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## Positioning at the Olympic Winter Games:

### Examining the targeting of Olympic winter sports by medal-winning nations

Drs. Andreas Ch. Weber, Prof. Dr. Veerle De Bosscher, Dr. Hippolyt Kempf



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## **Abstract**

**Purpose:** Since the 1990s, the International Olympic Committee has offered nations more medal-winning opportunities at every Winter Games. Meanwhile, many countries are constrained by their limited financial resources to target sports strategically. The purpose of this paper is to examine the targeting approaches of National Sport Agencies (NSAs), and to identify the factors they assess in the decision-making process.

**Design/methodology/approach:** The data were collected through semi-structured interviews with 11 decision-makers of medal-winning NSAs at the 2014 Sochi Games. The data were then analysed with reference to strategic management in an approach which combines a resource-based view (RBV) with a market-based view (MBV) to build a competitive advantage.

**Findings:** The results show that NSAs, comparable to firms, combine an internal analysis that reflects the RBV on resources and capabilities (e.g., athletes' performance per sport, sport-specific elite sport system), with an external analysis of the competitive environment that reflects an MBV (e.g. sport's medal market size, intensity of competition at Games) to target sports. Using this information, two phases were distinguished: Firstly, the target sports are identified and finance is prioritised accordingly; secondly, the allocation of the nation's resources is constantly reviewed in order to optimise it.

**Research limitations/implications:** Even though the transfer of mainstream business techniques to NSAs is limited, the findings can help policy makers to distinguish between the internal and external factors identified in this study, and to make more strategic decisions by combining RBV and MBV approaches to build up their nation's competitive advantage.

**Originality/value:** This paper models the targeting strategies of NSAs during an Olympic cycle by introducing the competitive positioning of firms to sports management.

**Keywords:** Olympic Winter Games, strategic targeting of sports, competitive positioning, competitive advantage, resource-based view, market-based view

**Paper type:** Research paper

## 1. Introduction

The Olympic Winter Games are a dynamic environment for nations to compete in. Between 1992 and 2014, the International Olympic Committee (IOC) increased the number of medals from 175 to 294 by including new sports (e.g. curling in 1998), new disciplines (e.g. ski cross in 2010) and new events (e.g. mixed relay biathlon in 2014) in the Olympic programme. In contrast, the Summer Games programme has been relatively stable for the last two decades (Chappelet 2002, Kempf *et al.* 2014). Consequently, the IOC has provided new medal-winning opportunities for nations, particularly at the Winter Games.

Analysing the nations competing in this environment, researchers found strong evidence that the effective management of elite sport systems allows nations to increase their Olympic success (Robinson and Minikin 2012, Robinson and Böhlke 2013, De Bosscher *et al.* 2015). Given that competition between nations is increasing by virtue of increased financial investments (De Bosscher *et al.* 2015), there is a great deal of evidence that nations are becoming more strategic in their efforts to achieve Olympic success (Green and Oakley 2001, Green and Houlihan 2005, Digel *et al.* 2006, Bergsgard *et al.* 2007, Houlihan and Green 2008, Andersen *et al.* 2015, De Bosscher *et al.* 2015).

However, there is little research on how National Sports Agencies (NSAs) apply targeting approaches by allocating financial resources amongst their nationally supported sports or national governing bodies<sup>1</sup> (NGBs) to increase (or at least stabilise) their nation's Olympic success (e.g., Sam 2012, De Bosscher *et al.* 2015, Zheng and Chen 2016). NSAs are the leading decision-making organisations in the elite sport system and are responsible for, amongst other things, the distribution of finance to those sports which are supported at the national level (Sotiriadou and De Bosscher 2013). Reviews of the literature and policy documents have found that performance is the factor that has the greatest influence on nations' decisions about how to

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<sup>1</sup> The term *national governing body* is used as a synonym for National Federation or National Sport Organisation.

allocate resources amongst their funded sports (e.g., Sam 2012, Houlihan and Zheng 2013, De Bosscher *et al.* 2015, Zheng and Chen 2016, Weber *et al.* 2018). Hence, the targeting strategies of NSAs focus on sports in which the nation is performing well, which is an inward-looking perspective. Because the IOC has increased the number of medal-events at every Games for the last few decades, the question emerges whether the NSAs of successful nations also include an analysis of this external dynamic to make targeting decisions, and if so, which internal and external factors do they examine?

The literature provides some evidence that NSAs analyse the Olympic programme to identify niche sports to target their funding (e.g., Houlihan and Zheng 2013, Reiche 2016, Zheng and Chen 2016). For example, Zheng and Chen (2016) show that the Chinese Ministry of Sports (i.e. the NSA of China) targets sports or disciplines by conducting an analysis of different aspects of the external competitive environment, such as the number of Olympic events/medals and the number of competing nations per sport. Despite the evidence that NSAs position their nations at Olympic Games by targeting particular sports and funding their NGBs accordingly (e.g., Sam 2012, Houlihan and Zheng 2013, Reiche 2016, Weber *et al.* 2018), there is little research available on the positioning strategies they use. There is no comprehensive framework that describes the elements that are taken into account when sports funding decisions are made. In business, the attempt to build a competitive advantage over rival companies is common practice. Firms undertake a comprehensive analysis of their internal resources and capabilities and the external competitive environment in order to identify target markets, and to align the firm's resources accordingly (e.g., Wheelen and Hunger 2010, Hooley *et al.* 2017).

The aim of this study is twofold: firstly, to examine the targeting approaches of Olympic winter sports managed by NSAs by using a model derived from strategic management; and secondly, to identify the factors they assess to decide which sports to target. The relevant mainstream business literature is reviewed in the next section.

This paper applies Hooley et al.'s (2017) framework for the strategic positioning of firms to sports management. Hooley et al. (2017) introduced the strategic targeting of markets to business practice by combining the internal analysis (i.e. resources and capabilities) that reflects the RBV and an external, market-orientated analysis. This approach is consistent with the argument that professional sports organisations are adopting traditional business practices (Shilbury and Ferkins 2011, O'Boyle 2015). The outcome of this study enables policy-makers and high-performance managers to reflect their own targeting strategy by referring to mainstream economics, and it can support NSAs to develop a more strategic approach towards the Winter Games.

## **2. Literature Review**

### *2.1 Targeting markets in economics: the model of competitive positioning*

The strategic management literature identifies two main theoretical strands which are used to build a competitive advantage: the resource-based view (RBV) (e.g., Wernerfelt 1984, Peteraf 1993, Barney 2001), and the market-based view (MBV) (e.g., Hooley *et al.* 2001, Porter 2008a). The RBV focuses on the firm's organisational resources and dynamic capabilities (e.g., Mahoney 1995, Teece *et al.* 1997, Helfat *et al.* 2007, Klein *et al.* 2013), while the MBV focuses on industry's markets. The RBV identifies a firm's organisational strengths and weaknesses and aims to create a competitive advantage based on the resources and core capabilities of the firm that are valuable, rare, imperfectly imitable by rival firms and non-substitutable (i.e. VRIN characteristics) (Barney 2007). When applying the MBV, organisations analyse the competition in available markets to identify market opportunities and to decide which ones to target. The MBV uses measures derived from industrial economics (e.g., Porter 1981, Scherer and Ross 1990, Chen 1996, Porter 1998) to recognise relevant market changes that the firm can exploit (e.g. market growth) and allows enhancement of the firm's understanding of the underpinning

market mechanisms that determine competition (Porter 2008b). This allows a firm to predict market changes and to target them faster than its rivals do. According to Grant (2008), these two views supersede the strengths, weaknesses, opportunities and threats (SWOT) framework. It is commonly applied in practice, when strategic targeting decisions are made regarding the allocation of the firm's financial resources. Scholars state that to identify a suitable strategy that builds a competitive advantage over the long run, managers need to combine an internal analysis which uses an RBV of their firm with an external analysis which applies a MBV (e.g., Spanos and Lioukas 2001, Ketchen *et al.* 2007, Porter 2008b, Ali *et al.* 2010, Wheelen and Hunger 2010, Kumar *et al.* 2011).

