

The world at their feet: a combined historical ranking of nations competing in football and futsal

MOORE, Richard <<http://orcid.org/0000-0002-8865-6746>>, RAMCHANDANI, Girish <<http://orcid.org/0000-0001-8650-9382>>, BULLOUGH, Steven <<http://orcid.org/0000-0001-8836-5853>>, GOLDSMITH, Simon <<http://orcid.org/0000-0002-0271-7772>> and EDMONDSON, Lee

Available from Sheffield Hallam University Research Archive (SHURA) at:

<http://shura.shu.ac.uk/21566/>

This document is the author deposited version. You are advised to consult the publisher's version if you wish to cite from it.

Published version

MOORE, Richard, RAMCHANDANI, Girish, BULLOUGH, Steven, GOLDSMITH, Simon and EDMONDSON, Lee (2018). The world at their feet: a combined historical ranking of nations competing in football and futsal. *American Journal of Sports Science and Medicine*, 6 (2), 49-59.

Copyright and re-use policy

See <http://shura.shu.ac.uk/information.html>

The World at Their Feet: A Combined Historical Ranking of Nations Competing in Football and Futsal

Richard Moore^{1,*}, Dr Girish Ramchandani¹, Steve Bullough¹, Simon Goldsmith¹,
Lee Edmondson¹, Dr Daniel Berdejo-del-Fresno²

¹Sport Industry Research Centre, Sheffield Hallam University, Sheffield, South Yorkshire, England

²Bay Area Futsal Club, San Francisco, United States of America

*Corresponding author: r.moore@shu.ac.uk

Abstract Some elite football players (e.g. Cristiano Ronaldo, Lionel Messi, Neymar and Andres Iniesta) endorse the benefits of futsal and express how it has helped them to develop as football players. This has contributed to an increase in futsal development activity, in some countries, leading to interest into the relationship between the two sports. A lack of research exists to explain the developmental relationship between the two sports, aside from anecdotal evidence from players, coaches and media commentators, some of whom acclaim futsal for its role in developing elite footballers. This study investigates the relationship which exists between the two sports, by providing the first ever combined historical rank of nations competing in futsal and football. The results highlight the most successful nations as well as a 'select group' that appear to be in an advantageous position to develop in future. It also provides indicative evidence as to the relationship between the two sports and recommends that both sports may be able to benefit from a more collaborative approach to development.

Keywords: futsal, football development, ranking, success, FIFA, UEFA, AFC, OFC, CONMEBOL, CONCACAF, CAF, World Cup, European Championships, Copa America

Cite This Article: Richard Moore, Dr Girish Ramchandani, Steve Bullough, Simon Goldsmith, Lee Edmondson, and Dr Daniel Berdejo-del-Fresno, "The World at Their Feet: A Combined Historical Ranking of Nations Competing in Football and Futsal." *American Journal of Sports Science and Medicine*, vol. 6, no. 2 (2018): 49-59. doi: 10.12691/ajssm-6-2-3.

1. Introduction

Football and Futsal are two of the most popular participation and spectator sports in the world. The sports are unique, in that football is played with eleven players on each team in an outdoor setting, and futsal with five players in an indoor setting, using a smaller and heavier ball. The sports are similar insofar that they have some shared rules as well as comparable technical and tactical elements.

Football is the more dominant of the two sports achieving greater worldwide appeal in terms of participation and spectator numbers. For example, the 2014 FIFA Football World Cup attracted a global television audience of 3.2 billion [1] compared with 138.6 million for the 2012 FIFA Futsal World Cup in Thailand. [2]

Some elite football players (e.g. Cristiano Ronaldo, Lionel Messi, Neymar and Andres Iniesta) endorse the benefits of futsal and express how important it was to their own development in football. [3] This has contributed to the recent spike of futsal development activity, in some countries. [4] In turn, this has led to increased media attention, surmising the potential benefits of futsal as a football development tool, primarily because elite footballers have played futsal, during their formative years of development. [5]

Currently, a lack of research exists to explain the developmental relationship between the two sports, aside from anecdotal evidence from players, coaches and media commentators, some of whom acclaim futsal for its role in developing elite footballers. [6] Amongst both the football and futsal community, there is intrigue, that two nations; Spain and Brazil, have achieved unparalleled success in both sports [7]-neither nation were able to win the most recent World Cups, both held in 2016, in futsal or football.

This study aims to take a first step, in investigating the relationship between the two sports, by ranking national success in futsal and football to provide the first combined rank of nations. The study utilises results from all major world and regional tournaments held between 1989 and 2016. Data from 1989 onwards was collected because this was the year when FIFA standardised the sport of futsal, mirroring the international competitive structure of football. [8]

The rationale for this study is to provide evidence of the most successful nations participating in both sports. Confirmation of the leading nations may lead to further research, to identify how football and futsal co-exist in these nations (e.g. socially and developmentally), and stimulate further exploration into the complex relationship which exists between the two sports.

Further investigation in this area is required to provide evidence of 'what works' for all nations that provide opportunities in futsal and football. This particularly

applies to developing nations that are attempting to integrate futsal into an already dominant footballing culture, with the aim of achieving national success by creating an environment to develop players that can excel in both sports.

2. Review of Literature

2.1. Study Rationale

Two nations in particular have sparked interest in the influence of futsal on elite football players as they have achieved unparalleled success in football and futsal. In football, Brazil has won the FIFA World Cup in football five times and the Copa America eight times; the most competitive successes in either competition. [9] Spain won the FIFA World Cup in football for the first time in 2010. [9] They have since won the UEFA European Championships three times, including two of the last three competitions. [10]

Brazil is also the most successful nation in futsal winning the FIFA World Cup five times and the South American futsal Championship, which later became the Copa America, nineteen times. [11] Spain is the second most successful nation after Brazil, winning the FIFA World Cup twice [11] -and the UEFA European Championships six times. [10]

According to research by the CIES Football Observatory, Brazil (455 players) has the highest number of players playing in thirty-one professional football leagues in Europe whilst Spain (178 players) is fifth overall. [12] This demonstrates the total quantity and quality of players produced by these nations, insofar that they have a high proportion of players that have achieved professional footballing status in some of the most competitive leagues in the world.

