A COMPOSITE INDEX TO ASSESS THE TOP EUROPEAN FOOTBALL CLUBS IN 2014

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Abstract

The study addresses the need for assessment of football clubs through a single integrating index, representative for the industry. The research goals target the aggregating of a set of relevant sport, economic and social variables in a composite index with statistical relevance. To this effect, we used tests of the relevance of data and factor analysis to determine the weights. The expected results consist of the ranking of analysed clubs and their grouping into different value clusters. This is particularly important in representing the upper echelons of European football and can become a future benchmark for experts in the field.

Key words: *composite index, factor analysis, football clubs.*

JEL classification: *C43, L83, Z20.*

1. Introduction

European football has experienced significant growth since the 90s, which led to increasing amounts of money invested in it. This triggered the transition of football clubs from simple sport entities to real business units, consequently adapting the organizational structure, their activities and objectives. But football is not just a business, it is a social phenomenon. The overwhelming interest is demonstrated by the ever more impressive figures of audience, and the exponential growth of the number of global supporters following their favourite team.

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In early 2015, Deloitte published the study Football Money League (FML), containing the ranking of the strongest European clubs based on the revenues in the recently finished season (2013/14). FML is the main instrument for gauging the financial strength of the teams in the field. On the other hand, in order to have an objective representation of the sports performance of clubs, industry experts are relying on the UEFA ranking, which measures teams in European Cups and is the foundation for the algorithm that assigns the teams to specific value groups for the next season. A comparison of the two rankings, the financial one by Deloitte and the sports one by UEFA for the 2013/14 season, highlights major differences, with only 6 common teams in the top 10 and 14 in top 20.

Obviously, considering both general industry trends presented above, as well as practical elements highlighted for 2014, there is a need for the integration of indicators that reflect both local and global supporters' interest in order to capture the social dimension of the phenomenon. Also, sports and financial variables require the integration of several variables that reflect relevant aspects of the industry. Generalizing, the analysis based on the evolution of a single indicator is limited and, in order to construct a ranking that reflects the current necessities and trends, a more complex assessment is required. In this regard, we have developed a composite index in order to describe a club's sports, economic and social performance.

Of course, this approach is limited by the available data, the main obstacle in advancing research activity for this niche of sports management.

2. Literature review

The scientific research focused on football clubs is one of the topics addressed in the relevant literature circumscribed to the field of sports management. Scientific approaches pertaining to the professional sports industry were mainly directed towards championship in which the clubs' individual objectives were either profit maximization or victories maximization (based on budget constraints). The literature associates the profit maximization strategy with North American sports leagues where clubs are driven mainly by business rules, just like any other business venture, while the victory maximization strategy is favoured by European clubs, where the profit argument comes second after sports performance objectives.

The European football is, in turn, divided by the struggle for supremacy between on-field and off-field objectives. Dobson and Goddard

(2011) analyse "the correlation between profit maximization and utility maximization", showing that there is a strong link between them. Kuper and Szymanski (2009) highlight three possible states of the relationship between playing success and financial success: positive correlation, negative correlation and indifference. Their study, analysing 40 clubs between 1978 and 1997, follows the relationship between two values (ranking in the championship and financial profit), demonstrating that there is a connection between them, but without identifying a formula to precisely measure the correlation.

However, apart from profit or victories maximization, we can identify a third type of objective called "fan welfare maximization", also subject to budget constraints, in which fans have a special affiliation to a team, are consuming the club offerings and directly influence its policies. This third vector, the social approach, with its correlations, analysis and related models, brings a new dimension to this domain, dominated till now by economic and sports benchmarks. (Madden, 2012)

The specialists consider that the measure of success for a club's development is correlated with the brand value, the possibility to expand into new markets and develop new products (Beech and Chadwick, 2007), the ability to generate added value based on the brand's reputation (Aaker, 1991) or the ability to expand based on the club's core products: players, coaches, stadium etc. (Mullin, Hardy and Sutton, 2000). Other researchers look into the classification of supporters: the segmentation of a team's followers based on loyalty to their favourite team and how often they come to the stadium (Westerbeek and Smith, 2003).