This argument is reflected in the model of competitive positioning (see Figure 1) developed by Hooley *et al.* (2017). In contrast to researchers who focus on the consecutive steps of the firm's strategic management process to achieve sustainable success (e.g., Barney and Hesterly 2010, Wheelen and Hunger 2010), this model focuses on the continuous evaluation of the firm's choices of which markets to target in order to build a competitive advantage (see Figure 1). The firms analyse their distinct resources and capabilities as well as the relevant market trends such as market growth, the weaknesses of rival firms (to identify opportunities), increased competition and changing consumer needs (to identify threats). The firm can develop a competitive advantage over rival firms that do not apply a market-oriented analysis by combining the two strands (Hooley *et al.* 1998, Hooley *et al.* 2001). The combination of these two strands as represented by the arrows in Figure 1 and is explored in the literature on dynamic capabilities (e.g., Ali *et al.* 2010, Teece *et al.* 2016). This research approach focuses on the firm's capability to respond to identified, external market opportunities. According to Hooley *et al.* (2017), dynamic capabilities can be considered a key for competitive advantage in a dynamic competitive environment, because it allows the firm to respond to identified market opportunities by adapting its strategic choice of targeted markets – that is, competitive positioning.



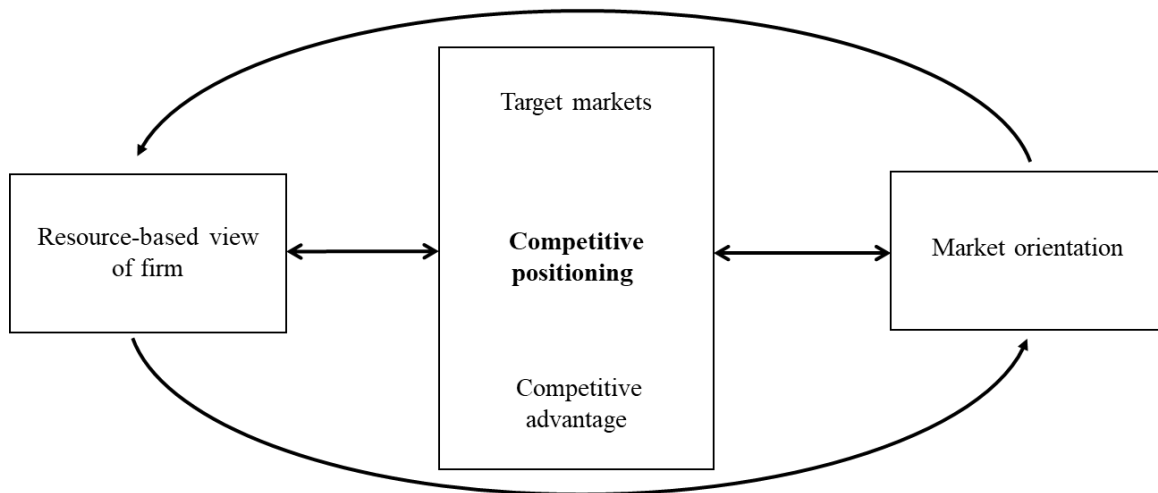


Fig 1. Competitive positioning (Hooley *et al.* 2017, p.136)

## 2.2 Resource-based view of elite sport systems

The analysis of national elite sport systems attracts much interest in the sport management literature. While some researchers have attempted to identify the key determinants of success in national elite sport policies in order to improve international sporting success (e.g., Oakley and Green 2001, Digel *et al.* 2006, De Bosscher *et al.* 2008, De Bosscher *et al.* 2015), others have examined elite sport systems in a broader political and historical context (e.g., Green and Houlihan 2005, Bergsgard *et al.* 2007, Houlihan and Green 2008, Andersen *et al.* 2015). Some researchers have analysed the national elite sport systems of a specific sport, such as athletics, cross country skiing, triathlon or tennis (e.g., Böhlke 2007, Newland and Kellett 2012, Phillips and Newland 2014, Truyens *et al.* 2014, Brouwers *et al.* 2015).

However, researchers have only recently begun referring to the RBV when analysing the competitive advantages of nations. Robinson and Minikin (2012) examine the organisational resources and capabilities of NGBs in three nations of the Pacific region. These authors argue that NGBs are the main resources for National Olympic Committees (NOCs) to build a competitive advantage. They focus their RBV analysis on eight areas: governance; management; physical resources, human resources; finance; communications; sport activity; and cultural, attitudinal and behavioural values. Truyens *et al.* (2014) use an RBV to examine

the manageable resources and capabilities of 24 nations in athletics by interviewing high-performance directors and elite coaches. In contrast to the first set of authors, Truyens *et al.* (2014) used as a starting point of their analysis the nine pillars of a framework known as the Sports Policy Factors Leading to International Sporting Success (SPLISS) (De Bosscher *et al.* 2008). The nine SPLISS pillars<sup>2</sup> are: *financial support; governance, organisation and structure; sport participation; talent identification and development; athlete support; coach development and provision; training facilities; (international) competitions; and research and innovation.* Similar to Truyens *et al.* (2014), other researchers have referred to this framework to compare and operationalise the national elite sport systems of tennis (Brouwers *et al.* 2015) and judo (Mazzei 2016). These authors conclude that sport-specific resources and capabilities can be classified according to the basic policy areas of the nine pillars that frame national elite sport systems.

While the studies discussed above analyse sport-specific systems of competitive nations drawing on the SPLISS-framework to explain their international sporting success in a given sport, this paper refers to the nine policy areas to examine the internal factors that are analysed by NSAs to identify sports to be targeted from an RBV perspective. The use of the SPLISS framework follows Winand (2014) and O'Boyle (2015) who argue that it is amongst the most comprehensive approaches used to operationalise elite sport policies and compare elite sport systems.

### *2.3 External factors determining national success at the Olympic Winter Games*

Although there is no validated framework to refer to when conducting market-orientated analyses in sports management, there is evidence that nations analyse specific factors of their external competitive environment at the Olympic Games. For example, NSAs analyse the

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<sup>2</sup> For a fuller explanation of the nine pillars framing the Sport Policy factors Leading to International Sporting Success (SPLISS), we refer to De Bosscher *et al.* (2010).

number of medal-winning possibilities in each sport separately (e.g., Reiche 2016, Zheng and Chen 2016). These possibilities are commonly measured by the *increase in the number of Olympic events per sport*, and hence the *number of medals contestable* in every Olympic sport (e.g., Shibli *et al.* 2013). The number of medals that are actually contestable by a nation in a sport is limited in the *Rules for Qualification* and *the Rules of Competition*. Whereby the IOC regulates, in collaboration with the relevant international federations (IFs), the maximum number of athletes a nation can enter in each event (i.e. IOC-starting quota). In team events, only one team per nation can start, while in individual events, three or four athletes per nation can compete for the three medals awarded by the IOC. The governing documents are published two years prior to every Games for each sport and discipline (e.g., FIS 2012, IBU 2012, ISU 2012). These regulations reduce the possibilities for dominant nations to win all medals in a sport (e.g., Baimbridge 1998, Szymanski 2003, Houlihan and Zheng 2013, Weber *et al.* 2017). In addition, there is evidence that nations compare the *number of rival nations* that are sufficiently competitive to win medals in particular events to prioritise the funding of sports (e.g., Houlihan and Zheng 2013, Reiche 2016, Zheng and Chen 2016).