The FIFA website highlights five of the world's most successful players, including Cristiano Ronaldo, Lionel Messi, Neymar and Andres Iniesta whom describe how playing futsal in their formative years has helped them to become world class footballers. [3] Two of the aforementioned players are of Brazilian nationality and one Spanish, which demonstrates that this trend is not only exclusive to these nations, as other world class professional footballers in other countries have attributed their successful development to playing futsal at a young age.

Lionel Messi, the five times FIFA World Player of the Year described the influence futsal had on his career.

“As a little boy in Argentina, I played futsal on the streets and for my club. It was tremendous fun, and it really helped me become who I am today”. [3]

2.2. Football and Futsal Participation

FIFA's 'Big Count' study states that 265 million male and female worldwide are registered with their National Governing Body to play football. [13] In terms of futsal participation, the 'Big Count' indicates that in 2006 just over 1 million male and female registered to play futsal.

The figures for futsal are likely a conservative estimate, as the study only includes players registered with their

national football governing body, whereas futsal at club level, in some countries, is governed independent of these organisations. Generally, the evidence base for futsal participation is virtually non-existent. For example, the literature searches for futsal & participation returned only 64 studies post- 1990, many of which mentioned participation, but were not predominantly participation based studies. [14]

2.3. The Relationship between Football and Futsal

Both sports are governed at world level by FIFA, and regionally by the following 6 international confederations:

- The Union of European Football Associations (UEFA), consisting of 55 member associations.
- Confederación Sudamericana de Fútbol (CONMEBOL), consisting of 10 member associations.
- The Confederation of North, Central America and Caribbean Association Football (CONCACAF), consisting of 41 member associations.
- Confederation of African Football (CAF), consisting of 56 member associations and 2 associate members.
- Asian Football Confederation (AFC) - consisting of 47 member associations
- Oceania Football Confederation (OFC) - consisting of 11 member associations and 3 associate members. [15]

Futsal is a global sport in its own right and differs to football in terms of the rules of the game and tactical actions. There is a lack of research as to what technical and tactical aspects of futsal may help individuals to benefit, particularly when considering the potential benefits to elite footballers who have played the smaller side game. Confidence on the ball, receiving a pass under pressure, decision-making in 1v1 situations, and ball retention are all important fundamentals' according to guidance provided by The Football Association of England around the benefits of futsal. [16]

A number of researchers do refer to the influence that the small sided environment has on the development of football and futsal players. For example, Costa *et al*, Almeida *et al*, and Frencken *et al* have conducted research into the effect of small sized pitches and small sided games on interactive and tactical team behaviour in both futsal and soccer. [17,18,19] Frencken *et al* conducted a study in order to evaluate the effect of pitch size manipulations on interactive team behaviour in small-sided soccer games. [19]

They concluded that teams seem to adapt their interactive behaviour according to pitch size in small-sided games. Conversely, Costa *et al* studied the tactical behaviours performed by youth soccer players in small-sided games according to different goalposts of soccer (6m x 2m) and futsal (3m x 2m). [17] Almeida *et al* presented a study aimed to analyse the interaction and main effects of deliberate practice experience and small-sided game formats on the offensive performance of young soccer players. [18] The researchers found that experienced players produced longer offensive sequences with greater ball circulation between them, whereas non-

experienced players performed faster offensive sequences with a predominance of individual actions.

Another difference between futsal and football is the size and weight of the balls, with futsal being slightly smaller (size 4) and heavier. Heim *et al* studied the use of futsal balls in physical education lessons by comparing them with traditional and other felt indoor footballs. [20] The use of futsal balls was associated with improvements in the areas of assessment tested, with ball-control (of a bouncing ball) being significantly faster than leather and felt balls. Furthermore, use of the futsal ball resulted in the number of touches of the ball increasing for each player, alongside improved offensive play. The authors reported that participants appeared to have 'markedly less fear of the futsal ball in comparison with other types of balls', leading to conclusions that there is a strong level of support to make greater use of futsal balls with young people when playing indoor football.

2.4. Ranking performance in international football and futsal

The FIFA/Coca-Cola World Ranking is a system for men's football national teams to determine national success in international football. [21] A system is used that is based on points being awarded according to the results of all FIFA-recognised full international 'A' matches, defined by FIFA, "as a match between two FIFA members for which both members field their first representative team 'A' team" Under the latest system, which has been in place since the 2006 FIFA World Cup, a team's ranking is based on performances over the last four years, with the most recent results and more significant matches being weighted to help reflect the current competitive state of a team.

2.5. History of World Rankings

In December 1992, FIFA launched the first FIFA/Coca-Cola World Rankings (football) of its member associations and began publishing regular rankings from August 1993, in order to provide a basis for comparison of the relative strengths of these teams. Since their introduction, the rankings have been subject to much debate and have been heavily criticised, particularly in relation to calculation procedures and unrealistic rankings of some teams. [22]

In order to address such challenges, FIFA made changes that were introduced in 1999 which included

increasing the point ranking scale up by a factor of ten. This meant a fixed number of points were no longer awarded for a victory or a draw and match losers were able to earn points, as the method of calculation changed to take into account factors such as: the number of goals scored or conceded, game location (home/away/neutral), match/competition importance, and regional strength. [23]

Widespread criticisms of the system resurfaced and grew more significant after this change. One of the main criticisms of the system was that the rankings considered teams' performances over an eight-year period, and that the rankings did not reflect teams' recent performances. [24] Therefore, FIFA introduced a modified system of ranking based on a simplified method of calculation, with the new formula based on a four year evaluation period and came into place three days after the 2006 FIFA World Cup final. [23]

Stefani & Pollard suggest the new system is an improvement because it overcomes two of the main criticisms of the previous system, and is now relatively simple and transparent. [25] However, they also highlight further consequences of the system, such as; it ignores home advantage; a loss is always assigned zero points; regional strength factor is unclear; inactive teams penalised; ignores number of goals scored and no credit for a win in extra-time.

Gilchrist and Holden criticise the role of the FIFA ranking system in harming a nation's prospects or falsely boosting a team into an advantageous position. [26] This is further supported by Cummings who highlights the fact that host nations of major tournaments do not take part in qualifying rounds, and instead participate only in friendlies which offer fewer points. [27]

2.6. FIFA World Rankings

The logic behind the calculations used in the FIFA/Coca-Cola World Rankings is, according to FIFA relatively simple: "any team that does well in world football wins points which enable it to climb the world ranking". [28] The total number of points gained by a team over a four-year period is based on the average number of points gained from matches during the past 12 months and the average number of points gained from matches beyond 12 months, which depreciates annually. The number of points (P) gained in a single match depends on a number of factors according to the following formula detailed further in Table 1.

