

# When Scientific Production Enters in Field: Bibliometrics Appointments about Soccer

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**Abstract** — Soccer is an exponent of Brazilian culture and identity, being discussed and analyzed in the most varied areas and segments of the academic world. In this sense, this work aims to measure and analyze the scientific production produced on the subject. The Scopus Platform, which is the largest database of scientific reference documents in the world, has been chosen to fulfill the proposed objective. In his theoretical framework, the work presents concepts about bibliometry, with the contribution of Rodrigues et al. (2016), Araújo and Alvarenga (2011), Tolves et al. (2016) and Krauskopf (2018), and on soccer, with the contributions of Giulianotti (2010), Rossi and Mendes Jr. (2014) and Silva (2006). At the end of the study, a scientific landscape was established that quantitatively demonstrated the production of areas, countries, universities, authors and periodicals.

**Keywords** — Scientific indicators. Quantitative research. World Cup.

## I. INITIAL CONSIDERATIONS

In the field, 22 players. Outside him, a crowd accompanying the match with watchful eyes, watchful ears, and trembling hands. There is no more fascinating sport than soccer (DAMO, OLIVEN, 2013; GASTALDO, 2016). Therefore, as Guterman (2010) points out, sport can be understood as the largest social phenomenon in Brazil, since it represents the national identity and consolidates itself as the greatest expression of urban and mass popular culture in the country.

It is known, however, that sport is not only idolized by Brazilians. Soccer is consolidated as one of the most attractive and commented sports in the world (ROSSI; MENDES JR., 2014). Games involving large European clubs move millions of people around the globe, as there is now the possibility of seeing great stars parading their talent in a decision. The 2018 Champions League final, for example, had an audience of approximately 160 million people, surpassing even another major sporting event: the Super Bowl final. In Brazil it was no different: Globo, which has been broadcasting the competition since 2009, achieved its best result in 2018 (23 Ibope average

points, 10 points more than its traditional Saturday afternoon attractions).

In this sense, understanding soccer as a sport of collective interest, this work aims to measure and analyze the scientific production produced on the subject at a global level. Specifically, it is intended to establish a scientific landscape that demonstrates, quantitatively, the production of areas, countries, universities, authors and periodicals. In order to achieve the proposed objective, the Scopus Platform was chosen as the largest database and reference scientific documents in the world.

As for the work's disposition, the same is structured as follows: initially, the methodological procedures are presented with their selection criteria (RODRIGUES et al., 2016; ARAÚJO; ALVARENGA, 2011; TOLVES et al., 2016; KRAUSKOPF, 2018); after, it is discussed about the soccer (GIULIANOTTI, 2010; ROSSI; MENDES JR., 2014; SILVA, 2006); then the analyzes are presented; finally, the final considerations and the references are exposed.

## II. METHODOLOGICAL PROCEDURES

This work, which aims to measure and analyze the scientific production produced on soccer at a global level, used bibliometrics. For Rodrigues et al. (2016), bibliometrics is an important tool that allows to analyze the progress on the intellectual production of certain subjects. In agreement, Araújo and Alvarenga (2011, p. 51) argue that bibliometrics as an area of study of information science “has a relevant role in the analysis of scientific production, since its indicators portray the degree of development of an area of the knowledge of a scientific field or of knowledge”. Still, for Tolves et al. (2016), the analysis of the scientific production allows a better understanding of the nature of the research activities carried out in the numerous areas of knowledge, from different countries, institutions and researchers. It is also understood that the propagation of research results can generate improvement for professionals in the field and, consequently, several social advances.

From this point of view, to reach the defined objective, we used, in this research, a query to the Scopus database. Considered the largest database of abstracts and citations

in the world's peer-reviewed literature (KRAUSKOPF, 2018), the platform offers a comprehensive overview of the production of global research in the areas of Science, Technology, Medicine, Social Sciences, Arts and Humanities. In addition, it provides tools that enable the monitoring, analysis and visualization of researches.

As a search criterion, only the filter-term Soccer was used. It was decided not to insert a second word or phrase because the proposal was precisely that the results to be returned were broad, thus establishing a vast landscape regarding the scientific construction on the subject. Obviously, it was understood that, in order for the research to verify adequate results, the term should be searched in English (the official language of the platform and of global scientific production). Thus, the final draft was Soccer, which, according to the designated parameters, returned 21,376 works, including articles, reviews, book chapters and event annals.