There are good reasons for NSAs to examine the factors determining the *macroeconomic competitiveness* of the nations who are likely to be their rivals in particular winter sports. This is because a high gross domestic product (GDP) per capita and a cold climate have been identified as being particularly significant determinants of success at the Winter Games (e.g., Johnson and Ali 2004, Andreff and Andreff 2011, Otamendi and Doncel 2014, Forrest *et al.* 2017). Forrest *et al.* (2017) argued for example that differences in the correlations between medal performance and GDP per capita might help countries to identify less-expensive summer sports such as weightlifting, judo or boxing, in which a nations could increase its competitiveness at relatively low costs. Similar to the competitive environment of firms (e.g., Hooley *et al.* 2001, Grant 2008, Barney and Hesterly 2010, Wheelen and Hunger 2010, Vining

2011), these external factors are outside the short-run control of the NSAs, but relevant when making strategic decisions about which sports to target.

Finally, several authors have found evidence that *hosting the Games*, or being a neighbour of a host nation, is a significant success factor. One reason may be the familiarity of the athletes with the competition venues, which are often built for the Games (e.g., Balmer *et al.* 2001, Johnson and Ali 2004, Shibli *et al.* 2012). This external factor might become even more important, due to Agenda 2020 (IOC 2014). The Agenda foresees that the local organising committee for the Olympic Games (OCOG) may propose new sports or events to be included in the Olympic programme. As a consequence, the IOC (2016) provided Japan with more influence on the Olympic Programme for the Tokyo 2020 Summer Games. This strengthening of the OCOG has been formalised in the Olympic Charter (IOC 2015), which allows the hosting nation to adjust the Olympic programme to their own favour and thereby influence the external competitive environments of every other nation competing at the Games for Olympic medals.

In summary, reflecting the model of Hooley *et al.* (2017), the sports literature provides internal sport-specific policy areas and external environmental factors that can be evaluated by NSAs in preparation for targeting decisions. An overview of these factors identified in the literature is included in Appendix.

### **3. Method**

This study applies the basic model of Hooley *et al.* (2017) to frame the data of the internal and external factors that NSAs analyse to target Olympic winter sports and align their funding. The underlying assumption of this approach is that strategic targeting relates to a competitive advantage in elite sports.

### 3.1 Sample

The sample consists of NSAs in countries that performed among the top ten nations at the Sochi 2014 Winter Games: Russia (won 33 medals), United States (28), Norway (26), Canada (25), the Netherlands (24), Germany (19), Austria (15), France (15), Sweden (15) and Switzerland (11). Russia was excluded from the research because of language difficulties and strong doping accusations during and after this study. The NSAs of Austria and France decided not to participate. In total, decision-makers from seven of the top ten nations were interviewed. The four nations listed below the dotted line in Table 1 were added in a second step because the seven interviewees considered them to act particularly strategically (Australia [3], Great Britain [4] and New Zealand [0]<sup>3</sup>). Finland (5) was included as a traditional winter sports nation and because of the well-established relations between the researchers and the NSA that facilitated the contact with decision-makers. This sequential sampling method was applied because external validation is considered particularly critical in the strategic management literature (Short *et al.* 2002), and because the knowledge of insiders was required to locate people for this type of study (e.g., Biernacki and Waldorf 1981, Noy 2008). The 11 examined nations won 38% of the 294 medals awarded by the IOC at the 2014 Sochi Games.

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<sup>3</sup> *New Zealand* did not win any medals at the 2014 Sochi Games, but had four top eight places.

Table 1: Sample of National Sport Agencies and position of interviewed decision-makers.

Nation	Rank /	National Sport Agency	Position
	Medals		
United States	2 / 28	US Olympic Committee (USOC)	Head of Performance and Intelligence Unit
Norway	3 / 26	Olympiatoppen	(Deputy) Director of High Performance Unit
Canada	4 / 25	Own the Podium (OTP)	(Deputy) Director of Partnerships & Operations
Netherlands	5 / 24	Nederlands Olympisch Comité* Nederlandse Sport Federatie (NOC*NSF)	Head of Performance and Intelligence Unit
Germany	6 / 19	Deutscher Olympischer Sportbund (DOSB)	Project Manager of elite winter sports
Sweden	9 / 15	Riksidrottsförbundet (RF)	(Deputy) Director
Switzerland	10 / 11	Swiss Olympic	(Deputy) Director of High Performance Unit
Finland	19 / 4	Suomen Olympiakomitea	(Deputy) Director of High Performance Unit
Britain	20 / 4	UK Sport	(Deputy) Director of High Performance Unit
Australia	22 / 3	Australian Institute of Sport (AIS)	Head of Investments
New Zealand	27 / 0	High Performance Sport New Zealand (HPSNZ)	Head of Performance and Intelligence Unit

*Note:* the nations below the dotted line were sampled sequentially.

### 3.2 Procedures

After the 2014 Sochi Games, a senior decision-maker within the NSA of each sample nation was contacted by email and phone through Swiss Olympic, the SPLISS network or the Federal Office of Sports in Switzerland. The interviewees were selected according to their position within the organisation, their profound insight into the management processes of their NSAs, and their availability and willingness to participate in this study.

### 3.3 Data Collection

The data were collected in 2015 and 2016 by recording semi-structured, face-to-face or Skype interviews. The four main sections of the interview schedule were: (1) a general description of the strategic approach, (2) the internal and external analysis, (3) strategy formulation and (4) evaluation and control. The probing questions were *open-ended* to avoid yes/no answers, and they were formulated as *non-suggestive*. Formulating the questions was difficult due to the gap in knowledge about economic concepts and definitions between the interviewer and the decision-makers. The opening questions were therefore broadly formulated (e.g., Hsieh and

Shannon 2005, Fereday and Muir-Cochrane 2006). For example, the question reflecting the external analysis was: Could you describe which aspects of the development of the competition at the Olympic Winter Games, and in the Olympic disciplines, you monitor and analyse to target sports? This approach was chosen to avoid influencing the answers by using *a priori* defined technical terms and respective response categories in the interview grid, and thereby possibly diminishing social desirability bias in the answers (e.g., Flick 2007, Kuckartz 2012). Five of the 14 pre-defined questions focused on the development of the NSA's strategy in general, while four questions concentrated on the external and internal factors examined by the NSA to make targeting decisions. Depending on how the interview evolved, more specific questions were asked which reflected the policy areas derived from the sports literature. For example, a question referring to the macroeconomic competitiveness of rival nations in a sport asked: What aspects of the rival nations that compete in the sports that your NSA targets, do you analyse? The explorative interview was first pilot tested with representatives of the NSAs of Great Britain and the Netherlands for validation.

The validated grid was then sent to the interviewees in advance, along with an outline of the research purpose and the terms of confidentiality. This procedure was chosen to reduce the decision-makers' concerns about sharing their strategic approaches and to enhance the response rate. Since strategy is seen as a possible source of competitive advantage and is easy to copy, managers are generally very reluctant to share information. An additional precaution relates to the terms of confidentiality and the sparse use of quotes when presenting the results. Direct quotes were not used in the study unless the interviewee gave its explicit permission. In consequence, the data were analysed and presented in a rather quantitative way by counting the number of quotes per factor.