Table 1. FIFA World Ranking Formula (P = M x I x T x C)

M:	Points for match result - 3 points for a victory, 1 point for a draw and 0 points for a defeat. In a penalty shoot-out, the winning team gains 2 points and the losing team gains 1 point.
I:	I: Importance of match - friendly match (including small competitions): I = 1.0, FIFA World Cup qualifier or confederation-level qualifier: I = 2.5, Confederation-level final competition or FIFA Confederations Cup: I = 3.0, and FIFA World Cup final competition: I = 4.0.
T:	Strength of opposing team - the strength of the opponents is based on the formula: 200 – the ranking position of the opponents. As an exception to this formula, the team at the top of the ranking is always assigned the value 200 and the teams ranked 150th and below are assigned a minimum value of 50. The ranking position is taken from the opponents' ranking in the most recently published FIFA/Coca-Cola World Ranking.
C:	Strength of confederation - when calculating matches between teams from different confederations, the mean value of the confederations to which the two competing teams belong is used. The strength of a confederation is calculated on the basis of the number of victories by that confederation at the last three FIFA World Cup competitions. The regional confederation values are as follows; CONMEBOL 1.00, UEFA 0.99, and AFC/CAF/OFC/CONCACAF 0.85

2.7. Futsal Rankings

To rank competitive national success in Futsal, an unofficial system hosted by <http://www.futsalworldranking.be/> is one of the only measures of national competitive success. [29] The website uses the Elo ranking system, but it is not recognised by FIFA, the world governing body and consequently they do not endorse a system to rank international futsal teams.

2.8. History of the Elo Ranking System

The Elo based rating system was developed by Dr. Arpad Elo and used by the International Chess Federation to rate and rank chess players. The system was further developed by Bob Runyan in 1997, who adapted the Elo rating system to international football by adding a weighting for the kind of match played, as well as an adjustment for the home team advantage and goal difference in the match result. [30]

The Futsal World Rankings use the same formula that was used to develop the World Football Elo Rating System in 1997, incorporating home advantage and margin of victory, two factors ignored by FIFA. [29] Points gained or lost in past games are slowly discounted and inactive teams are not penalised, in contrast to FIFA's system which discounts in 12 month blocks and penalises teams that play less than five games in 12 month periods; fewer games played equals a heavier penalty. [29]

Table 2. Elo Ranking Formula ($R_n = R_o + K \times (W - W_e)$)

R _n :	is the new rating
R _o :	is the old (pre-match) rating
K:	is the weight constant for the tournament played - friendly match 20, all other tournaments 30, FIFA World Cup and continental qualifiers 40, continental championship finals and major intercontinental tournaments 50, and FIFA World Cup finals 60.
W:	is the result of the game - 1 for a win, 0.5 for a draw and 0 for a loss.
W _e (win expectancy):	$1 / (10^{-(dr/400)} + 1)$ and dr = the difference in ratings plus 100 points for a team playing at home

The Futsal World Rankings are based on the following formula detailed in Table 2. [29]

3. Methodology

Given both the uniqueness and complexity of the ranking systems used to rank national success in futsal and

football, it was important for this study to create a bespoke scoring system, which could combine and rank historical performance in both sports. The methodology was designed to measure performance since FIFA standardised Futsal in 1989, rather than provide a measure of current performance. [40] Crucially, this research measures tournament success based on the position they finish in the competition rather than on individual results against other nations.

3.1. Identifying the International Competitive Structure

In order to measure national success in football and futsal, it was important to establish any commonalities between the two sports in the way in which they are structured, to be able to determine whether the performance of each nation could be combined and compared fairly across both sports.

As previously mentioned, international competitions in both sports are governed by the 6 regional confederates, which provide a structure that enables all affiliated nations to qualify for the FIFA World Cup in both football and futsal. The first step of the methodology was to identify the international competitive structure in both sports for each of the 6 confederations, displayed in Table 3, so comparators of success across the two sports could be identified.

From this scoping exercise it was evident that both sports were standardised insofar that each confederation held a major regional competition and qualification to determine which nations would qualify for the FIFA World Cup. As the basic competition structure was identical in both sports this meant that it was possible to construct a combined point's based system to measure historical success.

3.2. Data Sources

The second step of the methodology was to identify whether secondary data in the form of competition results was available for each competition, and if so, for which period post- 1989, since Futsal was officially governed by FIFA. Firstly, websites were identified which could provide regional confederation data for each competition (i.e. UEFA Futsal Championship). As a result of this scoping exercise, the following world and regional confederation websites were searched. The websites for each of the confederations (displayed in Table 3) provided competition results which was then cross-checked with the other websites (e.g. soccerway.com) to ensure that the results were accurate.

Table 3. International competitive structure and data sources

Confederation	Football	Futsal	Website
Fédération International de Football Association (FIFA)	FIFA World Cup	FIFA Futsal World Cup	FIFA.com
Asian Football Confederation (AFC)	Asian Cup	Asian Futsal Championship	the-afc.com
Confederation of African Football (CAF)	Africa Cup of Nations	African Futsal Championship	cafonline.com
Confederation of North, Central American and Caribbean Association Football (CONCACAF)	Gold Cup	CONCACAF Futsal Championship	concacaf.com
Confederación Sudamericana de Fútbol (CONMEBOL)	Copa América	Copa América	conmebol.com
Oceania Football Confederation (OFC)	Nations Cup	Oceania Futsal Championship	oceaniafootball.com
Union of European Football Associations (UEFA)	UEFA European Championships	UEFA Futsal Championship	UEFA.com