Among the preferences available for consultation, in addition to the key-term mentioned, the following particularizations were applied:

- in the place where the term soccer should appear, it was selected "Article title, Abstract, Keywords";
- on the date of publication, the marked option was "All years" - "Present";
- in the document type to be located, "All" was preferred;
- in the type of access, "All" was selected;
- after, it was clicked on "Search".

The following figure explains, in a particular way, the way the site search fields have been marked.

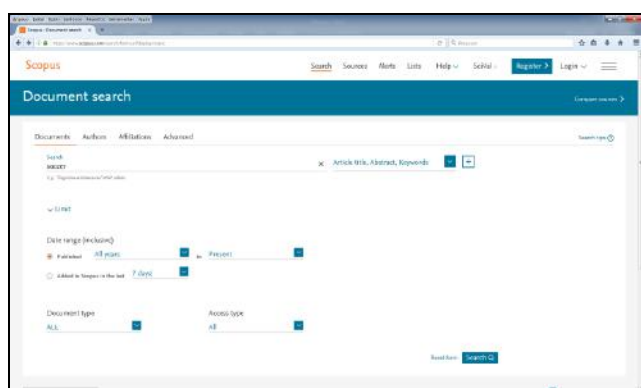


Fig. 1 – Scopus - Initial search

Source: Screenshot made by the authors

### III. BRIEF NOTES ABOUT SOCCER

Soccer is the most popular sport in Brazil. However, this preference can also be perceived in other countries, that is, it is the most globalized of sports. Be it in rich English soccer or in precarious African soccer, the ball rolls and with it a series of sensations and emotions surround their spectators. It is the sport in which in the last moment a game that seemed defined can have a huge turnaround.

It's also on the 4 lawn lines that a galactic team, full of valuable players, is not sure of the victory, even playing against an infinitely smaller payroll team.

Another interesting element is that, mainly in Brazil, the players does not have a specific biotype. It can be high or low, fast or slow. This is usually explicit before the start of an important game, when the national anthem is played. Profiled, the players are presented by the camera and, there, we perceive the different physical characteristics of each one that translate the Brazilian cultural diversity. There is, perhaps, no other place in the world where this question is so clearly perceived. Brazil is, therefore, a country of many cultures, races, ethnicities.

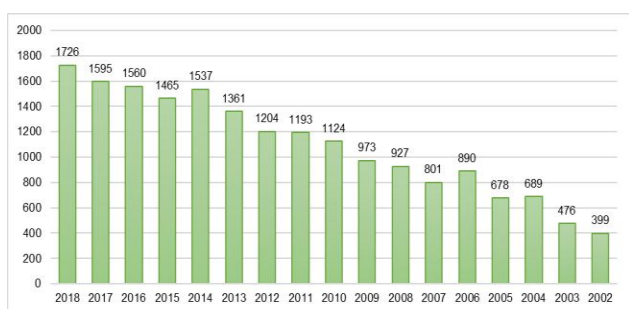
Giulianotti (2010, p. 07) mentions that, "although it may be increasingly outdated to say this, soccer is undeniably the world's leading sport." The author also seeks to uncover the characteristics that make the sport so popular: the simplicity of rules, equipment and body techniques. Roughly, it is enough that there are two teams, one ball and two goalies. The main purpose is to get the ball into the opponent's goal: it is the goal, the apogee, the maximum moment, whether on the European grassy slopes or in the muddy fields of the "gaucho countryside". However, although it seems a determining factor for the show, the goal is not fundamental, since there are anthological matches in which the score remained 0x0. What is worth is the emotion and the feeling that the sport provides.

In the current scenario, it is a consensus among fans and commentators that, in addition to enthusing the public, soccer also moves millionaire figures: contracts are made with players still adolescents, sponsorships are inserted in shirts and millions of products of the clubs are consumed. The sport has become an industry. However, from a different perspective, Rossi and Mendes Jr. (2014, 276) comment that, contrary to popular belief, soccer is a bad business: "the package of ideas that sees soccer as a great industry world to handle tens of billions of dollars is somewhat misleading". The authors cite examples of companies with millionaire billings and that, if they used the logic of the clubs, they would be bankrupt. About the games in Brazil, which occur during the week, close to the 10:00 a.m., the authors commented: "before complaining about the schedule, soccer needs to give more audience than the novel" (p. 282).