### 3.4 Data Analysis

The collected data were transcribed in full sentences, and then imported and coded using MAXQDA software for qualitative data analysis. As proposed by Fereday and Muir-Cochrane (2006), and by Hsieh and Shannon (2005), the list of nodes was deductively created from the literature review before the data analysis started. The resulting codebook consisted of nine pre-defined first-level nodes reflecting the nine SPLISS pillars (De Bosscher *et al.* 2015) for coding the data of the internal factors (i.e. RBV). The six external first-level nodes identified in the sports economics literature (e.g., Johnson and Ali 2004, Andreff and Andreff 2011, Otamendi and Doncel 2014, Forrest *et al.* 2017) were used for coding the external factors (i.e. MBV) (see Appendix).

Additional first-level nodes were created inductively when coding the data. This form of coding is a hybrid approach (Hsieh and Shannon 2005, Fereday and Muir-Cochrane 2006, Flick 2013), in which deductive and inductive coding are combined to efficiently extend the existing theory and identify higher-level themes to enhance the understanding of the researched phenomenon.

The process of inductive and deductive reasoning was repeated until no further nodes emerged. To improve the rigour of the analysis, the data for every first- and second-level node were extracted and recorded in separate lists, and then re-read to enhance the validity and reliability of the analysis (e.g., Flick 2007, Kuckartz 2012). Finally, when all transcripts were coded, the nodes were rearranged and clustered to identify higher-level themes by inductive reasoning.



## 4. Results

In the first section, Figure 2 frames the sampled NSAs' targeting approaches. It combines the analysis of internal and external factors to target sports, and the process of continuously reviewing the allocation of national resources.

In the second and third sections, the results for the external and internal factors are detailed in Table 2 and 3. Illustrative quotes are provided to demonstrate the content, after they were anonymised by referring to the policy-makers using random letters from (A) to (K).

### *4.1 Positioning of NSAs by targeting identified sports*

Two different phases can be identified in the targeting approaches of NSAs. The first focuses on the identification of the sports to be targeted in the beginning of the Olympic cycle and the prioritisation of their financial resources, while the second focuses on the continuous evaluation of resource allocation during the funding cycle. Figure 2 captures this procedure by combining the analysis of internal and external factors clustered in higher-level themes.

The first phase marks the start of a new funding cycle and the NSA's upcoming Olympic campaign. It is the basic strategy of every NSA to rank sports or NGBs on a scale from one to three, or one to five. According to the interviewees, this ranking is an indication of the identified potential of a sport to produce medals at the upcoming Games. Some NSAs support these Olympic medal potential sports directly through nationally coordinated programmes rather than indirectly through NGBs. The decision-makers were reluctant to share the tools they apply to collect the internal and external factors and how they used these to drive their targeting strategies. Two interviewees mentioned the use of a software program, while only one decision-maker explained their NSA's evaluation grid and the weighting used. To identify their NGBs' specific needs, nine out of eleven decision-makers ask each NGB to formulate their own action or business plans in every targeted sport for the upcoming funding cycle, including goals and budgeting. The NSAs then formulate a four-year funding agreement with the NGB of each

target sport and thereby prioritise their nationally coordinated resources, aligning them with sport-specific needs.

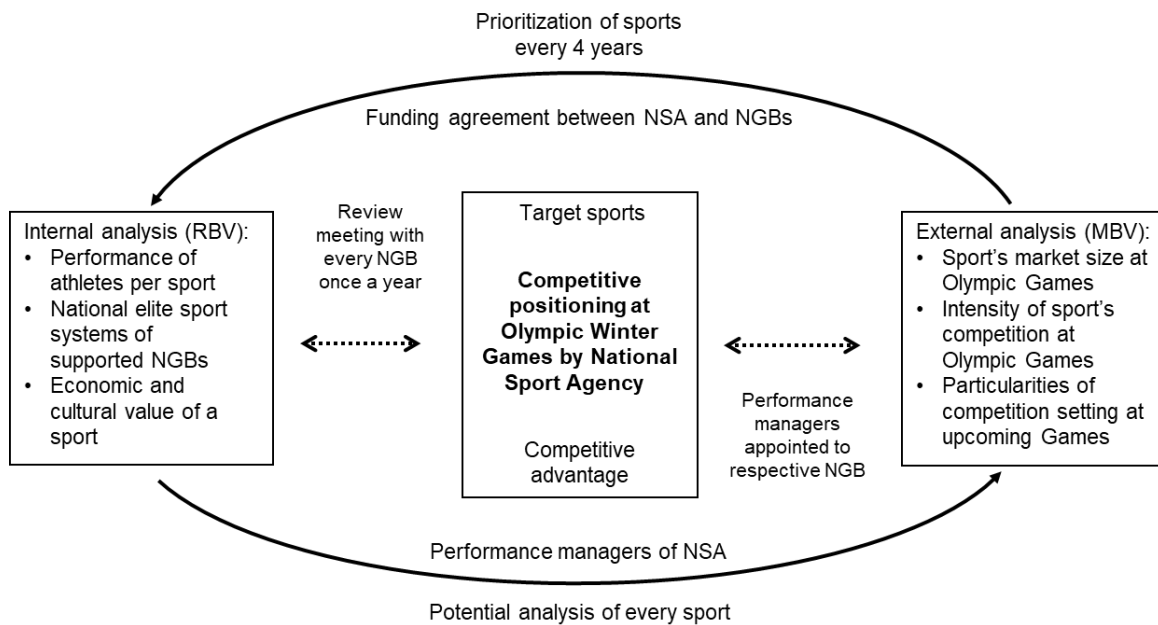


Fig 2. Framework of NSAs' strategic positioning by targeting Olympic winter sports (adapted from Hooley *et al.* 2017)

Ten decision-makers said they organise an annual review meeting between the staff of the NSA that is responsible for the elite sport strategy, and the respective NGB's performance director(s), head coaches and other NGB staff. In some nations a representative of the government attends. Every decision-maker reported that their NSA employs three to four performance managers that support and advise the NGBs (or winter sports). They visit national and international competitions or training camps to continuously collect and update their information onsite and by talking to athletes and coaches. Decision-maker (D) explained that these performance managers "are experienced, either former coaches or high-performance directors in various sports". Interviewee (B) clarified that their NSA's performance managers "are tracking against the milestones that they [i.e. NGBs] had indicated at the beginning of that funding cycle, to understand, if there are changes, either up or down, that we need to adjust". This continuous evaluation and control of their target sports to allocate the national resources most effectively is represented by the dotted arrows in Figure 2.

The ultimate consequence of this evaluation is that funding can be cut either after the Games, or even during the four-year agreement. This occurs if the NGBs do not provide the feedback as expected, and/or do not perform as projected in the ongoing campaign.

#### *4.2 Internal analysis from RBV*

This section describes the factors that NSAs monitor internally to target sports and consequently prioritise resources. Table 4 shows the three main themes that were identified by inductive reasoning: *performance of athletes per sport* (I), *elite sport systems of supported NGBs* (II) and *cultural importance and economic value of a sport* (III). The pre-defined nodes from the SPLISS pillars were mentioned by at least eight out of eleven interviewees when analysing their NGB's sport system, with the exception of sport participation (pillar 3 in SPLISS). Seven new factors were identified (shown in italics in Table 4), which were not derived from the literature: leadership was included in the NGBs' organisational tasks (see II in Table 4), while the remaining four items reflect the first and third higher-level themes.