Table 4. Regional and International Tournaments

Confederation	Football	Futsal
Fédération International de Football Association (FIFA)	FIFA World Cup 1990, 1994, 1998, 2002, 2006, 2010, 2014 (7 tournaments with 24-32 teams)	FIFA World Cup 1989, 1992, 1996, 2000, 2004, 2008, 2012, 2016 (8 tournaments with 16-24 teams)
Asian Football Confederation (AFC)	Asian Cup 1992, 1996, 2000, 2004, 2007, 2011, 2015 (7 tournaments with 8-16 teams)	Asian Futsal Championship 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2010, 2012, 2014, 2016 (14 tournaments with 9-18 teams)
Confederation of African Football (CAF)	Africa Cup of Nations 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2013, 2015 (14 tournaments with 8-16 teams)	African Futsal Championships 1996, 2000, 2004, 2008, 2016 (5 tournaments with 5-10 teams)
Confederation of North, Central American and Caribbean Association Football (CONCACAF)	Gold Cup 1989, 1991, 1993, 1996, 1998, 2000, 2002, 2003, 2005, 2007, 2009, 2011, 2013, 2015 (14 tournaments with 5-12 teams)	CONCACAF Futsal Championship 1996, 2000, 2004, 2008, 2012, 2016 (6 tournaments with 6-8 teams)
Confederación Sudamericana de Fútbol (CONMEBOL)	Copa América 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2004, 2007, 2011, 2015 (11 tournaments with 10-12 teams)	Copa América 1989, 1992, 1995, 1996, 1997, 1998, 1999, 2000, 2003, 2008, 2011, 2015 (12 tournaments with 4-10 teams)
Oceania Football Confederation (OFC)	Nations Cup 1995, 1998, 2000, 2002, 2004, 2007, 2012, 2016 (8 tournaments with 4-8 teams)	Futsal Championship 1992, 1996, 1999, 2004, 2008, 2009, 2010, 2011, 2013, 2014, 2016 (11 tournaments with 4-8 teams)
Union of European Football Associations (UEFA)	European Championships 1992, 1996, 2000, 2004, 2008, 2012, 2016 (7 tournaments with 8-24 teams)	UEFA Futsal Championship 1996, 1999, 2001, 2003, 2005, 2007, 2010, 2012, 2014, 2016 (10 tournaments with 6-12 teams)

3.3. Collation of Secondary Data

The third step of the methodology was to collate all the results for both the football and futsal competitions from 1989 onwards and detailed in Table 4. The search returned 162 nations competing in at least one of these competitions. Countries that did not qualify for the tournaments in Table 4 were not included in the research.

Furthermore, the following countries were excluded from the research because although they competed in one or more of the aforementioned competitions, they have since ceased to exist due to war, conflict, rebellion or uprising: Soviet Union, Commonwealth of Independent States (CIS), Serbia and Montenegro, West Germany, Zaire and Yugoslavia. This left 156 nations with 131 competing in football and 107 in futsal during this period. Of these nations, 82 qualified for both football and futsal competitions.

3.4. Scoring System

Table 5 displays the scoring system for the world and regional competitions. Nations that qualified for a FIFA World Cup during the study period were awarded a score between 25 and 100 based on their final round position in each tournament. Due to the higher significance of the FIFA World Cup tournament in comparison with regional tournaments, nations were given more points in lower rounds to account for the difficulty in reaching the knockout phase of the FIFA World Cup.

There were differences within and between regional confederation competitions both in terms of the number of nations (e.g. Oceania has fewer members than UEFA) and tournament structure preferences of each governing body. For example, the 1992 European Championships in football began with 8 teams and eventually evolved to 24

teams in 2016. This led to a quarter final being added in 1996 and a round of 16 in 2016. Some regional confederations also favoured a 3rd place play off for teams that were knocked out at the semi-final phase, whilst others did not.

Table 5. Scoring system

Position	FIFA	Position	CONFEDERATION
Winner	100	Winner	100
Runner-up	75	Runner-up	75
3 rd place	62.5	Semi Finals	50
4 th place	50	Quarter Finals or below	25
Quarter-finals / Round of 16	37.5		
Group Stage	25		

The scoring system for regional confederations was simplified to take into account such differences. Similar to the FIFA World Cup, nations were given a ranking between 25 and 100. Nations that were eliminated at the quarter final stage or below (i.e. group stage or round of 16) were awarded 25 points. Overall, the scoring system was able to conform to the different tournament structures, and provide a broadly consistent scoring system across the world and regional tournaments.

3.5. Confederation Weight

The scoring system in its current form favoured nations that were competing in weaker regional confederations such as Oceania, where they have fewer teams that have generally failed to achieve success in worldwide competition when compared with other regional confederations. It was apparent that to create a fair scoring system, the methodology

must include a confederation weight according to each region, to reflect the strength of each confederation.

In football and futsal, regional confederations competing in the FIFA World Cup are allocated a number of places depending on the size and overall competitiveness of nations competing within each confederation. A similar approach was applied to the methodology for this study with nations given a confederation weight according to the number of FIFA World Cup places given to each regional confederation. Table 6 displays the confederation weights applied to nations competing in both futsal and football.

Table 6. Confederation weight

Confederation	Football		Futsal	
	Number of qualifying nations	Confederation weight	Number of qualifying nations	Confederation weight
AFC	25	0.12	29	0.20
CONCACAF	20	0.10	21	0.14
UEFA	97	0.47	48	0.32
CAF	31	0.15	14	0.09
CONMEBOL	34	0.16	28	0.19
OFC	1	0.01	8	0.05

3.6. Scoring System - Worked Example

Once the confederation weight was created the scores for each nation could be calculated. The following provides a worked example for Spain and how the ranking and scores were recorded independently for football and futsal:

1. Spain competed in all 7 FIFA World Cup competitions post- 1989 culminating in them acquiring the following points during the study and displayed in Table 10. Spain competed in all 7 FIFA World Cup competitions post-1989 culminating in them acquiring the following points during the study, displayed in Table 7 and Table 8.

2. Total FIFA World Cup points were then averaged across all of the FIFA World Cup competitions, including those that nations had not qualified for. If Spain had only competed in 5 competitions then the total points would still have been divided by 7, the total number of competitions post- 1989. The rationale was that competitive success should be determined during the course of competitions held during this period, to create a more balanced scoring system which would not favour teams that achieved one-off or short term success, by succeeding in only a small number of competitions.

3. Regionally as part of UEFA, Spain competed in 6 of the 7 competitions held during this period, winning the competition twice. The total score was then divided by the total number of regional tournaments which was 7 for the UEFA European Championships. The average zonal points were then calculated (42.86).

4. Each nation's average zonal points were adjusted based on the confederation weight. Spain's zonal weight was 0.47.

5. The weighted average zonal points for Spain was 19.99.

6. The total score for Spain in football was calculated by adding the average FIFA World Cup points to the weighted zonal points to give Spain a total score of 62.84.