The point is that, generating losses or profits, or joys or sorrows, soccer is unanimous in the country and, as Silva (2006) argues, is understood as a symbol of national identity and an icon of Brazilian popular culture. Thus, in order to meet the proposed goal of this study, the bibliometric diagnoses are presented.

**IV. REVIEWS AND RATINGS**

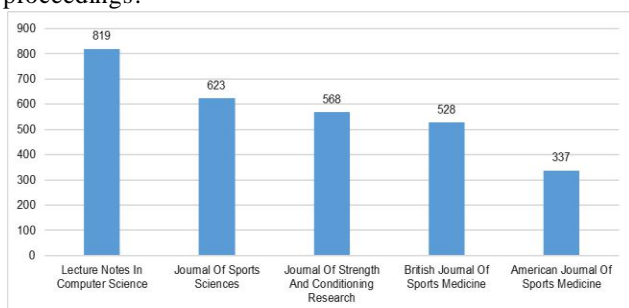
As a starting point for the discussions, we first sought to analyze the last 17 years of publications involving soccer. The respective time interval was selected with the intention of identifying the growth or decline of the number of publications year by year, since the FIFA World Cup, mega-event of the sport, occurs every 4 years. There was, therefore, the assumption that in the years in which the event occurs, the number of publications would increase considerably. Observing the following graph, we can see that, in the selected temporal section, this was not the occurrence, since it is noticed that the number of publications on the subject has been ignited, which expresses the growing interest of the scientific community in the subject.



Graph 1 - Number of annual publications

Source: Prepared by the authors

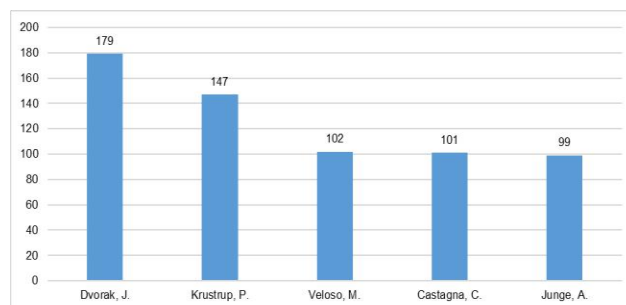
In order to identify the journals responsible for the greatest number of publications since the initial year of this survey (1932), the chart below shows that, with 819 publications, Lecture Notes in Computer Science has the lead. This, however, is not a journal that, in principle, is directly related to soccer: when we look at the themes that make up the total number (819), we notice that the works come from areas such as computer science, mathematics and biochemistry. The other journals that make up the chart - Journal of Sports Sciences, Journal of Strength and Conditioning Research, British Journal of Sports Medicine and American Journal of Sports Medicine - published in vast majority, work linked to the field of Medicine, dividing between articles and conference proceedings.



Graph 2 - Periodicals and number of publications

Source: Prepared by the authors

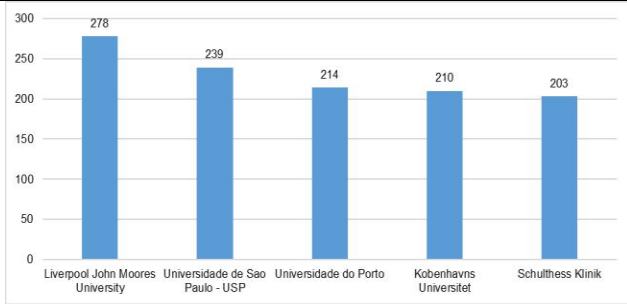
From the author’s point of view, Jiri Dvorak leads the ranking with 179 publications. The author comes from Medicine, having published much of his work in periodicals related to the subject. This fact can be seen in the other members of Graph 3 who publish, substantially, in medical journals. It is also noted that the immense part of these publications are co-authored; there is rarely publication alone or even with few authors. The work with the greatest number of citations from Dvorak (476), for example, is “Summary and agreement statement of the 2nd International Conference on Concussion in Sport” and has 10 authors. His second paper, “Consensus statement on injury definitions and data collection in studies of soccer (soccer) injuries” (449 citations), has 9 and this shows a tendency among all the authors that integrate the graph.



