Bibliometric analysis of the publication activity of Russian scientific institutions in sports science for 2008-2018

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Abstract:

Sport is of great interest to many countries around the world. Given that interdisciplinary research in the field of sports is developing (sports nutrition, sports medicine, sports management, sports engineering, sports psychology), the number of publications is increasing, expanding understanding of the role of sports in society. This study analyzed Russian publications on sports science indexed in the Scopus database from 2008 to 2018. During this period, 2622 articles were published in 69 journals, including 3 Russian journals. The dynamics of scientific publications indicates an increase in Russian scientific research in the field of sports science from 2012 to the present.

The following data were analyzed: publication years, journal titles, institutions, citations, types of publications, and international cooperation. The scientific products of Russian sports science show the progressive development and strengthening of this area clearly focused on international cooperation.

KeyWords: *assessment, bibliometric analysis, scientific journals, sports science, SJR, Scopus, SciVal*

Introduction

The publication activity of Russian scientists in sports science does not correspond to the pace of world development. A significant part of Russian scientists does not have time to adapt to existing realities. This leads to their inactive integration into international scientific communication. This issue is confirmed by the data of Scopus and the SciVal analytical tool. According to the data, Russia, in comparison with other countries, takes only 14th place (out of 164) by the number of indexed publications in the field of sports science and 40th place (out of 164) by the number of citations over the past ten years. Public investment in science and higher education improves research results, increases quantitative and qualitative indicators of publishing and the innovative potential of all participants (Kulmala et al., 2015).

To increase the publication activity of Russian scientists, since 2012, several programs have been implemented to support leading scientific and educational institutions (Decree of the Government of the Russian Federation. 2013; Decree of the President of the Russian Federation. 2012; Directive of the Government of the Russian Federation. 2012, 2013; Ministry of Education and Science of the Russian Federation).

The Russian project called Excellence Initiatives and the 5-100 project are aimed at improving the “competitiveness of leading Russian universities in the global market for research and education” (Turko, T., Bakhturin, G., Bagan, V. et al., 2016). In the Science national project, one of the six targets is “the place of the Russian Federation in the specific weight in the total number of articles in areas, determined by the priorities of scientific and technological development, in publications indexed in international databases” (Passport natsional'nogo proekta “Nauka”. (2018).

These initiatives have improved some parameters of the research activities of Russian scientific institutions (Markusova, V., Libkind, A., Mindeli, L., Jansz, M. (2013). The overall productivity, scientific, economic and social impact of Russian research institutes remain unclear. Comparative trends in specific indicators of research effectiveness and the most relevant rating of the Russian contribution in various scientific subjects have not been analyzed. The purpose of the study is a bibliometric analysis of the publication activity of scientific institutions in Russia in the field of sports sciences. Bibliometrics is defined as a quantitative analysis of the bibliographic features of publications in a given field of knowledge, such as chronology, citations, keywords, authors, collaboration networks, institutions, countries, themes, and journals (Bellis N de. (2009). Databases are considered reliable sources of information for conducting this type of study (Prieto J, Sampaio J, Gómez MA. (2015), as they include periodicals with great scientific relevance.

Some authors have already carried out bibliometric studies on specific topics of sports science (Belfiore, P., Iovino, S., Tafuri, D. (2019); Carbinatto, MV, Moreira, WW, Chaves, AD, Santos, SP, Simões,

RR, (2016); Franchini, E., Gutierrez-Garcia, C., Izquierdo, E., 2018; Harker, JL, Saffer, AJ, (2018); Huertas González-Serrano, M., Jones, P., Llanos- Contrera, O. (2020); Knudson, D. (2018); Möller, AM, Ansari, P., Ebrahim, NA, Khoo, S. (2016); Rodríguez-López, ME, Alcántara-Pilar, JM, Del Barrio-García, S., & Muñoz-Leiva, F. (2019); Vicentini, L., Marques, RFR (2018), including the most cited publication (Brito, J., Nassis, GP, Seabra, AT , Figueiredo, P. (2018); Khoo, S., Li, C., Ansari, P. (2018),) and information sources (Pérez-Gutiérrez, M., & Gutiérrez-García, C. (2015); Coimbra, D. R., Dominski, F. H., Correia, C. K., Andrade, A. (2019). On this topic, we have identified publications that analyze publication activity in certain countries: Chile, Poland, Spain, Brazil, China, and Arab countries (Barczyński, BJ, 2013; Pérez-Gutiérrez, M., (2016); Reverter-Masía, J. (2014); Zhang, B. (2017); Završnik, J., (2016); Fares, MY, Fares, J., Baydoun, H., Fares, Y. (2017); Betrán, JO, Valle, AA (2017)). Research in the field of sports sciences in the Russian Federation has not been identified.