As for the development of composite indexes for measuring the football clubs industry, the academic initiatives are scarce on this subject, due to both the "immaturity" of this research niche, and the lack of data which plagues the sports world. As such, Alm (2012) built an index to assess stadiums in order to estimate their future usage capacity after the major competition for which the stadium was originally built was over. "The World Stadium Index" was built on the correlation between estimates of attendance and stadiums' capacity.

Andrikopoulos and Kaimenakis (2009) propose a set of intangible resources (such as player talent or athletic performance), measuring the added value brought by intellectual capital to the club's overall value. The resulting "FOrNeX model represents a decision-making tool based on a

multidimensional approach to the football club's organizational performance". Plumley, Wilson and Ramchandani (2014) applied a weighted average methodology on several financial and sporting parameters to develop a composite score which measures overall performance of the British first league clubs. Their research adapts the FOrNeX model, using data obtained from 13 of the Premier League clubs for five seasons.

Compared to the current level of knowledge in this research niche, the scientific novelty of this approach focuses on two directions. On one hand, an innovative aspect consists of the inclusion of the social dimension in the composite index of a clubs performance, together with the commonly used economic and sports indicators. On the other hand, the indicators used, although found in various academic initiatives, were never integrated into a systemic, complex perspective. Each of the indicators used in this index touch a different facet of a clubs performance, and their integration provides a global perspective on the management of sports units.

3. Methodology, research design and data analysis

The research aims to build a composite index that is both relevant to the sports industry and statistically valid, in order to evaluate the performance of a football club. It highlights the overall performance of the team, determined by taking into consideration three types of aspects: sports, financial and social. This polyvalent approach is more appropriate for the sports clubs of the year 2015 and more relevant than any single criterion classification. The expected results of using this composite index are the development of a ranking with a broader perspective and the segmentation of teams into categories. The analysis applies to the latest European football season (2013/14).

We follow all steps needed for constructing a composite index: establishment of its purpose based on a theoretical approach; selection of the variables used to determine it; collection, selection and analysis of data; data normalization; calculation of weights and aggregation; presentation of results and their interpretation. (OECD, 2008)

To calculate this index, we used seven variables: two economic, two social, two sport and one variable for all dimensions. The variables and their description are given in Table 1.

Table 1: Variables used in this research (profile, description, abbreviation)

Variable	Profile	Description	Abbreviation
UEFA coefficient	Sport	European sport performance	UEFA
IFFHS score	Sport	Global sport performance	IFFHS
The average number of spectators at "home" matches	Social	Impact in the local community	Spectators
Digital reach	Social	Impact in the online community	Digital
Total revenues	Economic	Business level	Revenue
Brand value	Economic	International reputation	Brand
The market value of the squad of players	Economic, sport and social	The ability to achieve sports show	Players

Based on data analysis, we tried to gather all the important data for clubs who occupied leading positions in the rankings for each variable. Due to the lack of data, one of the problems specific to this area of scientific research, the study is limited to 42 clubs. Thus the recommendation that the cases-to-variables ratio should be no lower than 5. (Bryant and Yarnold, 1995)

The geographical distribution of the selected teams (Table 2) reflects the importance and transparency of each league. Due to lack of data, Spain has only 4 teams in this study, which is inconsistent with the real value of the championship. The relevance of the analysed clubs is high, covering 94% of the top 10 positions of the selected variables. The most important team that is not included in this research is Sevilla FC, Europa League title holder and 9th position in the UEFA coefficient rankings for the last season. The other top 10 teams absent: FC Salzburg (8th score IFFHS), B. Monchengladbach (8th place in the number of fans in the stadium) and Hertha Berlin (9th place fans - stadium) perform on a single indicator, not being part of the top 30 for most indicators, their absence from the study having no significant impact.