Table 7. Spain's FIFA World Cup score

FIFA World Cup	Round eliminated	Score
1990	Round of 16	37.5
1994	Quarter finals	37.5
1998	Group stage	25
2002	Quarter finals	37.5
2006	Round of 16	37.5
2010	Champions	100
2014	Group stage	25
Total		300

Table 8. Spain progress in UEFA European Championships

European Championships	Round eliminated	Score
1992	Did not qualify	0
1996	Quarter finals	25
2000	Quarter finals	25
2004	Group stage	25
2008	Champions	100
2012	Champions	100
2016	Group stage	25
Total		300

The same methodology was used to calculate Spain's futsal score (97.13) displayed in Table 9.

3.7. Final Combined Score

Once all scores had been calculated in football and futsal, for all nations during this period, both the combined FIFA World Cup and regional confederation tournament scores were calculated. For example, Spain's FIFA World Cup and European Championship scores were totalled to calculate a combined score for futsal and football of 159.97 (62.84 + 97.13) to enable national competitive success during this period to be compared.

3.8. Limitations of the Study

Some nations scored more favourably, as they qualified for tournaments as the host nation. If they were not the home nation then they may not have qualified for the tournament which would have meant they would have scored fewer points.

Table 9. Spain - football scoring system

Country	Confed.	Avg. WC Pts	Avg. Zonal Pts	Zonal Weight	Weighted Zonal Pts	Combined Score (Weighted)
Football	UEFA	42.86	42.86	0.47	19.99	62.84
Futsal	UEFA	68.75	87.5	0.32	28.38	97.13

Other limitations include the need to design a bespoke scoring system which reflected the different tournament structures, and confederation weighting which was required to deflate performance of some confederations.

4. Results

Before the combined score for both futsal and football was calculated, it was important to analyse the scores independently, to present the top 25 nations in each sport to assess the balance of success achieved by nations.

4.1. Football

The results for football were dominated by nations in the UEFA confederation, with over half of nations making the top twenty-five ranking, followed by 20% from CONMEBOL. Interestingly, all but one (Italy) of the top 5 nations have won both the FIFA World Cup as well as the relevant regional confederation competition (i.e. UEFA European Championships) during this period. Table 10 displays ranked nations in football.

Table 10. Football - Combined Score

Rank	Country (Football)	Confederation	Combined Score (Weighted)
1	Germany	UEFA	94.51
2	Brazil	CONMEBOL	73.65
3	Italy	UEFA	68.44
4	Spain	UEFA	62.84
5	France	UEFA	59.15
6	Netherlands	UEFA	57.85
7	Argentina	CONMEBOL	54.97
8	England	UEFA	43.80
9	Portugal	UEFA	41.29
10	USA	CONCACAF	39.35
11	Mexico	CONCACAF	38.67
12	South Korea	AFC	35.08
13	Sweden	UEFA	34.87
14	Nigeria	CAF	33.71
15	Uruguay	CONMEBOL	30.34
16	Japan	AFC	30.01
17	Cameroon	CAF	28.54
18	Belgium	UEFA	28.33
19	Croatia	UEFA	27.97
20	Denmark	UEFA	27.61
21	Switzerland	UEFA	26.30
22	Paraguay	CONMEBOL	25.22
23	Colombia	CONMEBOL	24.54
24	Czech Republic	UEFA	23.92
25	Saudi Arabia	AFC	22.94

4.2. Futsal

In futsal, UEFA were slightly less dominant with 32% of nations, followed by AFC with 24% and CONMEBOL, CONCACAF and AFC all with 20%, ranking in the top

twenty-five. Overall, the balance of success was more evenly spread throughout the regional confederations in futsal.

Spain and Brazil have achieved unparalleled success in both world and regional tournaments and therefore unsurprisingly are clearly the most successful nations. Six (60%) of the teams that were presented in the top ten in football were also in the top ten in futsal which provides an indication of the success achieved by a cluster of nations in both sports. Table 11 displays the ranked nations in futsal.

Table 11. Futsal - Combined Score



Rank	Country (Futsal)	Zone	Combined Score (Weighted)
1	Brazil	CONMEBOL	102.11
2	Spain	UEFA	97.13
3	Russia	UEFA	57.77
4	Italy	UEFA	56.90
5	Argentina	CONMEBOL	51.28
6	Iran	AFC	49.44
7	Portugal	UEFA	34.73
8	USA	CONCACAF	34.25
9	Paraguay	CONMEBOL	32.52
10	Japan	AFC	32.05
11	Ukraine	UEFA	30.79
12	Egypt	CAF	30.39
13	Australia	AFC and OFC	27.13
14	Thailand	AFC	26.80
15	Cuba	CONCACAF	24.49
16	Netherlands	UEFA	23.61
17	Costa Rica	CONCACAF	23.52
18	Czech Republic	UEFA	19.05
19	Guatemala	CONCACAF	19.00
20	Belgium	UEFA	18.18
21	Uruguay	CONMEBOL	18.05
22	China	AFC	13.92
23	Colombia	CONMEBOL	13.30
24	Panama	CONCACAF	12.54
25	Uzbekistan	AFC	12.22

4.3. Combined

When combining the results for both futsal and football, the top four represent nations that have performed consistently well in both sports during this period. Teams highlighted in green and displayed in Table 12 were present in the top 25 of nations in both football and futsal, whilst those highlighted in red were only reported in either of the football and futsal lists of the top 25 nations. For example, Germany are ranked 5th because of their consistent rate of success in football and not as a result of their performance in futsal, as they have only recently formed a national futsal team and have, as yet, not qualified for a major tournament. Notwithstanding this, the top ten nations have all achieved some success (i.e. have either won or reached the latter stages of tournaments) in both sports during this period.

Table 12. Football and Futsal - Combined Score

Rank	Country (Futsal)	Zone	Combined Score (football and futsal)
1	Brazil	CONMEBOL	175.76
2	Spain	UEFA	159.97
3	Italy	UEFA	125.34
4	Argentina	CONMEBOL	106.25
5	Germany	UEFA	94.51
6	Netherlands	UEFA	81.46
7	Russia	UEFA	78.48
8	Portugal	UEFA	76.02
9	USA	CONCACAF	73.60
10	Japan	AFC	62.06
11	Iran	AFC	60.45
12	France	UEFA	59.15
13	Paraguay	CONMEBOL	57.73
14	Thailand	AFC	61.67
15	Uruguay	CONMEBOL	48.39
16	Mexico	CONCACAF	47.70
17	Belgium	UEFA	46.51
18	Costa Rica	CONCACAF	45.16
19	England	UEFA	43.80
20	Australia	AFC and OFC	43.62
21	Czech Republic	UEFA	42.96
22	South Korea	AFC	40.33
23	Egypt	CAF	40.08
24	Ukraine	UEFA	39.48
25	Colombia	CONMEBOL	37.85

 Nations that ranked in the 'top 25' for both football and futsal.
 Nations that ranked in the 'top 25' in either one of the sports

UEFA nations dominate across the two sports, with 44% of nations, although, like Germany, three of these nations do not have a strong competitive profile in futsal. More so, this reflects the balance of competitiveness in Europe, particularly in football. CONMEBOL, the region where futsal originated, account for 20% of teams, including the leading nation, Brazil, a nation synonymous for futsal, even though the sport originated in Uruguay.