Material & methods

We conducted a bibliometric analysis of Russian publications on sports science indexed in the largest international science citation database Scopus (Elsevier) from 2008 to 2018.

The choice of this database is determined by the following factors:

1. A wider coverage of publications affiliated with Russia in comparison with the Web of Science database;
2. The ability to export source data to the SciVal analytical tool for the analysis of publications on various parameters.

The search was conducted on January 24, 2020 in the Scopus database. The field of study at Scopus is sports science. The query string created in the Scopus advanced search form is based both on country affiliation (field code - AFFILCOUNTRY) and on a subject subheading according to the ASJC classifier (field code - SUBJMAIN).

Request: SUBJMAIN (3612) AND AFFILCOUNTRY (Russian AND Federation). The period is limited to 10 years from 2008 to 2018, since articles for 2019 are not yet all indexed in the Scopus database. The analysis did not take into account editorial, note, short survey and undefined, since they are not the result of research.

The data obtained as a result of the request was exported to the SciVal analytical tool. SciVal is another bibliometric tool that uses Scopus data but provides more options for analysis. (Fest, P. M. J., 2017).

Results

As a result of the search, 2622 sources of information were found. Among them 2,478 articles, 100 reviews, 20 conference papers, 15 editorials, 5 notes, 3 short surveys, 1 undefined.

After filtering and excluding sources with incomplete abstracts, 2,598 publications remained.

The volume and dynamics of research in sports science in Russia are shown in Fig. 1. A sharp increase in publication activity was observed in 2012 and 2014. From 2015 to 2017, the increase in the number of publications was constant and a steady quantitative growth was observed. In 2018, sports science publications have peaked at the moment. (Fig. 1)

Fig. 1. Distribution of the number of publications by year

This is explained by several reasons.

The first reason is the implementation of support programs for leading universities. State funding for the publishing activities of Russian scientists has become an incentive, resulting in the growth of quantitative indicators. Therefore, the first 15 institutions (Fig. 2) that have the largest number of publications are universities. Of these, 6 universities are participants in the 5–100 project.

Fig. 2 TOP 15 institutions by the number of articles

However, when it comes to the Citations per publication indicator, scientific institutions at the federal level demonstrate the best results, while publications with university affiliation are quoted much less. (Fig. 3)

Fig. 3 TOP 10 institutions by Citations per publication

The second reason is the inclusion of several Russian scientific journals in the Scopus database. The *Teoriya i Praktika Fizicheskoy Kultury* journal has been included in the Scopus database since 2012. Over the past 5 years, 2 more Russian journals have been included in Scopus: *Human Sport Medicine* and *Obrazovanie i Nauka*, which publish articles on sports topics.

Table 1 demonstrates the sources of information in the field of sports sciences. A total of 69 journals and conference proceedings were identified for analysis, 9 of which belong to TOP 10% Journal Percentiles by SJR. Journals are ranked by number of publications in descending order.

Also, for each publication, Views per Publication and Field-Weighted Citation Impact, which is the ratio of citations received relative to the expected world average for the subject field, publication type and publication year, are calculated. The last criterion shows the degree of international cooperation in the publications of institutions.