Graph 3 - Authors and number of publications

Source: Prepared by the authors

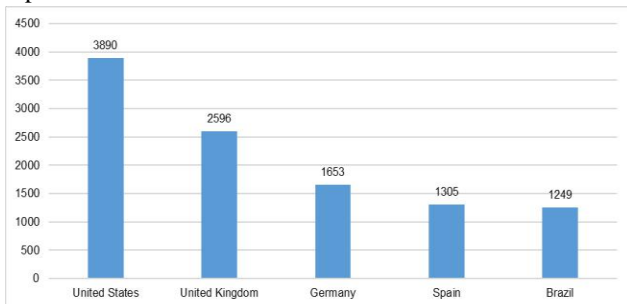
Graph 4 highlights the institutions with the largest number of publications. At the top, there is Liverpool John Moores University, a traditional english university founded in 1823. Among the most cited articles produced in the institution, the first three positions have Thomas P. Reilly as co-author: “Anthropometric and physiological predispositions for elite soccer” (468), “A multidisciplinary approach to talent identification in soccer” (418) and “Talent identification and development in soccer” (341). It is also worth noting the position of the University of São Paulo as the second institution that produced most works on soccer indexed in Scopus. Its most cited work, times 121, is “A model for the structural, functional, and deontic specification of organizations in multiagent systems”, authored by J. Hübner, J. Sichman and O. Boissier, published, precisely, in the Lecture Notes in Computer Science. The high scientific production reinforces the idea that sport is of great interest in the country (GIULIANOTTI, 2010), even in the academic world.



Graph 4 - Institutions and number of publications

Source: Prepared by the authors

Although “within the four lines” the United States is not an exponent of soccer - the country has never won a FIFA World Cup, for example - in the academic field leads the ranking of nation with the largest number of publications<sup>1</sup>. There are 3890 works, mostly from Medicine. Brazil, defined by Silva (2006) and Guterman (2010) as the country of soccer, ranks 5th with 1249 jobs. Between the two countries are the United Kingdom, Germany and Spain: nations known globally for their tradition in sport, possessing, in addition to world titles, national championships consolidated as the most important of the soccer.



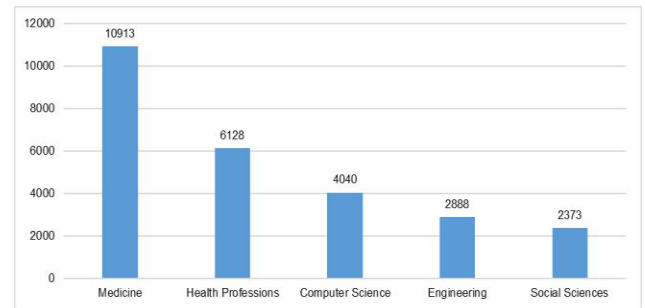
Graph 5 - Countries and number of publications Source:

Prepared by the authors

As already mentioned, Medicine has a remarkable production on soccer in the scientific world: it is, therefore, the area that most produced works indexed in Scopus (10913). The article “Biomechanical measures of neuromuscular control and valgus loading of the knee predict anterior cruciate ligament injury risk in female athletes: A prospective study”, published in the American Journal of Sports Medicine, has 1351 citations and is the most cited work in the field. The ranking also includes the areas of Health Sciences, Computer Science, Engineering and Social Sciences. We chose to demonstrate, graphically, only the 5 areas with the highest number of citations; however, it is important to mention that given the breadth of soccer, the subject is addressed in countless

<sup>1</sup> Data refer to the nationality of journals and not to authors who have published. In this way, it is important to mention the interest about soccer in periodicals, coming from a country where sport is not a reference.

other areas, such as Psychology, Marketing and Economy, for example.



Graph 6 - Area and number of publications Source:

Prepared by the authors

The synthesis-table presented below presents the main quantitative results highlighted by the research.

Table.2 - Summary table of results

Quantitative highlights of the search for the term soccer		
Year	2017	1726 publications
Journal	Lecture Notes In Computer Science	819 publications
Author	J. Dvorak	179 publications
Higher education institutions	Liverpool John Moores University	279 publications
Country	United States	3890 publications
Area	Medicine	10913 posts

Source: Prepared by the authors

The conclusions drawn for this work are presented below.

## V. CONCLUSIONS

The present work, including soccer as a sport of global interest, aimed to measure and analyze the scientific production produced on the theme. The priority was to build a scientific landscape that quantitatively demonstrated the production of areas, countries, universities, authors and periodicals. Therefore, in order to achieve the desired objective, the Scopus Platform, which is the largest database and scientific documents in the world, was chosen.

