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RESEARCH ARTICLE

The early bird catches the worm: The impact of first-mover advantage on long-term elite team sport success

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Abstract

The research on success factors in elite sport focuses primarily on the one hand to sport in its entirety and on the other hand to the prediction of success in individual sporting events, especially in soccer. In this paper, we investigate the existence of a first-mover advantage for national team sports, which has a long-term impact on a nation's success in a sport. To this end, we hand-collected data for soccer and rugby and analyzed our sample concerning a first-mover advantage. To do this, we examined the relationship between the date of establishment of each national sports association and later success as measured by the country's world ranking. We check for the essential macro determinants such as GDP per capita and population. Our study shows empirical evidence that the first-mover advantage has a stronger effect on the success of a state in a team sport than the macro factors mentioned. In this way, we complement previous research on team sports by considering a hitherto neglected effect, a long-term perspective and by including rugby.

JEL CLASSIFICATION

L83, M20, Z20, Z21

1 | INTRODUCTION

If we look at the success of national teams in team sports, which to a certain extent reflect the level of performance that the country in question has in this sport, the impression arises that some countries are particularly successful in certain sports and have dominated these sports for a long time. While Germany or Brazil are associated with successful soccer teams, similar observations can probably be made for basketball (USA) or ice hockey (Soviet Union/Russia).

Meanwhile, there is a large number of empirical studies that analyze the factors influencing sports success on an elite level (see, e.g., Wunderlich et al., 2021) and especially in soccer (see, e.g., Andreff & Scelles, 2021).

However, what has not yet been sufficiently investigated, is whether first-mover effects are the cause of success in a country's

sport (Daumann et al., 2021). Therefore, the aim of this article is to examine whether a first-mover advantage is a decisive reason why certain states are dominant in certain sports over a long term. We limit our research to two popular team sports, namely soccer and rugby.

Our contribution expands the previous empirical studies on the topic of determinants of the sporting success of nations, which are primarily synchronic and compare the strategies of different states in narrow time windows or which rather have a prognostic aim and intend to predict a nation's success in a single sport event such as the Soccer World Cup, with a diachronic perspective, that is, a perspective in which the development over time plays a crucial role. In particular, our data show for two disciplines that the importance of common macro factors such as gross domestic product per capita and population has less explanatory power than the first-mover advantage, which

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determines the success of a state in a sport over a long period of time. In addition to soccer, we also include rugby in the study, for which studies on the determinants of success at the macro-level have so far been lacking.

The paper is structured as follows: In Section 2, we will give a brief overview of the literature on success determinants in sport in general and in soccer in particular. Besides, we will describe the concept of first-mover advantages in general and concerning sports particularly. Section 3 provides empirical evidence using the examples of soccer and rugby. In Section 4, we discuss the results and point out important limitations of our results. Finally, Section 5 summarizes the most important findings of our study and gives hints for further research.

2 | THEORETICAL BACKGROUND

Studies on the determinants of the sporting success of states are now quite numerous. First of all, we identify papers that deal with the success of nations across all sports. There are also studies focusing on team sports and, in particular, on soccer. In addition to these two strands of research, in this section we want to briefly go into the theoretical foundations of the first-mover effect as a further explanatory variable and finally transfer these findings to team sports.

2.1 | Factors of sporting success across all sports

According to De Bosscher et al. (2006), international sporting success of nations can be traced back to three categories of factors. These categories include factors on the macro, on the meso-level and on the micro-level. While at the macro-level, factors such as Gross Domestic Product per capita, population size, and socio-cultural conditions can be identified, the meso-level factors include, particularly, sports policy. Micro-level factors relate to the athlete and his/her close

environment (for an overview see, e.g., Wunderlich et al., 2021). Furthermore, De Bosscher et al. (2006) identify overlapping drivers between the macro and the meso-level which are summarized under the term “environment of the sport system.” The latter includes besides others “the role of the education system,” “the private sector as a partner in sport” especially “the elite sports culture and the tradition of certain sports in a country” (De Bosscher et al., 2006).¹ The most important factors are pointed out in Table 1.

Empirical analyses show that macro-level factors can explain over 50% of the variance of a country's international elite sporting success (see, e.g., Bernard & Busse, 2004; De Bosscher et al., 2003, 2006; Johnson & Ali, 2004). In addition, De Bosscher et al. (2006) state that the overlapping factors between the macro and the meso-level “potentially have a huge effect on elite sports development.”