Table 1. List of journals where Russian authors are published

	Scopus Source	Country	Scholarly Output	Views per Publication	Field-Weighted Citation Impact	International Collaboration (%)
1.	Teoriya i Praktika Fizicheskoy Kultury	Russia	2133	13,9	0,15	1,9
2.	Human Sport Medicine	Russia	145	4,8	0,12	12,4
3.	Obrazovanie i Nauka	Russia	80	14,4	0,59	12,5
4.	Journal of Physical Education and Sport	Romania	76	36,2	0,76	17,1
5.	Journal of Human Sport and Exercise	United States	14	20,8	1,44	28,6
6.	European Journal of Physical and Health Education	Poland	12	29,5	0,23	8,3
7.	Biology of Sport	Poland	10	32,6	1,02	80
8.	Archives of Budo	United States	7	18,6	1,76	100
9.	Journal of Sports Sciences	United Kingdom	7	41	1,92	85,7
10.	Journal of Strength and Conditioning Research	United States	6	15,7	0,91	100
11.	British Journal of Sports Medicine	United Kingdom	5	12,2	0,87	0
12.	icSPORTS 2017 - Proceedings of the 5th International Congress on Sport Sciences Research and Technology Support	Portugal	5	10,4	0,23	0
13.	icSPORTS 2018 - Proceedings of the 6th International Congress on Sport Sciences Research and Technology Support	Portugal	5	22,2	0,6	80
14.	Journal of Sports Medicine and Physical Fitness	United States	4	69,2	3,92	75
15.	Footwear Science	United Kingdom	4	2,2	0	0
16.	Medicina dello Sport	Italy	4	6	0,11	50
17.	Motor Control	United States	4	14,2	0,2	75
18.	icSPORTS 2014 - Proceedings of the 2nd International Congress on Sports Sciences Research and Technology Support	Portugal	3	21	0,32	0
19.	icSPORTS 2015 - Proceedings of the 3rd International Congress on Sport Sciences Research and Technology Support	Portugal	3	26,7	0,52	0
20.	International Journal of Sports Physiology and Performance	United States	3	33,3	1,81	33,3
21.	Journal of Human Kinetics	Poland	3	19,7	0,82	66,7
22.	Medicine and Science in Sports and Exercise	United States	3	83,7	3,44	100
23.	Medicine and Sport Science	Switzerland	3	59,7	1,93	66,7
24.	Scandinavian Journal of Medicine and Science in Sports	United Kingdom	3	35	2,05	66,7
25.	Applied Ergonomics	United Kingdom	2	65	0,9	100
26.	European Journal of Physical and Rehabilitation Medicine	Italy	2	23,5	1,15	50
27.	European Journal of Sport Science	United Kingdom	2	25,5	0,63	100
28.	International Journal of Performance Analysis in Sport	United Kingdom	2	14	1,66	100
29.	Journal of Aging and Physical Activity	United States	2	19,5	1,5	100
30.	Journal of Sports Science and Medicine	Turkey	2	33	0,93	100
31.	PM and R	United States	2	35,5	0,63	100
32.	Science of Gymnastics Journal	Slovenia	2	15	1,5	50
33.	Annals of Applied Sport Science	Iran	1	39	0,4	100
34.	Apunts Medicina de l'Esport	Spain	1	56	0,47	0
35.	Archives of Physical Medicine and Rehabilitation	United Kingdom	1	14	0,78	100
36.	Cartilage	United States	1	11	0,44	100
37.	Clinical Journal of Sport Medicine	United States	1	85	2,03	100
38.	Disability and Rehabilitation: Assistive Technology	United Kingdom	1	28	1,04	100
39.	Ergonomics	United Kingdom	1	31	0,24	0
40.	icSPORTS 2016 - Proceedings of the 4th International Congress on Sport Sciences Research and Technology Support	Portugal	1	16	0,5	100
41.	Ido Movement for Culture	Poland	1	17	0,09	100
42.	International Journal of Athletic Therapy and Training	United States	1	31	1,11	100
43.	International Journal of Therapy and	United States	1	25	0	100

	Rehabilitation					
44.	Journal of Athletic Training	United States	1	12	0,22	100
45.	Journal of Back and Musculoskeletal Rehabilitation	Netherlands	1	8	0,45	100
46.	Journal of Developmental and Physical Disabilities	United States	1	40	2,76	100
47.	Journal of Orthopaedics, Trauma and Rehabilitation	Netherlands	1	19	0	0
48.	Journal of Physical Therapy Science	Japan	1	18	4,22	0
49.	Journal of Rehabilitation Medicine	United Kingdom	1	17	0,89	100
50.	Journal of Science and Medicine in Sport	Netherlands	1	65	2,65	100
51.	Journal of Sport Management	United States	1	6	0,35	100
52.	Journal of Sport Rehabilitation	United States	1	42	0,15	100
53.	Manuelle Medizin	Germany	1	7	0	0
54.	Motricidade	Portugal	1	16	0,22	100
55.	NeuroRehabilitation	Netherlands	1	39	0,92	100
56.	Open Sports Sciences Journal	Netherlands	1	64	0,15	100
57.	Physical Medicine and Rehabilitation Clinics of North America	United Kingdom	1	42	0,89	100
58.	Physikalische Medizin Rehabilitationsmedizin Kurortmedizin	Germany	1	15	0	0
59.	Physiotherapy Theory and Practice	United Kingdom	1	94	0,63	100
60.	Retos	Spain	1	5	0,46	100
61.	Revista Internacional de Medicina y Ciencias de la Actividad Fisica y del Deporte	Spain	1	35	0,19	100
62.	Schweizerische Zeitschrift für Sportmedizin und Sporttraumatologie	Switzerland	1	9	0	0
63.	Shoulder and Elbow	United Kingdom	1	3	0,17	0
64.	South African Journal for Research in Sport, Physical Education and Recreation	South Africa	1	22	0	0
65.	Sport Science	Bosnia and Herzegovina	1	19	0	100
66.	Sport, Ethics and Philosophy	United Kingdom	1	8	0	0
67.	Sports Medicine	United Kingdom	1	20	0,89	100
68.	Sports Medicine - Open	United Kingdom	1	4	1,31	100
69.	Sports Technology	United Kingdom	1	9	0	0

The distribution of journals by SJR quartiles shows that the main number of publications (88.1%) was published in the journals of 3rd quartile (Fig. 4). This is explained by the fact that the majority of articles (82.2%) were published in the *Teoriya i Praktika Fizicheskoy Kultury* journal, which has a SJR (2018) indicator of 0.199. This journal is published in Russia, and it is easier for Russian scientists to publish in it due to the lack of geographical and language barriers.