Table 2: Geographical spread of selected teams

Country	Number of teams
England	14
Germany	6
Italy	6

France	5
Spain	4
Turkey	3
Holland	2
Portugal	1
Scotland	1

Data normalization was achieved using the standardization method by determining the z-scores, whereby the data is transformed to a common scale with 0 average. The appropriate formula for this method is shown in Equation (1); for each individual variable x^t_{qc}, the average value $x^t_{qc=\bar{c}}$ and standard deviation $\sigma^t_{qc=\bar{c}}$ being determined. (OECD, 2008) The advantage of this approach is that it considers the effect of outliers, contributing to a better distinction between clubs based on their performance.

$$I^t_{qc} = \frac{x^t_{qc} - x^t_{qc=\bar{c}}}{\sigma^t_{qc=\bar{c}}} \quad (1)$$

To analyse the relevance of data we used Cronbach Coefficient Alpha, which "represents a measure of internal consistency, which shows how closely related a set of items are as a group. It is considered to be a measure of scale reliability. Technically speaking, Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency). If the result indicates a high correlation then there is evidence that variables form a unitary construction, closely fitted together". (UCLA, 2015)

The theoretical formula of C-alpha, shown in equation (2), indicate that the coefficient will increase if the number of used cases (N) increases or the average correlation of component variables ($\bar{\boldsymbol{c}}$) is high and will fall if the average variance ($\bar{\boldsymbol{v}}$) increases. C-alpha values vary between 0 (no correlation) and 1 (perfect correlation). Economic literature specifies different minimum thresholds for the condition of relevance, the most commonly used being 0.7. (OECD, 2008)

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}} \quad (2)$$

Also, C-alpha is useful in determining the importance of including each individual indicator in the composite index. As such, the coefficient is calculated by omitting, in turn, each of the individual variables slated for

inclusion in the composite index. If the exclusion of a variable yields a bigger C-alpha, it can be inferred that the variable does not have a high degree of correlation with the rest of the indicators.

The methodology employed to determine the weight of each variable used in the calculation of the composite index relies on factor analysis. This entails the identification of latent factors explaining the total variability of the analysed data set (variables). For the main factors obtained, i.e. those that explain most of the total variability of the data, we calculate the matrix of factor loadings which measures the correlation between the variables and the latent factors. Of these, we retain the highest value for each variable, i.e. the largest correlation between the variable and the factors used in the analysis. Based on these, we estimate the weights of the variables that will be used in the composite indicator by multiplying, for each variable, the chosen value from the factor loadings matrix with the proportion of total variation explained by the corresponding factor. (OECD, 2008)

We verified that the following two essential conditions are met by the composite index:

- the anti-catastrophic criterion (a "small" change of a variable does not trigger a major change in the final result)
- the non-compensatory criterion (a "big" change of a variable is not accompanied by a change in the opposite direction of another variable, hence two completely different situations cannot be differentiated) (Pele, 2004)

4. Variables used in analysis

4.1. UEFA coefficient

The variable used to measure the overall sports performance of every team in the European competitions is the UEFA coefficient. Calculated in every season, the coefficient plays an important role in determining the seeded teams in the draw and the number of teams that each country sends in European competitions. The algorithm is designed and calculated by the supreme administrative forum of European football, the Union of European Football Associations (UEFA), in order to measure the performance of clubs in the European inter-club competitions: UEFA Champions League (UCL) and UEFA Europa League (UEL). According to the algorithm, each team receives two points for a win and one point for a draw (half points for the

qualifying and playoff rounds). When reaching the superior stages of European competitions (first 32 teams in the UCL, and the first 16 teams in UEL) the teams receive one additional point for advancing into each next phase. In addition, teams participating in the main European competition (UCL) receive a bonus of four points for qualifying into the group stage and another 4 points for reaching the round of 16. (UEFA, 2015)

The finalists of the most recent UCL season, Real Madrid (39600) and Atletico Madrid (37600), have the highest values of the indicator, followed by ECL finalist: Benfica Lisboa (30,983). The lowest scores from the participants in the study belong to the Turkish teams Fenerbahce and Besiktas (1340). The average of the indicator is 13834 and the ratio between first place and the average is 2.86.