However, meso-level factors apparently have only little explanatory power for sporting success (Jacobs, 2014). Based on the preliminary work by De Bosscher et al. (2006), who provide a theoretical framework for recording national sports policies with nine pillars, which were further differentiated into a total of 100 success factors on a small-scale level, for example, a large-scale empirical study (SPLISS) (De Bosscher, 2016) examined the effects of these factors on the sporting success of a nation. The guiding principle was that precisely these factors can be influenced in a targeted manner by a national sports policy. Various empirical papers show that individual states strategically use the parameters available to them in order to achieve competitive advantages and thus generate sporting success, thereby fueling the global sporting arms race (De Bosscher et al., 2008, 2015; Oakley & Green, 2001). In a branch of research based on the findings of strategic management and in particular those of the resource- and competence-based view, relevant resources and capabilities are determined, national strategies are identified, and their success is evaluated (Truyens et al., 2014; Weber et al., 2019). For example, Zheng and Chen (2016) show that the People's Republic of China was very successful in the Olympic Games by targeting sports described by the characteristics “small,” “fast,” “women,” “water;”

TABLE 1 Classification of the determinants of athletic performance. Source: De Bosscher et al. (2006) and Truyens et al. (2014)

Level	Macro-level	Overlap between macro- and meso-level	Meso-level	Micro-level
Category	Social and cultural context in which people live	Environment of the sport system	Sports policies and politics	Individual athlete and his close environment
Attributes	Economic welfare Population Geographical and climate variations Degree of urbanization Political system Cultural system	Role of the education system Private sector as partner in sports Elite sports culture and the tradition of certain sports in a country Mass media as promoter of interest in sport Audience as a sounding board	Financial support Integrated approach to policy development Sport participation Talent identification and development system Athletic and post career support Training facilities coaching provisions and development National and international competition Scientific research and sports medicine support	Parents Friends Coaches Genetics

and “agile.” Other empirical studies compare the sporting success of nations that choose a prioritization approach with those that base their sport policies on a diversification approach (Weber et al., 2017; De Bosscher et al., 2019).

Admittedly, such comparative empirical analysis of elite sports between the various countries has considerable methodological problems (De Bosscher, 2016; Dowling et al., 2018; Henry et al., 2005), since it is likely that not all influencing factors can be sensibly recorded and measured. Besides that, in all of these considerations, it must be taken into account that sporting success is success in competition and is therefore based on relative strength and not necessarily on absolute strength. In such a system, probably no finding is more accurate than Hayek's (1964) insight that in complex systems, at best, only pattern predictions can be made.

2.2 | Factors of sporting success in team sports using the example of soccer

To sufficiently flesh out the general success factors for the discipline(s) considered in our analysis, we look at soccer, not least because, to the best of our knowledge, no comparable studies can be identified for rugby. As far as leagues are concerned, the insights gained in the field of soccer play a prominent role: while in individual sports the performance of the individual athlete is in the foreground, in team sports the environment of the athletes is of greater importance (Andreff & Scelles, 2021): Concerning the team, the efficiency of the coordination between the individual team members as well as the relationship between the players and the coaches or the support staff have an impact on the sporting outcome. Furthermore, the socio-economic environment including the education and training conditions of the players, the availability and quality of appropriate sports facilities, the quantity and quality of the team management, and the monetary and nonmonetary incentives of the players seem to be crucial.

Meanwhile a large number of empirical studies deal with the topic of the success of nations in soccer (see for an overview, e.g., Andreff & Scelles, 2021; Scelles & Andreff, 2019; Rockerbie, 2016). The most influencing factors are as follows:

Size of the talent pool: It is assumed that since the national teams have to rely on local players, a larger population also implies a larger talent pool and this in turn is associated with higher performance. The size of the population of the respective country is regularly used as a proxy for this. Empirical studies regularly come to the conclusion that the population has a significant positive effect on the athletic performance of the respective national team (e.g., Allan & Moffat, 2014; Berlinschi et al., 2013; Hoffmann et al., 2002; Houston & Wilson, 2002; Kuper & Szymanski, 2012; Leeds & Leeds, 2012; Papanikos, 2015; Scelles & Andreff, 2019; Yamamura, 2009, 2012).