Interestingly, AFC has an equal number of teams to CONMEBOL in the top 25. The popularity and relative success of both football and futsal in nations such as Thailand, Iran and Japan means they score higher than renowned footballing nations such as England and France.

4.4. Categorising Success in Both Sports

The results presented so far, do not provide a true indication of the competitive success of nations in both sports because some nations (e.g. Germany), have scored higher because of significantly greater achievement in one particular sport (i.e. football). The key aim of the research was to identify the leading nations in both sports, to create an evidence base which could lead to further investigations into the relationship between the two sports and how they are able to achieve success. It was imperative that another measure should be used to identify these nations.

Consequently, the top and bottom quartile of the combined score was calculated to determine nations that were 'good' (i.e. top quartile) and 'poor' (i.e. bottom

quartile). The middle 50 percentile represented teams that were classified as 'average' for the purposes of the research.

The following categories were therefore created to determine the historical level of success achieved by each nation in both sports.

- good (football) - good (futsal)
- good (football) - average (futsal)
- good (football) - poor (futsal)
- average (football) - average (futsal)
- average (football) - poor (futsal)
- poor (football) - poor (futsal)

Figure 1 displays the nations according to the category which they are grouped. Figure 2 provides a geographic representation of these nations using the following five grouped categories, which shows a cluster of successful nations predominantly around Europe and the Americas.

- good - good
- good (e.g. football or futsal) - average (e.g. football or futsal)
- good - poor
- average - average
- average - poor

A select group of fourteen nations were classified as 'good' in both sports and represent a historical list of elite nations that include seven nations from UEFA, five from CONMEBOL, one from AFC and one from CONCACAF. In brackets, the nation's current (i.e. 12th January 2017) FIFA World Ranking and Futsal World Elo ranking is displayed to reflect their current position and level of recent success:

UEFA

Spain (10 football, 2 futsal), Italy (16, 5), Netherlands (22, 25) Russia (56, 3) Portugal (8, 7) Belgium (5, 32) Czech Republic (43, 20)

CONMEBOL

Brazil (2,1) Argentina (1, 4) Paraguay (40, 11) Uruguay (9, 27) Colombia (6, 13)

AFC

Japan (46, 15)

CONCACAF

USA (28, 46)

Four nations - Spain, Portugal, Brazil and Argentina are currently ranked in the top ten in both sports and provide some indication as to where further investigation should be focussed, as they have all achieved consistent success throughout this period.

Interestingly, certain nations appear to have achieved, historically, a greater level of success in both sports during specific periods, in particular USA, Netherlands and Czech Republic. More recently their success in both sports has waned and the reasons for this require further examination. Moreover, Spain's success in futsal was subsequently followed by a sustained period of success in football. This suggests success in one sport may have led to success in the other, although it is unclear how and whether this may have occurred.

		Football									
Poor Football / Good Futsal (n=1)		Average Football / Good Futsal (n=11)						Good Football / Good Futsal (n=14)			
Kazakhstan		Australia	Guatemala	Thailand	Argentina	Italy	Russia				
		Costa Rica	Iran	Ukraine	Belgium	Japan	Spain				
		Cuba	Panama	Uzbekistan	Brazil	Netherlands	Uruguay				
		Egypt	Solomon Islands		Czech Republic	Paraguay	USA				
						Portugal					
Poor Football / Average Futsal (n=29)		Average Football / Average Futsal (n=45)						Good Football / Average Futsal (n=7)			
Azerbaijan	Guyana	Samoa	Algeria	Haiti	Mozambique	Sudan	Zimbabwe				
Belarus	Hong Kong	Singapore	Angola	Honduras	New Zealand	Tahiti		Cameroon			
Brunei	Kiribati	Somalia	Bahrain	Hungary	Nicaragua	Turkey		Croatia			
Cambodia	Kyrgyzstan	St Kitts and Nevis	Bolivia	Indonesia	Palestine	Tunisia		Denmark			
Chinese Taipei	Macau	Suriname	Canada	Iraq	Peru	Trinidad and Tobago		Mexico			
Cook Islands	Maldives	Tajikistan	Cape Verde	Jordan	Poland	Turkmenistan		Nigeria			
Curacao	Netherlands Antilles	Tuvalu	Chile	Kuwait	Qatar	South Africa		Saudi Arabia			
Fiji	New Caledonia		China	Lebanon	Romania	Vanuatu		South Korea			
French Polynesia	Papua New Guinea		Ecuador	Libya	Serbia	Venezuela					
Guam	Phillipines		El Salvador	Malaysia	Slovenia	Vietnam					
Guinea-Bissau	Puerto Rico		Ghana	Morocco	UAE	Zambia					
Poor Football / Poor Futsal (n=0)		Average Football / Poor Futsal (n=44)						Good Football / Poor Futsal (n=5)			
		Albania	Ethiopia	Latvia	Rep. of Ireland						
		Austria	Gabon	Liberia	Rwanda				England		
		Belize	Greece	Malawi	Scotland				France		
		Berlin	Grenada	Mali	Senegal				Germany		
		Bosnia-Herz.	Guadeloupe	Martinique	Sierra Leone				Sweden		
		Botswana	Guinea	Namibia	Slovakia				Switzerland		
		Bulgaria	Iceland	Niger	cent and the Grenadines						
		Burkina Faso	India	North Korea	Syria						
		Congo	Ivory Coast	Northern Ireland	Thailand						
		DR Congo	Jamaica	Norway	Togo						
		Equatorial Guinea	Kenya	Oman	Wales						