4.2. IFFHS score

The IFFHS score is the second sports variable used in this study. The International Federation of Football History & Statistics is an organization whose purpose is to track and analyse football events. Since 1991, the IFFHS produces and publishes a global ranking of clubs. Calculations are based on the performance of the team throughout the year, in official competitions at continental, intercontinental and national championship level. It also takes into account the most important local cup (national), from which it considers only the phases above 1/16. All countries are divided into several levels, on the basis of the strength of the national championship. Clubs from the strongest leagues (Level 1) receive 4 points for each victory, 2 for a draw and 0 for a loss. Those in Level 2 are given 3 points (win), 1.5 (draw) and 0 (loss), and so on for the following lower levels. (IFFHS, 2015)

The top ranked teams on the IFFHS leaderboard for 2014 are Real Madrid - 381 points (2 trophies won: Champions League and Spanish Cup), Bayern Munich - 276 points (4 trophies: German championship and cup, UEFA Supercup and FIFA Club World Cup). At the bottom of the rankings we find 2 German teams: Hamburger SV and VfB Stuttgart (42 points each), both with a very weak sports season.

4.3. The average number of spectators at "home" matches

To measure the impact in the local community we used as a variable the average number of spectators at home matches in all official competitions. This information is provided by several websites specializing in sport

statistics, our choice being European-Football-Statistics.co.uk, a website with a 25 years old tradition of providing sports results and audience figures from European championships and continental competitions. This variable cumulates several aspects: the ability to use and maintain a stadium with a certain capacity (or build and maintain the arena, in some cases) and the ability to fill the stadium as much as possible. Correlated, on one hand, with the financial strength of the club or the community to provide the team with a stadium as big and modern as possible, and, on the other hand, with the sports performance of the club that attracts fans at the stadium, the indicator retains however a primarily social perspective, representing in synthetic form the impact of the club in the surrounding community.

The values of this variable for the teams surveyed in 2014 ranges between 80,297 (Borussia Dortmund) and 18833 (Girondins de Bordeaux), with an average of 43,757 spectators per game. Top 20 highlights the supremacy of German teams in this area, with 5 teams in the top 10 positions. 11 teams in Europe have averaged more than 50,000 fans at every match at home. The ratio between the first place and the average is 1.83, the indicator values being fairly close to each other.

4.4. Digital reach

While the variable measuring the impact of a club within the local community is limited due to certain geographical (distance from the venue of the matches) and organizational (stadium capacity) reasons, these drawbacks are eliminated when measuring a teams' impact within a virtual community. Data on the number of teams' supporters on various social networking sites are public and are used in different journalistic and academic materials. We opted for using data provided by the German Digital Sports Media (DSM), which for years has aggregated data relevant to this new niche which combines social elements with marketing and communications expertise. The number of supporters for each team on social sites is calculated by adding the supporters from the most important digital social networks: Facebook (like), Twitter (follower), Google+ (follower), YouTube (subscriber) and Instagram (follower). Result Sports (2014)

The biggest number of fans in virtual communities for 2014 belongs to Spanish football's "star" teams FC Barcelona (119,999,613) and Real Madrid (111,544,170), followed at a great distance by Manchester United (72,314,748). Starting with the 4th position, teams have less than half the

number of digital fans of the first two places. Last is PSV Eindhoven (528,492) and the average value is 16,211,081. The ratio between first place and the average is 7.4, which shows a large dispersion of this variable.

4.5. Total revenues

To measure the financial success of a football club, the most relevant indicator is the current revenue of the sports society, without including proceeds from transfers which are considered exceptional income. Current revenues are considered the benchmark of financial success of the club, based on available, easy to compare information. (Deloitte, 2015)

Like other scientific initiatives, Kuper and Szymanski (2009) use in their research the Deloitte Football Money League (FML) which ranks the richest clubs on earth. With a tradition of over 15 years, FML quantifies income from ordinary activities of the sports society, classified into three broad categories: broadcasting, commercial and matchday. The consulting company used data from the audited financial results of the club or directly from the annual reports of the company or the group to which the team belongs. The figures are converted to the same currency (Euro) and "some slight adjustments are applied to provide significant insight and make them easily comparable". (Deloitte, 2015)

Top 20 clubs selected on this criteria highlights the economic superiority of the English Championship (8 teams), Galatasaray being the only team from outside the strongest five European championships. For the 10th year in a row Real Madrid holds the top position (549.5 million euros), followed by Manchester United (518 million euros), which manages a remarkable financial performance, despite a poor season in terms of sports results.