Economic resources: The basic assumption is that a country's higher economic performance means that, on the one hand, individuals can direct more time and other resources into competitive sport and, on the other hand, that the state and the national sport

organizations have more resources at their disposal to improve the training possibilities and the medical services necessary for the athletes (Gelade & Dobson, 2007). In addition, researchers assume that there exists a declining marginal benefit. The GDP per capita or its square is regularly used as a proxy. Here, the studies also regularly conclude that GDP per capita has a positive and significant impact on athletic performance (Allan & Moffat, 2014; Berlinschi et al., 2013; Gelade & Dobson, 2007; Kuper & Szymanski, 2012; Leeds & Leeds, 2012; Macmillan & Smith, 2007; Papanikos, 2015; Yamamura, 2009). In line with the assumption of declining marginal benefits of further economic resources, literature shows that the sporting performance of a country correlates statistically significantly negatively with the square of GDP per capita (Hoffmann et al., 2002; Houston & Wilson, 2002).

The country's tradition in soccer: The assumption is that countries with a longer tradition had a longer time window at their disposal “to gain tactical expertise, organizational skills, and competitive intelligence” (Gelade & Dobson, 2007). As a proxy for the tradition, studies use the year of foundation of the national soccer association (e.g., Berlinschi et al., 2013; Macmillan & Smith, 2007), the duration a nation has been a FIFA member (Houston & Wilson, 2002; Yamamura, 2009, 2012), the age of the federation (Allan & Moffat, 2014; Gelade & Dobson, 2007), the year of the first international game (Macmillan & Smith, 2007), or the number of games played by a country in its history (Kuper & Szymanski, 2012). Here, too, the expected influence on performance is regularly shown in a statistically significant way.

The quality of soccer in the country: Some studies base their investigations on the assumption that a higher quality of soccer playing in the respective country contributes to a higher performance of the national team. Proxies to measure the quality are, for example, the number of World Cup appearances (Houston & Wilson, 2002; Yamamura, 2009, 2012), the performance of each country's soccer teams in the main club competitions (Berlinschi et al., 2013; Leeds & Leeds, 2012), the number of Youth World Cup Appearances (Houston & Wilson, 2002), the number of players playing abroad (Gelade & Dobson, 2007), and affiliation to the different confederations and the political system (Leeds & Leeds, 2012; Papanikos, 2015). In this context, the empirical studies come to different conclusions: While Houston and Wilson (2002) can demonstrate a statistically significant positive effect on a nation's athletic performance in terms of the number of World Cup appearances, Yamamura (2009) cannot confirm this result. Similar results can be found with the other proxies.

Climate: Studies show that the relatively high physical demands of the players can best be met at a temperature of 14°C (Hoffmann et al., 2002). Higher or lower temperatures are detrimental to athletic performance and affect the popularity of outdoor sports. Extreme deviations from 14°C discourage potential young players from pursuing such a sport (Hoffmann et al., 2002). We can observe regularly a statistically significant influence of temperatures on a country's athletic performance (Allan & Moffat, 2014; Berlinschi et al., 2013; Hoffmann et al., 2002; Macmillan & Smith, 2007; Scelles & Andreff, 2019).

In addition, other factors are discussed, which, however, relate more to the prediction of the outcome of individual events (a world championship etc.), such as home advantage (Scelles & Andreff, 2019).

2.3 | Theory of first-mover advantages

In economics literature, the term first-mover advantage describes a positive effect on the competitive position that arises for a market participant by offering a product or service before other competitors (Haucap & Dewenter, 2006; Mueller, 1997). The original protagonists of this concept—Lieberman and Montgomery (1988)—emphasize three main advantages and four disadvantages associated with the first-mover position:

One of the advantages of a first-mover company is the technological leadership that it gains. In this way, the company that first manages to enter the market succeeds in attaining technological leadership in which it can implement learning curves and build up market entry barriers in the form of patents. Newcomers are hindered by these factors to enter the markets because the entry costs rise.

The second advantage is that the first mover has initial access to scarce resources, input factors and location. Thus, the first-mover deters followers from entering the market.

Thirdly, they emphasize an advantage that arises from the existence of switching costs and the specifics of the purchase decision under uncertainty. Market followers must therefore invest additional resources to acquire new customers when switching costs exist. When customers have to make a decision under uncertainty, they tend to buy the pioneer's product.

Hsiao et al. (2017) emphasize a fourth aspect in that early movers have time advantages in developing and improving the technology and management in relation to their core competencies. This has a positive impact on the early movers' ability to bring new products to market.