In this sense, some observations can be pointed out:

- It was assumed that in the years in which the FIFA World Cup takes place scientific production on soccer would increase considerably. This did not occur, since the number of publications increased year by year, regardless of the event;
- The newspaper that has more texts on soccer indexed in Scopus is Lecture Notes In Computer Science, that has no

direct relation with soccer. In addition, the works that make up the total number (819) come from areas such as Computer Science, Mathematics and Biochemistry;

- From the author's point of view, one can see that, among the quantitative highlights, the vast majority of publications are co-authored; there is rarely a solitary publication or even a few authors;

- Among the universities that most published works is Liverpool John Moores University (278). However, it is considered fundamental to highlight the University of São Paulo in the second position (239);

- The United States, a country without a tradition in soccer, ranks first in the ranking of nations with the largest number of publications. After, appear the United Kingdom, Germany, Spain and Brazil, countries where soccer has high popular appreciation;

- Medicine is the area with the most works indexed in Scopus, followed by Health Sciences, Computer Science, Engineering and Social Sciences. It is also evidenced that the subject is approached by countless other areas, such as Psychology, Marketing and Economy, for example.

At the end of the study, it is understood that the proposed goal has been achieved, while at the same time projecting its continuity. It is possible, for example, to carry out this landscape on other platforms, such as Redalyc, Scielo and Web of Science. There is also the prospect of joining the word Soccer with other filter-terms in order to acquire a greater delimitation in the presented results.

#### REFERENCES

- [1] ARAÚJO, R.; ALVARENGA, L. A bibliometria na pesquisa científica da pós-graduação brasileira de 1987 a 2007. **R. Eletr. Bibliotecon. Ci. Inf.**, Florianópolis, v. 16, n. 31, p.51-70, 2011. Disponível in: <<https://periodicos.ufsc.br/index.php/eb/article/view/1518-2924.2011v16n31p51/17757>>. Access in: 29 set. 2018.
- [2] DAMO, Arlei Sander; OLIVEN, Ruben George. O Brasil no horizonte dos megaeventos esportivos de 2014 e 2016: sua cara, seus sócios e seus negócios. **Horiz. antropol.**, Porto Alegre, v. 19, n. 40, p. 19-63, dez. 2013. Disponível in: <[http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0104-71832013000200002&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-71832013000200002&lng=en&nrm=iso)>. Access in: 17 out. 2018.
- [3] GASTALDO, Edison. Arquibancada Cotidiana: jogos, sociabilidade e interação entre torcedores de futebol no Brasil. **Logos**, v. 23, n. 1, out. 2016. Disponível in: <<http://www.e-publicacoes.uerj.br/index.php/logos/article/view/22362>>. Access in: 17 out. 2018.
- [4] GIULIANOTTI, Richard. **Sociologia do futebol: dimensões históricas e socioculturais do esporte das multidões**. São Paulo, SP: Nova Alexandria, 2010.
- [5] GUTERMAN, M. **O futebol explica o Brasil: uma história de maior expressão popular do país**. São Paulo, SP: Contexto, 2009.
- [6] KRAUSKOPF, E. An analysis of discontinued journals by Scopus. **Scientometrics**, v. 116, i. 3, 1 September 2018, p. 1805-1815.
- [7] RODRIGUES, L. *et al.* A bibliometria como ferramenta de análise da produção intelectual: uma análise dos hot topics sobre sustentabilidade. **Biblionline**, João Pessoa, v. 12, n. 3, p. 34-47, jul./set., 2016. Disponível in: <<http://www.periodicos.ufpb.br/index.php/biblio/article/viewFile/29000/16638>>. Access in: 29 set. 2018.
- [8] ROSSI, J.; MENDES JÚNIOR, L. **Guia politicamente incorreto do futebol**. São Paulo, SP: Leya, 2014.
- [9] SILVA, E. J. da. **A taça do mundo é nossa: o futebol como representação da nacionalidade**. Governador Valadares, MG: Editora Univale, 2006.
- [10] TOLVES, T. *et al.* Bibliometria da fisioterapia no Brasil: uma análise baseada nas especialidades da profissão. **Fisioter. Pesqui.**, São Paulo, v.23, n.4, Oct./Dec. 2016. Disponível in: <[http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S1809-29502016000400402&lng=en&nrm=iso&tlng=pt#B1](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1809-29502016000400402&lng=en&nrm=iso&tlng=pt#B1)>. Access in: 29 set. 2018.