4.6. Brand value

The second economic variable used in the study, the international reputation of a club, is determined based on the estimated value of a club's brand. For this we used data provided by the specialized publication Brand Finance. According to it, the brand of a team is measured as the value of the brand plus attached intellectual property. "The calculation method used is Royalty Relief due to its recognition by regulatory authorities around the globe", its reflection of the current commercial realities and its reliance on only public data provided by the teams. "The method requires four steps to

reach its conclusion: evaluation of brand power based on the brand's strong points, risks and development potential; establishing a royalties rate corresponding to the analysed sector and income typology; determining a discount rate to calculate the net present value of future income flows associated with the brand; determining the value based on the aggregation of results from previous steps". (Brand Finance, 2014)

The clubs with the most valuable brand in 2014 are Bayern Munich (659 million euros), Real Madrid (565 million euros) and Manchester United (543 million euros). It is noted that top 20 is balanced if we consider the teams' country of origin: United Kingdom - 6 teams, Italy, Germany - 4 teams, Spain - 3 teams.

4.7. The market value of the squad of players

The last variable of the paper is meant to measure a multi-dimensional variable, whose reach brings together economic, sporting and social aspects. The market value of the lot of players has an economic component given by the value of intangible assets represented by players, a sports component represented by the fact that the value of each player is influenced by his current athletic and sports form and a social component due to the direct relationship between this indicator and the fans' interest in the team. The data used was taken from the German website transfermarkt.de, the "authority in assessing the market value of football players". The site records detailed information about most of the top leagues footballers, the evaluation being based on data analysis and opinions of various experts in the field. (Yuan, 2014)

The most valuable lot of players in 2014 belongs to FC Barcelona (620.35 million euros), followed closely by Real Madrid and Chelsea FC. The average is 235.54 million euros and the ratio between first place and average is 2.63.

5. Development of a composite index

An important step in the scientific endeavor of building a composite index is data normalization. For this, we used the z-scores method, with which we transform each variable so as it has an average of 0. Based on normalized data, we determined the correlation between the z values of the variables used in this research, as well as the correlation of each variable with an index created with equal weights (Table 3). We notice medium to strong positive

correlations between variables, with values ranging from 45% (supporters-IFFHS) and 94% (brand-income).

Table 3: The correlation between the z values of the variable

	Z.UEFA	Z.Digital	Z.Spectators	Z.IFFHS	Z.Revenue	Z.Players	Z.Brand	Equal weight index
Z.UEFA	100%							
Z.Digital	59%	100 %						
Z.Spectators	54%	61%	100%					
Z.IFFHS	79%	57%	45%	100%				
Z.Revenue	70%	82%	69%	62%	100%			
Z.Players	75%	84%	62%	71%	93%	100%		
Z.Brand	63%	81%	75%	60%	94%	87%	100%	
Equal weight index	83%	87%	77%	78%	94%	94%	92%	100%

Source: author's calculations based on data from Brand Finance (2014), Deloitte (2015), IFFHS (2015), Result Sports (2014), UEFA (2015), european-football-statistics.co.uk/attn.htm and transfermarkt.de

For data consistency analysis, we calculated the Cronbach Alpha Coefficient and obtained a value of 0.944, which means that the variables selected for analysis form a consistent group. The condition C-alpha> 0.7 is met, the coefficient showing a high degree of relevance of the data used in this study. We determined the C-alpha values for each variable (Table 4), most of the values are below the overall coefficient of relevance. The only values close to the global C-alpha were obtained by excluding the IFFHS and Supporters variable, but the differences are very small and do not justify the removal of them from the calculation of the composite index. We also calculated the correlation of each variable with the group, yielding high values that support the notion of a well-articulated, unitary composite structure.