The results show that the most important higher-level theme used to make targeting decisions is the analysis of the performances of athletes per sport in different types of competitions. Eight NSAs mentioned that they analyse World Cup results on a regular basis, using a sport's analytic database like Gracenote Podium<sup>4</sup> or other self-managed databases. It is used to monitor the results of every supported sport, and to track the performances of their athletes during the year. Interestingly, every NSA reported that they go beyond a performance analysis to compare and identify the sports to be targeted. Decision-maker (G) explained that their questions asked, which determine their nation's financial and non-financial support for a sport, are not focusing on the top athletes only, but include: "What are the funding decisions

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<sup>4</sup> Gracenote Sports is a company that collects and edits global sports performance data and with *Podium Performance* provides a software to analyse it.

inside the sports? What is the quality of the coaching education and also the high elite culture behind the sports?”

It is notable that ten out of eleven interviewees explained that their NSAs examine the athletes' daily training environments of the sports they intend supporting, and the direct services that are provided to athletes (e.g. availability of competition infrastructure, quality of the coaching). Furthermore, NSAs commonly evaluate the NGBs' organisational arrangements (e.g. finance & governance, research & development, talent ID & development, and management of [national] competition). Remarkably, four decision-makers mentioned that their NSAs also evaluate leadership within their NGBs when making funding decisions. According to decision-makers (C) and (K), leadership is one of their key performance indicators, and it is therefore evaluated on the same level as quality of coaching, or the daily performance environment in a sport. Decision-maker F explicated the importance of stability in an NGB's governance and leadership for their NSA, because after unsuccessful Games, “there are tendencies of big changes, people are leaving. That is not necessarily a good thing, because it means that you basically have to start over again”.

Furthermore, three interviewees stated that their NSAs examined the *elite sport cultures* of their NGBs. They are looking at their NGBs processes and commitment to be the best in every aspect when developing potential medal-winning athletes. This includes for example comparing the budget that is appointed to elite sport versus sport for all and the appointed professional staff for elite sports. Furthermore, these NSAs analyse if medal success is culturally rooted by analysing their tradition of medal performance in international competitions.

Table 2: Overview of clustered, internal factors analysed by NSAs to target sports (i.e. RBV)

Themes	Sub-themes	1 <sup>st</sup> level coding items	Mentioned (%)	2 <sup>nd</sup> level coding items	Mentioned			
Performance of athletes per sport (I)	Performance at Olympic Games	<i>Olympic Games</i>	11 (100%)	<i>Number of top 3 and top 8 places</i>	11			
				<i>Final rank of athletes</i>	3			
	Performance at international competitions during the Olympic Cycle (e.g. qualification competitions)	<i>World Championships (11)</i>	11 (100%)	<i>Number of top 3 places</i>	11			
				<i>Personal best of athletes</i>	3			
				<i>Final rank of athletes</i>	2			
Elite sport system of supported NGBs (II)	Athletes' daily training environment	Athlete support (SPLISS Pillar 5)	11 (100%)	<i>Performance development of athletes during season</i>	7			
				<i>World Cup points won by athletes</i>	2			
				<i>Medical support services (doctors, physiotherapists)</i>	11			
				<i>Sports science (training, nutrition, etc.)</i>	6			
				<i>Dual career services (education/working and sports)</i>	3			
				<i>Daily training data of NGB's athletes</i>	1			
				<i>International standard of facilities</i>	5			
				<i>Availability and accessibility</i>	5			
				<i>Centralised or decentralised training facilities</i>	5			
				<i>Quality and professionalisation of coaches</i>	5			
				<i>Number of coaches</i>	3			
				<i>Quality of NGB's coaching education</i>	2			
				NGB's organisational tasks	Governance, organisation & structure (Pillar 2)	9 (82%)	<i>Budget of NGBs</i>	8
							<i>Funding decisions within NGBs (e.g. towards elite sport)</i>	2
							<i>Revenues of NGB</i>	2
<i>Good management of processes &amp; programmes</i>	3							
<i>Staffing structure reflecting NGB's goals</i>	3							
<i>Professionalisation of personnel</i>	3							
Research & innovation (Pillar 9)	9 (82%)	9 (82%)	<i>Composition of NGB's Board</i>	1				
			<i>Bringing together scientists and sports experts</i>	6				

				Technology development and data analysis	5
		Talent ID & development (Pillar 4)	9 (82%)	Reflecting athlete's pathway from talented to elite	8
		(International) Competition (Pillar 8)	6 (55%)	International potential of talents	4
				Size of talent pool	1
				Schedule of competitions for athletes during the year	3
				Sport hosting major sports events	2
		<i>Leadership and elite sport culture of NGB</i>	4 (36%)	Performance at major domestic competitions	1
				<i>Stability of NGB's leadership</i>	2
				<i>Quality / professionalisation of NGB's leaders</i>	2
				<i>High-performance culture within NGB</i>	2
Cultural importance and economic value of a sport (III)	Cultural-related sporting performance	<i>Longstanding success of sport</i>	3 (36%)	<i>History of medal wins at Olympic Games</i>	3
		Sport participation (Pillar 3)	3 (27%)	Number of clubs	3
		<i>Economic value</i>	1 (9%)	Number of active members in clubs	1
				<i>Volume of national sales of sport's equipment</i>	1

*Note:* Factors that have been added to the codebook during the coding process are shown in italics. Pillars refer to the original SPLISS model (De Bosscher *et al.* 2008)

### 4.3 External analysis from MBV

This section deals with the factors of the external competitive environment that NSAs examine to target sports and drive their funding decisions. The results presented in Table 3 confirm the relevance of the six pre-defined external factors derived from the literature. Three new factors were inductively identified. Through inductive reasoning, three higher-level themes emerged: the *sport's market size* (I), the *intensity of sport's competition* (II) at the Olympic Games, and the *particularities of the competition setting* (III) at upcoming Games.

It is noteworthy that every decision-maker pointed out the need to monitor changes to events in the Olympic winter programme for the upcoming Games. Some interviewees also reported that their NSAs attempted to predict the future development of sports and disciplines based on the Olympic Charter. As stated by decision-maker (C): “We are working closely with our international relations team to identify what changes one can expect to the programme, so that we can be ready to flex our investment”. He explained that they expected that more mixed events would be included in the Games, because in the Agenda 2020, the IOC emphasised youth-oriented sports and gender equality. In consequence, an NSA's investment approach needs to be flexible to be able to react promptly to changes in the events programme through optimising their allocation of resources. It is also notable that eight interviewees declared that their NSAs identifies modifications in the rules of qualification and competition. For example, regarding the IOC quota system, they decide on the number of athletes that NGBs could enter per sport to prioritise resources. Three decision-makers mentioned the necessity to monitor changes to the technical regulations of the sports equipment, to be able to ask NGBs how they plan to respond to these changes. Furthermore, five policy-makers stated that they also include information on the number of medals awarded per sport to estimate the number of medal-winning opportunities when making targeting decisions.