These advantages are offset by corresponding disadvantages. For example, it may be noted that players entering the market later can learn from the pioneer's mistakes, while the pioneer has no blueprint (Haucap & Dewenter, 2006). Furthermore, the market followers have the option to free ride: companies that enter the market later can benefit from the investments of the first mover. In this way, they can obtain relevant technological knowledge through its patents and use the existing infrastructure (Lieberman & Montgomery, 1988). Additionally, they can start with the information about the products that consumers have gained through the first mover.

Another disadvantage of the first mover is that the phenomenon of technological and market uncertainty has already disappeared with the successors. The risk of entering the market is, therefore, lower for the successor. Additionally, changes in technology and consumer behavior can create a disadvantage for the first mover. The first mover must always react to the technological changes and the changes in the needs of the customer that arise when a new market entry takes place. If the first mover fails to respond appropriately, he or she will lose his or her position as market leader.

Empirical studies have dealt extensively with the first-mover effect. Tsuchihashi (2015) reviews the empirical literature and concludes that the majority of the studies confirm a first-mover advantage. The remaining studies show that the advantage is rather small or disappears over time. Against this background, especially internal resources and market conditions seem to have a high impact on the success.

That the advantage is not limited to specific industries and that the research can basically be extended to new industries is shown by recent studies that focus, for example, on the first-mover effect in block-chain startups (Park et al., 2020), on online IT service markets (Yao et al., 2020) and on customer evaluation (Kirjavainen et al., 2022). However, other recent studies completely deny such an effect (Xie et al., 2021).

Overall, and this is also shown in the broad literature, the advantages of early market entry probably outweigh the disadvantages (Mueller, 1997; Vidal, 1995), so that in the following we want to focus on the economic causes of this positive effect.

2.4 | First-mover advantage in team sports

Studies of the first-mover effect at the level of countries in the field of sport have not yet existed besides the preliminary study of Daumann et al. (2021). However, this investigation is limited to professional team sports that are played in leagues. Of course, some of the studies listed under Section 2.2 take into account phenomena such as the category *a country's tradition in soccer*, which is closely related to a potential first-mover effect.

The concept of first-mover advantage can be applied to team sports, with countries taking on the role of companies.² Similar aspects can be found at the country resp. league level as at the company level.

The first-mover advantage has an effect on the general success factors of athletic performance, especially on the meso-level factors and the overlap between the macro and meso-level factors. With regard to team sport-specific insights into success factors, the first-mover advantage impacts the country's tradition in a specific sport, the quality of the sport in the country and exploitation of the talent pool.

Countries which introduce a specific team sport early gain a technological lead by developing successful skills in human capital formation (Daumann et al., 2021). In this way, training centers can be set up for coaches and athletes, in which previous experience in exercise science can be passed on and supplemented with innovative elements. A process of continuous improvement is initiated, which is necessarily time-dependent. In the field of exercise science or in the construction of sports facilities, learning curves are also emerging. With increasing production, learning curve effects set in for a nation, for example, in relation to optimal training and competition planning, so that the average costs for the sport produced decrease with increasing volume and the specialized nation can produce more cost-effectively per unit (Spence, 1981). Generally, therefore, league-specific capital is built up

at the level of the country concerned, in which experience curves occur (Daumann et al., 2021). In this way, the first-mover advantage has an impact on the following meso-level factors: Training facilities, coaching provisions and development, scientific research, and sports medicine support. In addition, this should also be accompanied by experiences of a relevant, efficient sports policy (integrated approach to policy development) and an appropriate design of athletic and post-career support. In terms of specific success factor research, the technological lead has a particular effect on the quality of practicing the sport in a country.

The first-mover state has further advantages in the use of resources, that is, in particular in the markets for human capital (coaches, athletes, sports managers). Players play the most important role in this. Frick and Wicker (2015) as well as Mutter and Pawlowski (2014) show that international success—and this is to be expected in a first-mover league—increases the willingness of the population to engage in this sport at an amateur level. This gives the league the opportunity to access a more extensive talent pool. International migration to the first-mover league is also conceivable and increases the talent pool, too.

In addition, the first-mover league can hope for a corresponding demand. Consuming the entertainment service in question presupposes knowledge of the rules of sport. Corresponding specialization takes place on the demand side by building consumption capital (Stigler & Becker, 1977) in this sport (Flatau & Emrich, 2016). With increased consumption, consumers improve their knowledge of this particular sport and thereby accumulate consumption capital, enabling them to better understand this sport and subsequently derive greater benefit from its consumption.