Table 4: Cronbach Alpha Coefficient for each variable

	Alpha	Std. Alpha	r (item, total)
Z.UEFA	0.9398	0.9398	0.7607
Z.Digital	0.9352	0.9352	0.8138

Z.Spectators	0.9462	0.9462	0.6859
Z.IFFHS	0.9445	0.9445	0.7059
Z.Revenue	0.9258	0.9258	0.9191
Z.Players	0.9255	0.9255	0.9222
Z.Brand	0.9281	0.9281	0.8932

Source: author's calculations based on data from Brand Finance (2014), Deloitte (2015), IFFHS (2015), Result Sports (2014), UEFA (2015), european-football-statistics.co.uk/attn.htm and transfermarkt.de

To determine the weights of each variable, we operated a factor analysis, from which we derived three factors named F1, F2 and F3. We calculated the correlation between the variable and the three factors using the factor loadings matrix. The three factors were chosen on the grounds of the existence of eigenvalues greater than or equal to 1. We chose to include factor 3 in the analysis because its eigenvalue of 0.97 and the percentage of total variance explained by this factor (25.7%) recommend it as having a significant explanatory power, comparable to factor 2. We operated factor rotations and factor coefficients matrix, highlighting the value of covariance between the variable and latent factor showing the strongest correlation (Table 5).

Table 5: Factor coefficients matrix

Factor loadings	**F1**	**F2**	**F3**	**(F1)2**	**(F2)2**	**(F3)2**	**scaled to unity**		
Z.UEFA	0.313	0.918	0.233	0.09797	**0.84272**	0.05429	4.53%	**43.35%**	3.02%
Z.Digital	0.512	0.311	0.616	0.26214	0.09672	**0.37946**	12.11%	4.98%	**21.08%**
Z.Spectators	0.675	0.297	0.233	**0.45563**	0.08821	0.05429	**21.05%**	4.54%	3.02%
Z.IFFHS	0.268	0.678	0.358	0.07182	**0.45968**	0.12816	3.32%	**23.65%**	7.12%
Z.Revenue	0.658	0.384	0.602	**0.43296**	0.14746	0.3624	20.00%	7.59%	**20.13%**
Z.Players	0.444	0.474	0.757	0.19714	0.22468	**0.57305**	9.11%	11.56%	**31.84%**
Z.Brand	0.804	0.289	0.498	**0.64642**	0.08352	0.248	**29.86%**	4.30%	13.78%
% Variance explained	0.31	0.278	0.257						
Eigenvalue	1.355	1.000	0.971						

Source: author's calculations based on data from Brand Finance (2014), Deloitte (2015), IFFHS (2015), Result Sports (2014), UEFA (2015), european-football-statistics.co.uk/attn.htm and transfermarkt.de

The weight of each variable in the structure of the composite index (Table 6) highlights bigger values for the UEFA coefficient (sport), the brand value (economic), the players' lot market value (multidimensional) and the spectator numbers (social), showing an equilibrium determined by the variables' profile.

Table 6: The structure of the composite index

Variable name	Weight of each variable
UEFA	21.67%
Digital	9.02%
Spectators	13.02%
IFFHS	11.82%
Revenue	12.37%
Players	13.62%
Brand	18.47%

