditions identified in the literature review outlined above can be classified under one of the nine pillars. In an increasingly competitive environment, nations may develop innovative strategies and thus our proposed model may be subject to change over time. Furthermore, it needs to be tested applied empirically rather than just in theory. This is the subject of the subsequent research project, SPLISS, which has been established recently. SPLISS stands for Sport Policy Factors Leading to International Sporting Success. In this large-scale study, elite sports policies and the elite sports climate in different countries will be compared at national level (SPLISS, 2004). The nine-pillar model is used as a basic framework. The study aims to improve knowledge about the sports policy determinants that are important for international success. The end result may be an improved insight into how to operationalise the criteria for trans-national comparisons, especially for the throughput stages of the model. Whereas inputs and outputs can be measured relatively easily in quantitative or qualitative terms, throughput is more difficult to measure and often indirect methods will have to be used. Therefore, some throughputs may remain analysed at a descriptive level only. This is also the reason why in the SPLISS study, athletes, coaches and performance directors in six nations have been involved, as they are the primary stakeholders who can evaluate validly the throughputs in each pillar. This research strategy is, as acknowledged in the effectiveness literature, essential in order to fill in the 'gap' between observed and perceived quality. However, researchers and policy makers must be aware that uncertainties over the relationship between policies and international sporting success will always remain. The reason for this is that it is impossible to set up an experiment trying to explain a causal correlation of one factor leading to success while other factors are controlled. Furthermore, it is difficult to demonstrate the relationship between success and sports policies statistically due to a lack of reliable data on the one hand, and data that can not be quantified on the other hand. This makes statistical analysis particularly difficult to undertake.

So far, six nations are involved in the SPLISS research: Belgium, the Netherlands, the United Kingdom, Canada, Norway and Italy. These are all western capitalist and democratic cultures. It is quite conceivable that this framework will need adjustment before it can be used meaningfully in nations with different cultures and different sport systems, such as developing countries, the United States and China. It is impossible to create one single model for explaining international success. A system leading to success in one nation may be doomed to fail in another. Therefore it needs to be emphasised that the combination of the nine pillars may be specific to a given nation's context and that different systems may all be successful. This view is partly driven by the fact that sport is a reflection of the cultural system in which people live (Lüschen, 1970). There are plenty of inexplicable variables, which we all believe are important but no-one can explain why. Social phenomena such as sport cannot be understood without a clear

understanding of culture (Heinemann, 1998). Australia's passion for sport may be a stronger explanation for success than any other variable. The Dutch are more achievement oriented, more inclined to long-term thinking, better planners, less likely to avoid uncertain situations and find it easier to run risks than Flemish people (Van Praet *et al*., 2005). These characteristics are embedded in a culture and may, to a large but unquantifiable extent, explain why the Netherlands is more successful in sport than Flanders. Consequently, comparing nations is a complex process. Indeed, much discussion has taken place as to whether nations are appropriate units for comparison. However, given the complexity of the problem of identifying factors that affect international sporting success and the current lack of data available, trans-national comparison seems to be the only way to do this. We could refer to the view cited by Hofstede (1998) that every comparison of values and norms between nations is, in a way, a comparison between apples and oranges. It is important to find a common language for those factors that can be compared.

> 'Popular wisdom deems that one cannot compare apples with oranges. But what do we mean by 'compare'? Scientifically speaking, apples and oranges come under the general category of 'fruits' and can be compared on many criteria, such as availability, price, colour, vitamin content or keeping quality. Comparing apples with oranges, cross-cultural psychologist Harry Triandis once said, is okay as long as we possess a fruitology, a theory of fruits' (p. 16).

A consensus is building among researchers that macro-level factors such as population and GDP are becoming less accurate predictors of nations' performance in elite sport than they have been historically (Stamm and Lamprecht, 2001). The principal reason for this view is that as nations become strategic in the way in which they produce elite athletes, they rely less on uncontrollable variables. Australia is a good example of a nation which has recently been able to improve its performance in elite sport dramatically with (in relative terms) a modest increase in population. However, macro-level determinants still account for more than 50% of Olympic success and this may be even higher in developing countries (De Bosscher *et al.*, 2003). Taking into account all the various factors that determine elite sports success, those at the meso-level are the only ones that can be influenced and changed by policies. More nations are adopting strategic approaches towards the development of elite athletes (Shibli & Bingham, 2005). As stated by Oakley and Green (2001), as sporting systems are moving increasingly towards uniformity globally, it will become harder for nations to win more medals with a static level of investment. Therefore, in international sporting competition, standing still could mean going backwards if those nations taking a strategic approach develop a competitive advantage over those nations that do not plan for success (SIRC, 2002). It is clear that, for nations to be successful in the future, much more emphasis will need to be made on planning for success in a comprehensive manner.

Notes

1. The Advocacy Coalition Framework (ACF) was defined as '... people from a variety of positions (elected and agency officials, interest group leaders, researchers) who (1) share a particular belief system—i.e., set of basic values, causal assumptions and problem perceptions–and who (2) show a non-trivial degree of coordination over time' (Sabatier and Jenkins-Smith, 1999, p. 138', cited iny Green and Houlihan (2004, p. 389). 'A key feature of the ACF is its focus on the policy process as a whole over 'periods of a decade or more.'
2. What is meant by the term'elite sports climate' is defined by Van Bottenburg (2000) as: 'The social and organisational environment that provides the circumstances in which athletes can develop into elite sports athletes and can continue to achieve at the highest levels in their branch of sport' (p. 24).
3. Flanders is the northern, Dutch speaking part of Belgium.

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