Seven decision-makers explained that their NSAs evaluated the competition they are competing in, measured by the number of rival nations in a targeted sport, or the number of competing athletes. Additionally, five interviewees reflected also on the macroeconomic competitiveness of their rival nations, and three decision-makers mentioned that they analysed the domination of events by certain nations to estimate their own chances of increasing the number medals they could win. Decision-maker (J) referred to the Dutch dominance in ice skating: “Looking at the dominance and the lap-times that their athletes are doing, and just how far we are away. What is realistic and what is not realistic for our environment?” Decision-maker (K) explained the use of the churn of medal-winning nations between Games to identify whether there were “specific events, where a country would always dominate, or whether new countries pop up”, in order to estimate their own chances of succeeding in these competitions. Hence, there is evidence that NSAs estimate the intensity of the international competition to identify weaker events when making targeting decisions of sports. Furthermore, all NSAs identified nations to benchmark their performances and elite sport systems against. In doing so, they considered population size and wealth, outstanding Olympic performances and if these nations were direct rivals to win medals in targeted sports. Some NSAs evaluated the sport-specific competition elements of rival nations, such as: pushing time in bobsleigh, or difficulty level of scores in figure skating or snowboarding. Interviewee (D) explained that they look at “the difference between the medal winners and where our athletes currently stand. That gap analysis is a fairly common tool that most nations use, and certainly we do as well”. All decision-makers explained that their NSA collected information on foreign elite sport systems in meetings and through personal contacts (e.g. Chef de Mission Meeting at the Olympic Games). In order to improve their market intelligence, some NSAs had set up intelligence units that closely collaborated with their NGBs to collect and process valid information. Sometimes the NSAs are supported by affiliated research institutes. Examples of such institutes include the Institute for Applied Training Science (IAT) in Germany and the Swiss Federal Institute of



Sport Magglingen (SFISM). Other strategies sometimes used by NSAs are to hire coaches from rival nations, or to organise training camps with competitive nations to benchmark their sports. Decision-maker (C) explained the use of such information when evaluating their target sports: “We are looking for every sport to tell us what it actually takes to win, so that they are not just competing blindly, but they absolutely know what it takes.”

Finally, eight decision-makers explained that their NSAs examined conditions in the host country of the upcoming Games, in regard to the living circumstances for their athletes (e.g. accommodation, food and climate), the characteristics of the newly built competition venues, and the enhanced efforts of the home nation in the sports they are going to target. Decision-maker (I) stated that the NSA “finances training camps in the hosting nation” to allow the athletes to accommodate.

In summary, the results show that every NSA is concerned with investing its resources in an optimum way, and therefore continuously monitor and control their targeted sports. To steer this process during an Olympic cycle, the crucial roles of the NSAs’ performance managers were to collect and process valid internal and external information on the supported sports in the first phase, and to review them in the second phase of their targeting strategies. Finally, the results also show that the NSAs led the nations’ targeting strategies. However, they rely heavily on internal and external intelligence provided by their supported NGBs.

Table 3: Overview of clustered, external factors analysed by NSAs to target sports (i.e. MBV)

Themes	Sub-themes	1 <sup>st</sup> level coding items	Mentioned (%)	2 <sup>nd</sup> level coding items	Mentioned
Sport's market size at Olympic Games (I)	Competition per Olympic sport as governed by IOC	Change of Olympic programme	11 (100%)	Identify new events of upcoming Games, or events removed	11
				Anticipate development due to Agenda 2020 (e.g. team-, mixed-events)	2
				Compare new disciplines to traditional ones	2
				Enhance skills in disciplines that possibly grow	1
				Changes of quota places / distribution of quota places	6
		Rules of qualification and competition	8 (73%)	Changes in the technical competition rules	3
				Qualification criteria (number of points)	1
				Number of athletes' support personnel	1
				Opportunities to win medals	4
				Number of medals available per sport	5 (45%)
Intensity of sport's competition at Olympic Games (II)	Identifying weak international competition	Depth of field of competing nations (Macro-economic) competitiveness of rival nations per sport	7 (64%)	Number of rival nations per sport	6
				Number of athletes competing	1
				Rival nations with important financial resources and population	5
				Winter climate to train	1
				International competitiveness of nations within a sport	1
	<i>Domination of events</i>	3 (27%)	<i>Nation dominating a discipline or event over time</i>	3	
			<i>Churn of nations winning medals</i>	1	
			<i>Performance analysis of comparable / dominant rival nations</i>	11	
			<i>Gap analysis of performance level to win an Olympic medal</i>	6	
			<i>State of the art of specific performance elements in a sport to win medals</i>	4	
Analysis of selected nations	<i>Performance analysis of selected countries</i>	11 (100%)	<i>Performance tracking of rival nations per sport (e.g. top 3, top 8)</i>	2	
			<i>Formalised or informal exchange with policy-makers of other nations</i>	11	

				<i>Information provided by NGBs or affiliated research institutes on selected nation's elite systems of a sport</i>	6
				<i>Training with other nations</i>	3
				<i>Hiring foreign coaches of competitive nations</i>	2
Particularities of competition setting at upcoming Games (III)	Understanding particularities of competition related to the respective host nation	Nation hosting the Games	8 (73%)	Exchange with policy-makers of upcoming host nation (e.g. visits)	8
				Analysis of competition venues	3
				Benchmarking of host nation's elite sport system	2
				Analysis of food and climate	2

*Note:* Factors that have been added to the codebook during the coding process are shown in italics.

## 5. Discussion

The results provide evidence that the NSAs of successful winter sports nations apply a targeting approach that combines an analysis of internal and external factors to identify which sports to target and how to prioritise their financial resources accordingly. This strategy shows some similarities with the competitive positioning of firms as described by Hooley *et al.* (2017). It involves making judgements about each sport at the beginning of an Olympic funding cycle, and monitoring them during the cycle. However, given that NSAs can be classified as non-profit organisations, or quasi-public, mandated organisations (e.g., De Bosscher *et al.* 2011, Robinson and Minikin 2011, O'Boyle and Hassan 2014), there are some issues which need to be discussed, when applying to them a model derived from business theory.

NSAs base their decisions mainly on an extensive performance data analysis. This result refers to Shilbury (2012) who stated that measuring performance is consistent with elite sports, and therefore widely accepted by NGBs, athletes and coaches when prioritisation decisions are taken. This is relevant because, according to Stone and Cutcher-Gershenfeld (2002), measuring performance of non-profit or quasi-public organisation is typically less evident than it is in firms and more difficult to be compared. In sports, the performance data of athletes (e.g. time, rank or final score) are well-documented and therefore easy to take into account. This study found that NSAs use performance data for three managerial decisions: firstly, to prioritise sports; secondly, to monitor the progress of their supported sports or NGBs during the Olympic cycle; and thirdly, to predict the expected number of medals to be won at the upcoming Games. The databases used to collect and analyse performances are the main tools used in the NSAs' decision-making. This strategic process is similar to the extensive evaluation and control commonly applied in firms (e.g., Barney and Hesterly 2010, Wheelen and Hunger 2010). The performance managers act as intermediaries between the NSAs and their appointed portfolios of NGBs, and thereby play a key role in the annual assessment of each sport. Additionally,

NSAs collaborate very closely with their supported NGBs to target sports. This is because NGBs manage their sport-specific systems and they possess the resources and core capabilities needed to produce medal-winning athletes. This because, in contrast to firms, the production of elite sport success by an NSA involves many stakeholders of the elite sport system (e.g. government, NSA, NGBs, athletes and coaches), who provide financial and non-financial resources (e.g. human resources, infrastructure).