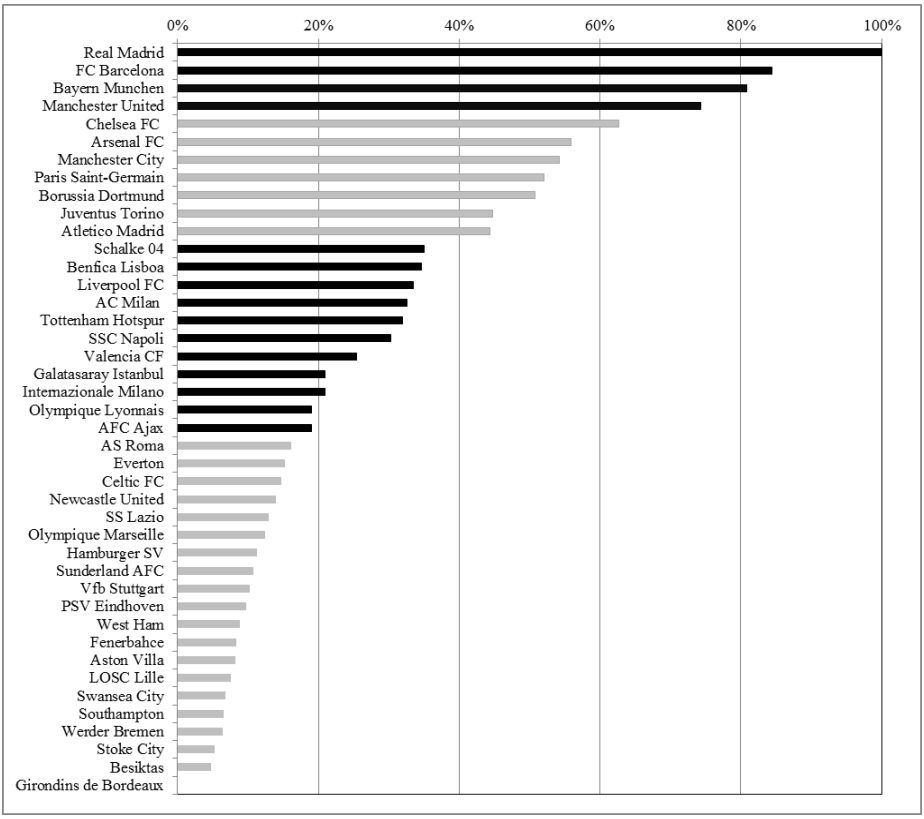
Applying the previously determined weights on the variables' normalized values for the 42 teams used in the study, we determined a ranking of clubs in 2014, ordered on a scale from 100% (Real Madrid) to 0% (Girondins de Bordeaux). After applying the composite index and obtaining the results and analyzing their structure, we decided to split the teams into categories, thus determining four value levels (Figure 1).

The first level comprises four teams that dominate world football in all respects. They are ranked, in fact, within the first 5 positions for most individual variables: Real Madrid is ranked first in 3 of 7 charts, FC Barcelona is a leader in two categories, Bayern Munich has a first and second position, and Manchester United has 4 top 3 scores out of the 7 charts. These clubs display such a commanding power that even when they have difficulties (as with the sporting results of Manchester lately), they still manage to obtain top scores for most parameters, their biggest strengths being tradition and reputation around the world.

The second level includes seven teams that are in the pursuit of the four great powers of football. Some of them are distinguished by a remarkable consistency, occupying the top 10 positions in most charts (Chelsea, Arsenal, Manchester City, PSG, Juventus), while others excel in certain chapters (Atletico Madrid has excellent sports results in 2014 and Borussia Dortmund

has the largest number of supporters at home for more than 5 years). This group also includes the already famous football's "new rich", be it the older (Chelsea) or the most recent (Manchester City, Paris Saint Germain).

Figure 1: Football club ranking and segmentation (2014)



Source: author's calculations based on data from Brand Finance (2014), Deloitte (2015), IFFHS (2015), Result Sports (2014), UEFA (2015), european-football-statistics.co.uk/attn.htm and transfermarkt.de

The third level includes 11 teams representing strong presences in European football. Some of them are on a downward slope (AC Milan, Liverpool, Internationale Milano) and others on an upward path (Benfica, Schalke 04, Tottenham). At this level we notice the first contenders from

outside the strongest five leagues in Europe: Benfica, Galatasaray and Ajax, top teams in their countries' championships.

The fourth level consists of 20 teams, medium or medium + at European level, representing a diverse group. We wither have level 2 clubs from the "big five" championships or leading clubs in less powerful championships (Celtic, Fenerbahce, PSV Eindhoven). Only a few of them score in the top 20 for a particular variable: SS Lazio in the UEFA coefficient; Celtic, Rome, Besiktas on the IFFHS chart; Hamburger SV, Celtic for average number of spectators; Fenerbahce, Marseille in digital reach; Newcastle, Everton in total current income; Hamburger SV in brand value, Everton, AS Roma at market value of the players' lot.

The ranking and clusters thus obtained from the sports performance, economic and social assessment of teams in 2014 provides a relevant and representative current snapshot of European club football.