Figure 1. Grouped categories of nations

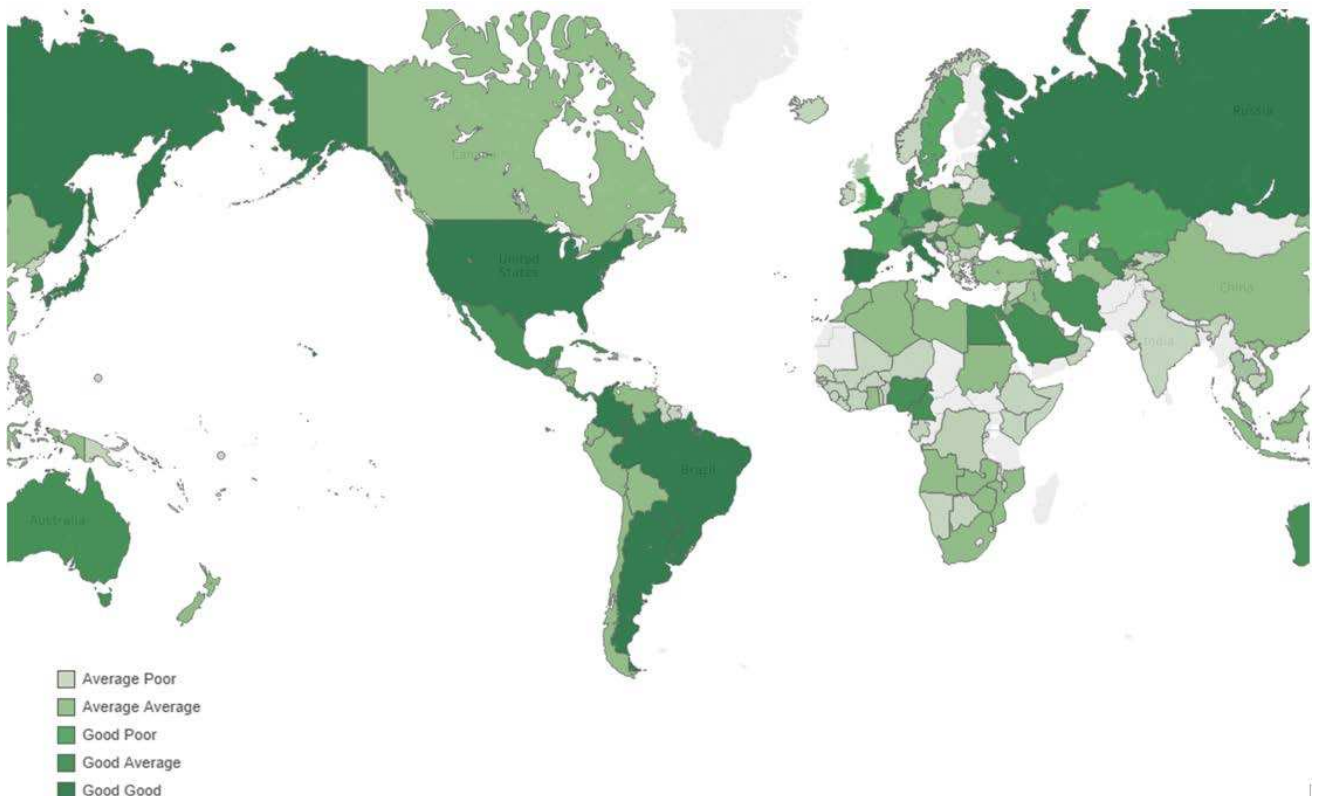


Figure 2. World Map of National Success in Football and Futsal

4.5. Developing Nations

As the research only included nations that had qualified for a major regional or world tournament in either futsal and football, none of the nations were categorised as 'poor' in both sports. Interestingly, only Kazakhstan were categorised as 'good' in futsal and 'poor' in football.

Looking at the results developmentally, there are 5 nations (Germany, France, England, Sweden and Switzerland) that were ranked as 'good' in football and 'poor' in futsal. These nations should be noted as primed for 'development' in the sport of futsal, as they are the only European nations that are included in the 'top 25' football nations but not in the 'top 25' futsal nations. This demonstrates huge potential

for these nations, as they all have a well-developed infrastructure which is required to achieve success in football, and although the sports differ significantly (i.e. facilities), the results demonstrate that such nations appear to be in a more advantageous position to succeed, when compared with other nations. Conversely, it will be interesting to see whether Kazakhstan's relative success in futsal can ever be replicated in the 11 aside game.

5. Discussion

The results confirm that the majority of the most successful performing nations in football, over the study period, are also successful in futsal, with some notable exceptions. This confirms that there is a correlation for success in both sports, although there is still a lack of evidence as to why this occurs, but there a number of possible assumptions, detailed in the literature.

On the whole, nations that are 'good' in both sports are mostly renowned for the type of possession based style, synonymous with the game of futsal (i.e. Spain and Brazil). Furthermore, some of the most successful football players in the world (i.e. Cristiano Ronaldo, Lionel Messi, Neymar, Andres Iniesta), also reside from the 4 nations identified as the most successful during this period (i.e. Argentina, Brazil, Portugal and Spain), when comparing historical and contemporary data. In these nations, there indicates a link between the two sports from a cultural perspective, both in terms of creating the right environment for individual player development (particularly from futsal to football), and a style or philosophy, which enables national success in both sports.

The exceptions include nations such as Germany and England, relatively successful in football but inexperienced futsal nations. Such nations appear to be ideally placed to achieve future success in futsal, if they can adopt or develop on the factors, yet established in a research context, for success in both sports to occur. Equally, if these results are an indicator of the direction of travel for future success, then it is in the interest of governing bodies to embed futsal within an already strong footballing culture. Notably, only one nation is poor in 'football' and good in 'futsal', which provides some evidence that well performing futsal nations may benefit from an already strong football culture. The opposite may also be true, but as in the majority of nations; football was established first, and therefore appears to have been a precursor for success in futsal to follow.

6. Conclusion

Overall, the results present a definitive list of the most successful nations during this period, and provide a basis for further research to take place to understand the relationship between the two sports. This should encourage nations to develop a more collaborative approach to development into the two sports, which will help to create a culture that fosters overall success. Success breeds success and nations should be intent on maximising this across both sports, and embracing both these formats of the beautiful game.