On the one hand, the initial access to scarce human resources like players, coaches, spectators affects the meso-level factors of sport participation and talent identification. In addition, there are also effects in the overlap area, namely in the acquisition of the private sector as a partner in sports, the sports culture and tradition, the role of the mass media and the audience as sounding boards. In the area of sport-specific success factors, the economic resources, the talent pool and a country's tradition are particularly affected.

A high level of sport-specific consumption capital increases the costs of switching to other sports and also increases the risk for the consumer of finding comparable benefit in another sport. How big these hurdles are can be seen in the examples of baseball or American football, which occupy a dominant position in the United States, but have been so far unsuccessfully fighting to establish themselves in Europe. In this respect, this fact has an effect on financial support (meso-level) and economic resources (sport specific factors).

The last aspect to consider is that early mover states can develop and improve core competencies in the areas of technology and management in a relatively early stage (Hsiao et al., 2017). This can mean, for example, that in such first-mover countries an efficient interaction between the various institutions involved in the production of sporting performance (state, research institutes, associations, clubs, athletes) evolves, which gradually develops further or that appropriately specialized research institutions are founded at an early stage, which contribute to the accumulation of relevant knowledge in the field of exercise science.

This in turn affects all aspects of the meso-level or the overlapping area. In the field of sport-specific factors, this primarily influences the quality of sporting activities. Figure 1 depicts the interaction of the various determinants.

On the other hand, corresponding disadvantages for first-mover states can also be identified (Daumann et al., 2021). In this way, competitors can learn from the mistakes of the first mover. For example, it could be considered a mistake to choose certain organizational forms of a league, such as that of the single entity league. This fact is superimposed a little on the second disadvantage: For example, later leagues can benefit from the experience of the first mover by trying to copy its recipe for success, insofar as the relevant necessary information is available. The remaining disadvantages of the first mover should not play an important role in leagues. Thus, consumption capital relates to a country; if a league in the same sport is to be established in another country, this requires that the corresponding consumption capital must be built up from scratch in that country. Likewise, the problem that newcomers introduce technological changes and then displace the first mover should be insignificant,

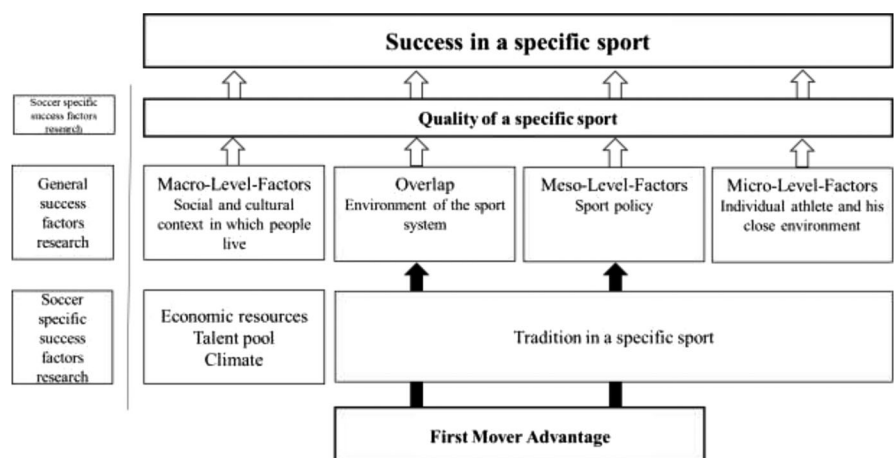


FIGURE 1 Interdependence of success factors and first-mover advantage

especially since other leagues rarely appear in other countries due to the national league principle.

Given this theoretical background and based on the concept of first-mover advantage, we hypothesized that an early implementation of a team sport in a country leads to a better long-term performance of the national team in international competitions.

As we have seen, different proxies are used in the literature to capture the “extent” of a country's tradition in the sport in question, which is congruent with the implementation of that sport in a country. These proxies are, for example, the year of foundation of the national soccer association, the duration a nation has been a FIFA member, the founding year of the first clubs and so on. The first-mover advantage and the effects on which it is based (in this context especially the technological leadership, the initial access to scarce resources and the time advantage in developing and improving technology and management in relation to their core competencies) assume a certain level of penetration of a country with the corresponding sport. This means that larger sporting competitions, which are necessary for initiating technological progress in team sports, have to be organized in a country. Against this background, it cannot be assumed that individual clubs will be able to initiate a first-mover advantage of the necessary breadth. We have therefore decided to use the founding year of the national federation as a proxy, since the formation of such an organization requires that there has been a certain degree of penetration of the country by the sport in question.³

National sports associations provide the organizational structures for league-based team sports within a country. Therefore, the founding year of a national sports association is a decisive operationalization of the time of implementation of sports in a country.