6. Conclusions

The academic endeavor of developing a statistically valid composite index for measuring the overall performance of sport entities, contributes to the advancement of scientific initiatives in the field of sports management.

This study provides a new perspective into the assessment of football clubs, evolving from one-dimensional classifications into a complex ranking befitting current realities, which aggregates aspects of sport, economic and social variables. Total score obtained for clubs by applying the composite index is an integrating representation of a team's sporting performance in all major competitions, its local and global reputation and its level of revenue generated by the business.

The scientific debate initiated by this paper is only a starting point. It may be continued by integrating new variables into the composite index developed by this study, variables for which sufficient data is currently not available. They can bring a quantification of other important elements of football clubs industry such as labor costs, debt volume, involvement in social projects or results of its own youth academy.

2. References

- Aaker, D. (1991), *Managing Brand Equity*, The Free Press, New York.

- Alm, J. (2012), *A lasting legacy or a sporting failure? The legacy of stadiums after a major international sporting* event, The 20th EASM conference - Sport between business and civil society.
- Andrikopoulos, A. and Kaimenakis, N. (2009), *Introducing FOrNeX: A composite index for the intangible resources of the football club*, International Journal of Sport Management and Marketing 5, 251-266.
- Beech, J. and Chadwick, S. (2007), *The Marketing of Sport*, Prentice Hall, Essex.
- Bryant F.B. and Yarnold, P.R. (1995), *Principal components analysis and exploratory and confirmatory factor analysis*. In Grimm and Yarnold, Reading and understanding multivariate analysis, American Psychological Association Books.
- Dobson, S. and Goddard, J. (2011), *The Economics of Football* - 2nd edition, University Press, Cambridge.
- Kuper, S. and Szymanski, S. (2009), *Soccernomics*, Perseus Books Group, New York.
- Madden, P. (2012), *Fan welfare maximization as a club objective in a professional sports league*, European Economic Review 56, 560–578.
- Mullin, B., Hardy, S., Sutton, W. (2000), *Sport Marketing, 2nd edition*, Human Kinetics, Champaign (IL), USA.
- Pele, D.T. (2004), *O teoremă de imposibilitate a agregării optime a indicatorilor economici*, [Online] Available from http://danielpele.ase.ro/index_files/art-cibe.pdf [Accessed: 10 March 2015].
- Plumley, D., Wilson,R., Ramchandani, G. (2014), *Towards a model for measuring holistic performance of professional football clubs*, Soccer & Society, Routledge, London.
- Westerbeek, H. and Smith, A. (2003), *Sport Business in the Global Marketplace*, Palgrave Macmillan, London.
- Yuan, He (2014), *Predicting Market Value of Soccer Players Using Linear Modeling Techniques*,

[Online] Available from http://www.stat.berkeley.edu/~aldous/Research/Ugrad/Yuan_He.pdf [Accessed: 10 March 2015].

- Brand Finance (2014), *Football 50 - The Annual Report on the world's most valuable football brands*, Brand Finance plc, London.
- Deloitte (2015), *Football Money League - Commercial breaks*, Sports Business Group, Manchester.
- International Federation of Football History & Statistics – IFFHS (2015), *Club World Ranking 2014*, [Online] Available from http://www.iffhs.de/club-world-ranking-2014/ [Accessed: 10 March 2015].
- OECD (2008), *Handbook on Constructing Composite Indicators: Methodology and User Guide*,

[Online] Available from http://www.oecd.org/std/42495745.pdf [Accessed: 10 March 2015].

- Result Sports (2014), *Digital Sports Media Magazine*, Result Sports Publication, Edition December 2014, Munich.
- UCLA (2015), *What does Cronbach's alpha mean?*, UCLA: Statistical Consulting Group, [Online] Available from http://www.ats.ucla.edu/stat/spss/faq/alpha.html [Accessed: 10 March 2015].
- UEFA (2015), UEFA rankings for club competitions, [Online] Available from http://www.uefa.com/memberassociations/uefarankings/club/index.html [Accessed: 10 March 2015].
- *** http://www.european-football-statistics.co.uk/attn.htm
- *** http://www.transfermarkt.de

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