References

- [1] FIFA.com, 'Big Count 2006: Statistical Summary Report', FIFA Communications Division, http://www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.summaryreport_7022.pdf (accessed 7 January 2017).
- [2] Kantar Sport, 'Futsal World Cup 2012 - Television Audio Report', FIFA, [http://resources.fifa.com/mm/document/affederation/tv/02/10/35/07/ffwcthailand2012tvaudiencereport\(finalversion\)\(issuedate05.06.13\)interactive_neutral.pdf](http://resources.fifa.com/mm/document/affederation/tv/02/10/35/07/ffwcthailand2012tvaudiencereport(finalversion)(issuedate05.06.13)interactive_neutral.pdf) (accessed 22 December 2016).
- [3] FIFA.com, 'The Football Greats Forged by Futsal', FIFA, 2012, <http://www.fifa.com/futsalworldcup/news/y=2012/m=10/news=the-football-greats-forged-futsal-1798909.html> (accessed 5 December 2016).
- [4] Moore, R, and Radford, J, 'Is Futsal Kicking Off in England: a Baseline Participation Study of Futsal', *American Journal of Sports Science and Medicine* 2, no.3 (2014), 117-122.
- [5] Rose, G, 'Could Futsal Help Produce an English Lionel Messi', BBC, 2013, <http://www.bbc.co.uk/sport/football/21533802> (accessed 10 November 2016).
- [6] Fahey, J, 'England Finally Put Their Best Foot Forward in the Futsal Revolution', *The Guardian*, 2015, <https://www.theguardian.com/football/2015/dec/09/england-futsal-world-cup-2016-spain-brazil> (accessed 10 November 2016).
- [7] Smith, B, 'World Cup 2014: Futsal - The Game behind Brazil's Superstars', BBC, 2014, <http://www.bbc.co.uk/sport/football/27980859> (accessed 8 November 2016).
- [8] FIFA.com, 'Futsal Development', FIFA, 2016, <http://www.fifa.com/development/news/y=2007/m=2/news=futsal-40019.html> (accessed 9 January 2017).
- [9] FIFA.com, 'FIFA World Cup Archive', FIFA, <http://www.fifa.com/fifa-tournaments/archive/worldcup/> (accessed 9 January 2017).
- [10] UEFA.com, 'History - European Championships (Football)', UEFA, <http://www.uefa.com/uefaeuro/history/index.html> (accessed 9 January 2017).
- [11] FIFA.com, 'FIFA Futsal World Cup Timeline', FIFA, <http://www.fifa.com/futsalworldcup/> (accessed 10 January 2017).
- [12] Poli, R, Ravenel, L, and Besson, R, 'Exporting countries in world football', CIES Football Observatory, (2015), http://www.football-observatory.com/IMG/pdf/mr08_eng.pdf (accessed 12 December 2016).
- [13] FIFA.com, 'Big Count 2006: Statistical Summary Report', http://www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.summaryreport_7022.pdf.
- [14] Moore, R, Bullough, S, Goldsmith, S, and Edmondson, Lee, 'A systematic review of Futsal literature', *American Journal of Sports Science and Medicine* 2, no.3 (2014), 108-116.
- [15] FIFA.com, 'Associations', FIFA, <http://www.fifa.com/associations/> (accessed 9 December 2016).
- [16] TheFA.com, 'Benefits of Futsal', The FA, 2012, <http://www.thefa.com/~media/files/pdf/get%20into%20football/small%20sided%20football/fa-futsal-benefits-guidance-resource.ashx> (accessed 5 January 2017).
- [17] Costa, I, *et al.* 'Analysis of Tactical Behaviours in Small-Sided Soccer Games: Comparative Study Between Goalposts of Society Soccer and Futsal', *Open sports sciences journal* 3, (2010), 10-12 ;
- [18] Almeida, C. H, Ferreira, A. P, and Volossovitich, A, 'Offensive Sequences in Youth Soccer: Effects of Experience and Small-Sided Games', *Journal of Human Kinetics* 36, no.1 (2013), 97-106;
- [19] Frencken, W, *et al.* 'Size Matters: Pitch Dimensions Constrain Interactive Team Behaviour in Soccer'. *Journal of Systems Science and Complexity* 26, no.1 (2013), 85-93.
- [20] Heim, C, Frick, U, Prohl, R, 'Akuteffekte des Einsatzes von Futsalbällen beim Fußballspielen', *Sportunterricht Sportwissenschaft* 43, no.1 (2013), 47-55.
- [21] FIFA.com, 'Revised FIFA/Coca-Cola World Ranking as of 12 July 2006', FIFA, 2016, <http://www.fifa.com/worldcup/news/y=2006/m=7/news=revised-fifa-coca-cola-world-ranking-july-2006-36936.html> (accessed 11 January 2017).

- [22] Stefani, R.T, 'Survey of the Major World Sports Rating Systems', *Journal of Applied Statistics* 24, no.6 (1997), 635-646.
- [23] FIFA.com, 'Revised FIFA/Coca-Cola World Ranking as of 12 July 2006', <http://www.fifa.com/worldcup/news/y=2006/m=7/news=revised-fifa-coca-cola-world-ranking-july-2006-36936.html>.
- [24] Harte, Adrian, 'The World Rankings Riddle', BBC, 2000, <http://news.bbc.co.uk/sport1/hi/football/1081551.stm> (accessed 4 January 2017).
- [25] Stefani, R.T, and R. Pollard, 'Football Rating Systems for Top Level Competition: A Critical Survey'. *Journal of Quantitative Analysis in Sports* 3, no.3 (2007), 3.
- [26] Gilchrist, P, Holden, R., 'Introduction: The Politics of Sport - Community, Mobility, Identity', *Sport in Society* 14, (2011), 4-6.
- [27] Cummings, 'FIFA World Rankings Place Brazil 18th - Reinforce Flawed Nature of System', Bleacher Report, 2013, <http://bleacherreport.com/articles/1488973-fifa-world-rankings-place-brazil-18th-reinforce-flawed-nature-of-system> (accessed 10 November 2016).
- [28] FIFA.com, 'FIFA/Coca-Cola World Ranking Procedure', FIFA, 2008, <http://www.fifa.com/fifa-world-ranking/> (accessed 14 January 2017).
- [29] Futsal World Ranking. 'Procedures', Futsal World Ranking, <http://www.futsalworldranking.be/procedure.htm> (accessed 18 December 2016).
- [30] EloRatings.net, 'World Football Elo Ratings', Elo ratings, <http://www.eloratings.net/> (accessed 7 January 2017).