H1. The longer a national association in team sports exists, the more successful it is.

To measure sporting success, we will use the world ranking position as a proxy.

As mentioned above, according to empirical studies, macro-level factors explain a large amount of variance in a country's international elite sporting success (see, e.g., Andreff & Scelles, 2021; Bernard & Busse, 2004; De Bosscher et al., 2003, 2006; Johnson & Ali, 2004). Therefore, the effects of the founding year of the national sports association on the world ranking (as a measure of sporting success) will be controlled for the macro-level variables Gross Domestic Product constant per capita (GDP constant per capita) and population size.

We omitted the control variable climate and quality of the sport in question in the country. We have left out the climate, as this effect is becoming increasingly negligible due to the constructing sports facilities, some of which allow cooling down to the optimum temperature. Besides that, the climate has different effects in the different sports. We left out the quality of the sport in the country as a control variable because, while it is useful for predicting the outcome of individual events, it is the dependent variable for a long-term view like ours.

3 | METHODOLOGICAL BACKGROUND

3.1 | Data and variables

To test our hypothesis, we collected data for men's national teams for soccer (FIFA) and rugby (IRB). We chose FIFA and IRB because the ranking is also available for the last decades on the homepages of the federations. The past world ranking data, for example, for basketball (FIBA), volleyball (FIVB), handball (IHF), or ice hockey (IIHF) was not available on the homepages of the federations.

3.2 | Dependent variable

As a measure of the long-term success of a country, we used the world ranking position. The data of all variables were hand-collected for the years 1992, 1994, 1996, 1999, 2002, 2004, 2006, 2009, 2012, 2014, 2017, and 2019 for FIFA. For IRB, there were no data for the years 1992 to 2002. A country was included in our analysis if it occupied a world ranking position in at least one of the considered years. Since we analyzed the data until 2019, the data during the COVID-19 pandemic were excluded from the analysis.

The world rankings for FIFA are provided monthly by the website of FIFA (2021a) and collected in a time frame from November 2020 to October 2021. Concerning rugby (IRB), we retrieved the ranking lists from the website of the International Rugby Federation (2021a) in October 2021.

3.3 | Predictors

As an operationalization of the time of establishment of a sports within a country, the founding years of the national association were included as a predictor in the data analysis. The founding years of the national associations were collected from the FIFA homepage (FIFA, 2021b) on the 29th of October in 2020. For IRB, we assessed the data from the IRB homepage (IRB, 2021b) and the homepages of the continental federations (Oceania Rugby, 2021; Rugby Africa Unions, 2021; Sudamérica Rugby, 2021) on the 3rd of April in 2021. For IRB, missing founding dates were supplemented using Wikipedia.

Furthermore, the gross domestic product (GDP) constant per capita (World Bank, 2021) (in constant 2010 US dollars) and the population size (in millions) (International Monetary Fund, 2021) were used as predictors in our analysis.

3.4 | Statistics

All statistics were done using *r* (version 4.1.2). The effects of the predictors founding year, GDP constant per capita, and population size on the dependent variable world ranking position were modeled for each sports federation, separately. To account for the dependencies in the data, multilevel models were built with multiple observations

TABLE 2 FIFA: Effects of founding year, GDP constant per capita, and population size on the world ranking position. The effects were modeled using multilevel models with observations (data of different years) nested within countries. All predictors were centered around the grand mean.

	Secondary analysis		Primary analysis
	Model 1: partial GDP	Model 2: partial population	Model 3: final
	Estimate (<i>p</i> value)	Estimate (<i>p</i> value)	Estimate (<i>p</i> value)
Fixed effects			
Intercept	99.420 (<.001)	80.175 (<.001)	91.314 (<.001)
Founding year			0.794 (<.001)
GDP constant per capita	0.001 (.117)		0.000 (.877)
Population		-0.576 (.009)	0.077 (.388)
Mean GDP constant per capita (mean within each country, level 2 predictor)	-0.001 (<.001)		-0.001 (.044)
Mean population size (mean within each country, level 2 predictor)		-0.092 (.049)	-0.172 (.018)
Mean GDP constant per capita × mean population size			-0.000 (.148)
Random effects (SD)			
Intercept	55.905	53.611	55.110
GDP constant per capita	0.003		0.004
Population size		1.692	0.298
Residual	21.192	21.802	20.717
Sample size			
Number of observations	2072	1888	1841
Number of groups (countries)	190	170	168

Note: Significant effects are set in bold.