A comprehensive performance data analysis after every Olympic Games is used as the ultimate measure to identify those sports, which were able to build a competitive advantage over their rival competitors. Therefore, the relevant performance factors are clustered in a discrete higher-level theme of the RBV. This study provides evidence that NSAs consider the nine policy areas identified in the SPLISS framework when making strategic targeting decisions and thereby adds to studies that use the SPLISS pillars to compare sport-specific elite sport systems between nations (e.g., Truyens *et al.* 2014, Brouwers *et al.* 2015, Mazzei 2016). NSAs analyse the resources and capabilities of their NGBs' in these policy areas to align the nationally coordinated finances and human resources like athletes' training and medical services, or scientific expertise in sport-specific performance areas. This includes also non-financial resources like subsidised contingents for NGBs to allow their athletes to train in national training centres. These financial and non-financial national resources are allocated by the NSAs according to the respective NGBs' action plans agreed on. Additionally, the importance of leadership and elite sport culture within the NGBs has been highlighted by decision-makers, which supports the call by Ferkins and Sihlbury (2015) to intensify research on governance and leadership in elite sport organisations.

In regard to the importance of using market-oriented analysis to build a competitive advantage, this study highlights that every NSA scans its external competitive environment with regard to new sports, disciplines or events being included (or replaced) in the forthcoming Games. This analysis from a MBV will become even more important in the near future because

the IOC (2015) formalised the Olympic Charter to empower the local OCOG to propose new sports and events (i.e. every four years). Therefore, the importance of hosting the Games will increase and the Olympic programme will change more frequently. Furthermore, NSAs analyse the elite sport systems of selected rival nations that either dominate the overall medal table or target the same sports. They examine their rivals' elite sport systems from a MBV perspective to make judgements on their chances of winning medals, given their own elite sport environment and the respective NGBs resources and capabilities.

Reflecting strategies to increase a nation's medal counts as described in the literature (e.g., Houlihan and Zheng 2013, Reiche 2016), NSAs aim to identify events that are characterised by weak international competition. For example, they scrutinise new nations entering the medal market or measure the churn of medal-winning nations. By using this MBV and combining it with the RBV to examine their supported sports or NGBs, NSAs can implement two general strategies. In their traditionally strong sports, they can try to crowd out the new nations, which are possibly weaker, because they have not yet established a sport system that continuously produces Olympic success. In new sports or disciplines they have decided to target, they analyse the gap between their athletes' performances and the performances of medal-winning athletes in order to estimate their own potential, and the resources needed by the sport or NGB to build up the capabilities needed to close that gap.

Due to the complexities involved in conducting a comprehensive internal and external analysis, in practice, NSAs adopt a more elaborate RBV. The internal data of the sport-specific resources and capabilities required by NGBs to produce Olympic success is easier to collect than external market intelligence. This finding is consistent with the extensive sports management literature, which compares national elite sport systems from an inside-out perspective to describe a nation's competitiveness (e.g., Digel *et al.* 2006, Bergsgard *et al.* 2007, De Bosscher *et al.* 2008, Houlihan and Green 2008, Andersen *et al.* 2015, De Bosscher *et al.* 2015).

This strategy implies the capability of NSAs to identify sport-specific resources that are valuable, rare and difficult for rival nations to imitate (i.e. VRIN characteristics), to build a competitive advantage. Some internal factors identified in this study (i.e. internal theme II and III) partially fulfil these characteristics, such as *technology development, hosting major sport events, quality of coaches and sports leaders* or the discipline's *history of medal success*. However, any identified factors that reflect the *performance of athletes per sport* (internal theme I), hardly mirrors the VRIN characteristics. Nevertheless, this latter theme is the most important one that is analysed by NSAs when prioritising financial resources amongst sports disciplines. This result is in line with the finding of Truyens et al. (2014) that the identified resources in athletics do not necessarily need to represent the VRIN characteristics to contribute to a nation's competitive advantage. Of greater importance is how NSAs use this intelligence and how they configure their resources and core capabilities. These results call for a more in-depth examination on how NSAs collect, analyse and interpret performance data of their talents and athletes to develop the capability to deliver a competitive advantage, for example in talent identification or monitoring of training stimulus. Meanwhile, this finding exemplarily highlights the challenge of applying a management techniques derived from mainstream strategic management.

Additionally, an enhanced market-oriented analysis of the Winter Games and the build-up of the dynamic capability to include such market intelligence in their targeting strategy, can support nations in the application of a more strategic approach. Thereby, NSAs can secure their nation's competitive advantage over the long run. This latter argument refers to the specification of researchers that a MBV is particularly valid for firms competing in a dynamic competitive environment (e.g., Ketchen *et al.* 2007, Kumar *et al.* 2011). Finally, this research adds evidence to other studies that professional sports organisations are aligning with traditional business practices of firms (e.g., Shilbury and Ferkins 2011, Nagel *et al.* 2015, O'Boyle 2015). Reflecting the literature that classifies NSAs as non-profit or quasi-public organisations (e.g.,

De Bosscher *et al.* 2011, Robinson and Minikin 2011, O'Boyle and Hassan 2014), the findings point to the limits of applying a management perspective derived from mainstream economics and to adopt it to the analysis of NSAs. Meanwhile, this study identifies the room for improvement in strategic decision-making to develop a competitive advantage by NSAs, compared to firms.

## **6. Conclusion and implications**

The transfer of the competitive positioning model developed by Hooley *et al.* (2017) is suitable for framing the targeting approach of NSAs and allows for internal factors to be distinguished from external factors that can be strategically analysed. The research approach draws on other studies that have adopted the managerial perspective of firms that apply an internal and external analysis to examine the prioritisation approach of resources in public and non-profit organisations (e.g., Nutt and Backoff 1987, Bryson 1988, Moore 2000, Joldersma and Winter 2002, Todnem and Macleod 2008). By contributing evidence from the research field of sports organisations, this management perspective adds to the research on national elite sport systems (Green and Oakley 2001, Green and Houlihan 2005, Digel *et al.* 2006, Bergsgard *et al.* 2007, Houlihan and Green 2008, e.g., Andersen *et al.* 2015, De Bosscher *et al.* 2015), and studies analysing the competitive advantage of nations from a RBV (e.g., Robinson and Minikin 2012, Truyens *et al.* 2014).

Future directions for the analysis of competitive advantage in elite sports could reflect on the strategic management literature on building up dynamic capabilities to react promptly to the identified market changes (e.g., Eisenhardt and Martin 2000, Ali *et al.* 2010, Teece *et al.* 2016). This is valid in elite sports, because the IOC (2015) policy will strengthen those NSAs, which show a strategic agility to target new sports or even specific events, and possess the organisational capability to effectively re-allocate resources amongst their sports or NGBs, even during an Olympic cycle (i.e. dynamic capability). With further reference to the literature of the



human resources of front-line employees, which collect valid market intelligence (e.g., Ali *et al.* 2012, Teece *et al.* 2016), the particular role of the NSA's performance managers offers a promising approach for further investigation. Moreover, an analysis of nations in the mid-range of the medal table, who are, according to Houlihan and Zheng (2013), particularly constrained by their limited resources to act strategically, might offer fruitful insights on the measures implemented to build up medal-winning resources and capabilities in disciplines to be newly targeted.

Finally, this study contains some limitations that suggest areas for future research. As in other studies, social desirability bias (Flick 2007, Kuckartz 2012) in the responses could not fully be excluded. Since it is commonly agreed on that strategic management decisions improve performance (Barney and Hesterly 2010), a failure to act strategically might be perceived by the interviewed decision-makers as an undesirable result. Nevertheless, all interviewees explained that their NSA's approach could be more strategic, but efforts towards a stronger non-compromise approach on winning more medals were perturbed, for example, by the larger political considerations by the public funding organisations (e.g., support of culturally important sports), as well as the need for a consensus in the NSA's general assembly. This points to an implicit assumption that NSAs aim at increasing, or stabilising at least, their nation's Olympic medal success when targeting sports. This has some justification, however, a coming analysis could take into account the NSA's goals beyond winning more medals (e.g. winning medals in showpiece events, improving the public recognition of elite sport).