Fig. 4. Distribution of journals by SJR quartiles

International cooperation is low (6.7% or 175 articles) but the citation rate for publication is 6.5. This is explained by the fact that articles with scientists from foreign institutes are published in English. This allows more readers to read the full article and increases the likelihood of citation compared with articles in Russian without an international collaboration.

Metric	Scholarly Output	Citations	Citations per Publication	Field-Weighted Citation Impact	
■ International collaboration	6.7%	175	1,137	6.5	0.84
■ Only national collaboration	25.1%	651	860	1.3	0.25
■ Only institutional collaboration	50.4%	1,309	1,178	0.9	0.19
■ Single authorship (no collaboration)	17.7%	460	291	0.6	0.12

Fig. 5. Collaboration

75.5% of the articles were written in collaboration with Russian scientists, which indicates the local character of scientific interaction. However, recent initiatives of the Ministry of Science and Higher Education of the Russian Federation have established the course for improving the quality of publications by Russian authors and increasing the rate of international cooperation. Therefore, Fig. 6 shows that the number of articles with international cooperation has been growing steadily since 2014.

Fig. 6. Number of articles with international collaboration by year

Discussion

The bibliometric analysis associated with the publication activity of Russian scientific institutions in the field of sports science is scarce. In recent years, only a small number of bibliometric studies on the publication activity of some countries have been published (Barczyński, BJ, 2013; Pérez-Gutiérrez, M., (2016); Reverter-Masía, J. (2014); Zhang, B. (2017); Završnik, J., (2016); Fares, MY, Fares, J., Baydoun, H., Fares, Y. (2017); Betrán, JO, Valle, AA (2017)). This study is the first of its kind to analyze articles by Russian authors for 2008-2018 in the field of sports science.

The dynamics of scientific publications indicates an increase in Russian scientific research in the field of sports science from 2012 to the present. The exponential growth in the number of publications can be associated with public investment in science and the implementation of several support programs for leading scientific and educational institutions. In particular, the 5-100 Project provided for large-scale budget allocations, the total amount of which exceeded 80 billion rubles. The number and significance of participants (21 largest universities in the country), together with its ambitious goals, made “5-100” one of the most significant systemic events aimed at the development of science and higher education in Russia (Kliucharev GA, Neverov AV, (2018). The main areas of allocations are the development of infrastructure (laboratories and academic facilities, housing for students and teachers, social facilities, sports and cultural facilities) (Kliucharev GA, Neverov AV, (2018).

However, scientometric indicators such as citation, SJR, collaboration, show the problem areas of Russian sports science. In particular, most of the articles were published in the Russian journal entitled *Teoriya i Praktika Fizicheskoy Kultury*, which is included in the 3rd quartile (SJR). These publications are in Russian and are written mainly in collaboration with Russian scientists, which is why they have a small percentage of citation. Therefore, it is necessary to expand the geography of publications and scientific cooperation.

This study has a number of minor limitations that do not affect the overall results of the study:

1. To search for publications in the field of sports science, the available data were used, while research institutions were not surveyed to verify the analyzed indicators. Our analysis was focused on the indicators available in Scopus and SciVal due to known shortcomings of other sources (Aldieri et al. 2017), so some significant research results indexed in other databases could be overlooked;

2. The percentage of publications for TOP 10% Journal Percentiles by SJR is calculated using only those journals that have a SJR score;
3. SJR is not calculated for all publications and only for journals;
4. When exporting data in SciVal to the Overview and Trends modules, it is possible to select a period only from 2009 to 2018. However, in 2008 only 3 articles were published that did not fall into the general array of the analyzed data, which, in our opinion, is an insignificant error.

Conclusions

Our bibliometric analysis of publications in the field of sports science allows us to conclude that the number of publications is increasing every year. Despite the fact that the publication activity of Russian scientists indexed in Scopus is lower than that of foreign ones, nevertheless, every year there is an increase in the number of published works. There is an increase in national and international cooperation between scientists.

We concluded that Russian research in the field of sports science has great potential despite much less financial support at the national and international levels. This study confirms the concentration of knowledge and innovations in large federal scientific institutions of Russian universities. The expansion of scientific cooperation, the expansion of research activities and the creation of Russian journals in the field of sports sciences that meet international standards help Russia to better integrate into the global scientific space

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