(first level) nested within countries (second level). For FIFA, GDP constant per capita and population size were modeled as random effects. Since the IRB model did not converge, for IRB a random intercept model was used. Additionally, the mean GDP per capita and the mean population size within each country as well as the interaction effect were included as second-level variables.

In a secondary analysis, we also analyzed two partial models with GDP constant per capita and its mean within countries (model 1) and population size and its mean within countries (model 2) as predictors.

All predictors were mean-centered to provide meaningful intercepts and main effects. All effects were considered significant if the *p* values were smaller than $\alpha = 5\%$.

4 | RESULTS

For FIFA, the results are listed in Table 2. According to the partial models (model 1), the mean GDP constant per capita of each year (the variance between countries) is associated with the ranking position ($p < .001$). A

higher GDP constant per capita corresponds to a better world ranking position. Model 2 (Table 2) shows an effect of population within each country ($p = .009$) and the mean population (differences between countries, $p = .049$) on the world ranking position. Both effects point to a better world ranking position for larger populations. Based on the results of our final model 3 (Table 2), there is an effect of the founding year on the world ranking position ($p < .001$), accounting for the differences in GDP constant per capita and population size. Earlier founding years were associated with better world ranking positions. In the final model, the differences in GDP constant per capita ($p = .044$) and population size ($p = .018$) between countries significantly affected the world ranking position. Here again, a larger population size and a higher GDP constant per capita were associated with a better world ranking position.

For IRB (Table 3), we did not find an isolated effect of GDP constant per capita (Table 3, model 1) nor the population size (Table 3, model 2) on the world ranking position. However, the final model depicts a significant effect of the founding year on the world ranking position ($p < .001$, Table 3), accounting for the differences in GDP constant per capita and population size. Earlier founding years were

TABLE 3 IRB: Effects of founding year, GDP constant per capita, and population size on the world ranking position. The effects were modeled using multilevel models with observations (data of different years) nested within countries. All predictors were centered around the grand mean.

	Secondary analysis		Primary analysis
	Model 1: partial GDP	Model 2: partial population	Model 3: final
	Estimate (p value)	Estimate (p value)	Estimate (p value)
Fixed effects			
Intercept	52.842 (<.001)	51.662 (<.001)	55.429 (<.001)
Founding year			0.564 (<.001)
GDP constant per capita	-0.000 (.136)		-0.000 (.121)
Population		-0.106 (.055)	-0.010 (.736)
Mean GDP constant per capita (mean within each country, level 2 predictor)	0.000 (.748)		0.000 (.349)
Mean population size (mean within each country, level 2 predictor)		0.007 (.860)	-0.043 (.259)
Mean GDP constant per capita × mean population size			-0.000 (.002)
Random effects (SD)			
Intercept	27.1	27.136	18.883
GDP constant per capita	0.001		
Population size		0.108	
Residual	7.51	7.583	7.643
Sample size			
Number of observations	629	516	514
Number of groups	96	79	79

Note: Significant effects are set in bold.

associated with better ranking positions. There was also a significant effect of GDP constant (the interaction effect of GDP constant per capita * population size, $p = .002$): The higher the GDP of a country, the better the world ranking position.

5 | DISCUSSION

Based on the concept of first-mover advantage, we assumed that countries in which leagues in a certain team sport are implemented first or at an early stage have long-term advantages as measured by the world ranking position of the national team. We observed a significant relationship between the founding year and the world ranking position as the dependent variable in both included federations soccer (FIFA) and rugby (IRB). Our results concur with our hypothesis and are in line with the concept of first-mover advantage: The longer a national association in team sports exists (the earlier it was founded), the better the long-term success (the world ranking position) is. The results of our study confirm the preliminary results of a recent study

(Daumann et al., 2021) analyzing the effects of the founding years on the world ranking position of a single year. However, Daumann et al. (2021) analyzed correlations between the dependent variable and one influencing variable but did not account for the relevant meso-level factors GDP constant per capita and population size.