Furthermore, this study points out the need of case studies to examine the decision-making process within an NSA in more detail. Referring to the literature on comparing national elite sports systems (Green and Oakley 2001, Green and Houlihan 2005, Digel *et al.* 2006, Bergsgard *et al.* 2007, Houlihan and Green 2008, e.g., Andersen *et al.* 2015, De Bosscher *et al.* 2015), there is reason to assume that the leading role of the NSA in national decision-making differs between competitive winter sports nations. The role of the government in implementing

national elite sport policy needs a particular research focus. In this regard, the study of Lucidarme *et al.* (2017), on the governmental power in relation to the public investment in elite sports, provides a promising approach. Additionally, further research should focus on the role of the NGBs in the national decision-making and their own elite sport strategies (e.g., Bayle and Robinson 2007, Winand *et al.* 2011, Robinson and Minikin 2012, Winand *et al.* 2013, Nagel *et al.* 2015). Such case studies need to select nations pragmatically, based on the public access to the relevant policy documents and the willingness of decision-makers of the NSA and the NGBs to participate. Hence, these findings and limitations outline the scope of research to be addressed in the near future.

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## Appendix

### Literature overview of manageable internal factors and given external factors determining national success at the Olympic Winter Games

Internal Factors	Sports Management Literature
Finance	9 Pillar-model of sports policy factors leading to international sporting success (Truyens <i>et al.</i> 2014, Brouwers <i>et al.</i> 2015, De Bosscher <i>et al.</i> 2015); Organisational resources of national elite sport (Digel <i>et al.</i> 2006); Processual and specific factors contributing to elite sport success: Case of China, France, Germany, New Zealand and Norway (Houlihan and Green 2008); Performance pillar of organisational elements including: record keeping, accounting and planning (Robinson and Minikin 2012).
Governance, organisation & structure	9 Pillar-model of sports policy factors leading to international sporting success (Truyens <i>et al.</i> 2014, Brouwers <i>et al.</i> 2015, De Bosscher <i>et al.</i> 2015); Organisational resources of national elite sport (Digel <i>et al.</i> 2006); Processual and specific factors contributing to elite sport success: Case of China, Japan, Poland (Houlihan and Green 2008); Performance pillar of ‘governance’ and ‘communication’ including: rules and regulations, policies and strategic planning as well as methods used to communicate (Robinson and Minikin 2012).
Sport participation	9 Pillar-model of sports policy factors leading to international sporting success (Truyens <i>et al.</i> 2014, Brouwers <i>et al.</i> 2015, De Bosscher <i>et al.</i> 2015).
Talent ID & development	9 Pillar-model of sports policy factors leading to international sporting success (Truyens <i>et al.</i> 2014, Brouwers <i>et al.</i> 2015, De Bosscher <i>et al.</i> 2015); Organisational resources of national elite sport (Digel <i>et al.</i> 2006); Processual and specific factors contributing to elite sport success: Case of Germany, Japan and New Zealand (Houlihan and Green 2008); Performance pillar ‘sport activity’ including: development programmes (Robinson and Minikin 2012).
Athlete support	9 Pillar-model of sports policy factors leading to international sporting success (Truyens <i>et al.</i> 2014, Brouwers <i>et al.</i> 2015, De Bosscher <i>et al.</i> 2015); Organisational resources of national elite sport (Digel <i>et al.</i> 2006); Processual and specific factors contributing to elite sport success: Case of France, Germany, Japan, Norway, Poland, United States and New Zealand (Houlihan and Green 2008); Performance pillar ‘sport activity’ including: athlete preparation (Robinson and Minikin 2012).
Coach provision & development	9 Pillar-model of sports policy factors leading to international sporting success (Truyens <i>et al.</i> 2014, Brouwers <i>et al.</i> 2015, De Bosscher <i>et al.</i> 2015); Organisational resources of national elite sport (Digel <i>et al.</i> 2006); Processual and specific factors contributing to elite sport success: Case of New Zealand (Houlihan and Green 2008); Performance pillar of ‘human resources’ and ‘sport activity’ including: type, diversity, planning and management practices as well as development programmes and training (Robinson and Minikin 2012).
Infrastructure	9 Pillar-model of sports policy factors (Truyens <i>et al.</i> 2014, Brouwers <i>et al.</i> 2015, De Bosscher <i>et al.</i> 2015); Organisational resources of national elite sport (Digel <i>et al.</i> 2006); Processual and specific factors contributing to elite sport success: Case of China, Germany, Japan, New Zealand and Norway (Houlihan and Green 2008); Performance pillar of ‘physical resources’ including: access to and availability of facilities (Robinson and Minikin 2012).
(International) competition	9 Pillar-model of sports policy factors leading to international sporting success (Truyens <i>et al.</i> 2014, Brouwers <i>et al.</i> 2015, De Bosscher <i>et al.</i> 2015); Organisational resources of national elite sport (Digel <i>et al.</i> 2006); Processual and specific factors contributing to elite sport success: Case of China, Japan, Poland, New Zealand and Norway (Houlihan and Green 2008);

Performance pillar of 'sport activity' including: competition (Robinson and Minikin 2012).

Research & innovation  
 9 Pillar-model of sports policy factors leading to international sporting success (Truyens *et al.* 2014, Brouwers *et al.* 2015, De Bosscher *et al.* 2015); Organisational resources of national elite sport (Digel *et al.* 2006); Processual and specific factors contributing to elite sport success: Case of Germany, Norway, Poland, New Zealand, Norway and United States (Houlihan and Green 2008); Performance pillar of 'physical resources' and 'communication' including: access to and availability of equipment as well as technology available for communication (Robinson and Minikin 2012).

<b>External Factors</b>	<b>Sports Economics and Sports Management Literature</b>
Increase of Olympic events	Targeting new sports as a strategy to increase success (e.g., Houlihan and Zheng 2013, Reiche 2016, Zheng and Chen 2016); Increase of new sports and disciplines within the Olympic winter programme (Chappelet 2002, Kempf <i>et al.</i> 2014).
Number of medals available per sport	Predicting medals at Olympic Winter Games (Johnson and Ali 2004, Andreff and Andreff 2011); Analysing Performance of Nations (e.g., Shibli <i>et al.</i> 2013).
Rules of qualification & competition	IOC quota system to handicap dominant nations at the Summer Games (e.g., Baimbridge 1998, Szymanski 2003, Houlihan and Zheng 2013); IOC governing policy influencing outcome of competition at the Winter Games by newly introducing team- and mixed events (Weber <i>et al.</i> 2017).
Number and performance of rival nations in the respective sport	Predicting medals at Olympic Winter Games (Andreff and Andreff 2011); China's Strategy to increase Olympic success by evaluating less popular sports (Zheng and Chen 2016).
(Macro-economic) competitiveness of the rival nations in the respective sport	Competitiveness of nation based on macro-economic determinants and partially the elite sport system (e.g., Johnson and Ali 2004, Andreff and Andreff 2011, Otamendi and Doncel 2014, Forrest <i>et al.</i> 2017) Differences between the correlation values of medal success of nations and GDP per capita, per sport, to identify less expensive sports (Forrest <i>et al.</i> 2017).
Nation Hosting Winter Games	Predicting medals at Olympic Winter Games (e.g., Balmer <i>et al.</i> 2001, Johnson and Ali 2004, Otamendi and Doncel 2014).