For FIFA, a higher GDP constant per capita and for IRB a higher effect of GDP constant (interaction effect of GDP constant per capita * population size) were significantly associated with a better world ranking position. The population size was a significant predictor for the FIFA world ranking position. Apparently, it is the case that in soccer the financial possibilities and the size of the talent pool have a great influence on the long-term success of the respective national team.

For IRB, GDP constant (the interaction effect of GDP constant per capita * the population size) were significantly associated with a better world ranking position. Here, however, the isolated determinants GDP per capita and population obviously play no role for the success in this sport, but the GDP of the state does. On the one hand, this suggests that the talent pool in the individual countries is not being fully exploited or that talent plays no decisive role in this sport.

On the other hand, it implies that the relative extent of the economic resources are obviously not important. The influence of the GDP on the long-term success of the national team can be interpreted as follows: Apparently, there is a socket effect. This means that a certain amount of investment must be made in this sport, the expansion of which, regardless of the number of people participating, contributes to improving the sporting performance of the national team.

Overall, the analysis of both soccer and rugby shows that the effect of the year of foundation on performance is strongest. This is a strong support of the existence of a first-mover advantage in national team sports for both disciplines.

The interaction of technological leadership, initial access to scarce resources, and the time advantage in developing as well as improving technology and management in relation to their core competencies obviously creates a first-mover advantage in the sports considered in our analysis, which in its impact outshines by far the effects of the size of the talent pool and the economic resources. With our analysis, however, we cannot provide any information on the extent to which these underlying effects are responsible. Against this background, it could be helpful to use proxies that illuminate the impact of the individual effects on which the first-mover advantage is based. This would also be important in order to be able to develop evidence-based recommendations for action for sports policy.

Our analysis is a first approach to investigating the relationship between national success in a sport and the effect of history. Furthermore, it should be discussed whether the establishment of a given sport can be measured by the founding year of the national association. It could be the case that a sport has developed regionally and not nationwide at a high level without a national sports association having been established. However, it can also happen that the national sports association has already been founded, although there was hardly any adequate sports infrastructure. This could have been done with the intention of promoting the development of this sport in the country concerned. Therefore, it could be helpful to search for other tracers of national sports development.

Additionally, our study assumes a largely uniform development of sport in one state. It would also be necessary to investigate whether—especially in territorial states such as the United States or India—some sports are at different regional levels of development. Such considerations play a role especially in states that are successor states of an empire such as the Soviet Union or the Austro-Hungarian dual monarchy.

Moreover, there is also the question of the external validity of the research results and thus the question of the transferability of the results to other team sports or even to individual sports. It should be noted here, of course, that other general conditions can be found in other sports and, in particular, that the demands on the sporting infrastructure can differ entirely.

6 | CONCLUSION

The aim of this study is to investigate whether the well-known first-mover advantage plays a role for the success of national team sports.

We find that countries in which the examined team sports were established at an early stage have a sustainable advantage in sporting competition. The earlier one of the examined team sports was established in a state, the more successful that state resp. its national team performs in this team sport. The reason for this can vary: They can affect the development of the sports infrastructure as well as that of consumption capital. It is also conceivable that initial success will improve the possibilities of recruiting successful players. Obviously, the first-mover advantage affects the meso-level factors for sporting success and the overlap between macro- and meso-level.

Our paper contributes to the literature on first-mover advantages by analyzing the effect on national team sports. With our study, we enrich the the research in this field in two ways: On the one hand, we add another piece to the puzzle of specialization in sports and provide an approach to explain the success of different nations in sports. On the other, we apply the theory of first-mover advantage that is well known from competition and innovation economics to the field of sports and we show that there are several similarities between the management of companies and the decision-making in sports politics.

It is also interesting to find out which factors are decisive for the first-mover advantage in team sports. Research should also consider a divergent regional development in a country—this applies in particular to territorial states.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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ENDNOTES

- ¹ In their 2014 paper, the authors integrate most of the overlapping factors into the meso factors under the item “environmental success factors” (Truyens et al., 2014).
- ² The role of states as “entrepreneurs” can also be found in the literature, which, based on the findings of strategic management, analyzes factors of the sporting success of states (see, e.g., Weber et al., 2019).
- ³ In most countries, the difference in time between the foundation of the first club in the sport in question and the foundation of the national federation is a few years. Only in England, several hundred years lie between these two points in time. Thus, the first football clubs were founded in the 15th century but the Football Association in 1863 (Magoun, 1929).

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