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Gender disparities in Russian academia: a bibliometric analysis

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Abstract

The problem of gender disparities in various areas of society has long been well known and identified in most countries. Russian academia is no exception. This paper describes the representation of Russian men and women authors in terms of research production. The analysis is based on 121,953 papers with at least one Russian author, covered by Web of Science (WoS) and published between 2017 and 2019. The results demonstrate that there are still evident signs of gender disparities. Women remain underrepresented in their overall presence and performance almost in all disciplines and generally in academia. In all research fields, women's mean number of publications is lower than analogous indicators for men. Although some areas have relative gender parity and even more women authors, the gap between both genders remains stable for most disciplines. As a result, despite some improvements in women's research performance, Russian academia is the case, demonstrating that without a gender policy in both Russian political and science systems, it is complicated to eliminate gender inequality.

Keywords Gender · Russia · Academia · Research production

Introduction

Gender disparities in academia

Despite significant improvements in gender equality proliferation, gender disparities remain in the academic profession globally and in Russia (Knights & Richards, 2003; Larivière et al., 2013; UNESCO, 2020). Nowadays, the general accelerating trend for many countries is that women undergraduate and graduate students outnumber men at universities (Bilton, 2018; Hare, 2020; O'Connor et al., 2015). However, the situation is different

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from an academic profession perspective. The discrepancy occurs at the researcher level, with men representing 72% of the global academic pool (UNESCO, 2016). Additionally, women scholars hold fewer academic positions than males at later career stages (Catalyst, 2020; Graddy-Reed et al., 2019; Herschberg & Berger, 2015). As a consequence, gender disparities are observable in various aspects of scientific activity, ranging from grant applications and grant awards (Ranga et al., 2012; Witteman et al., 2019; Cruz Castro & Sanz Menéndez, 2015) to publication patterns (Astin & Davis, 2019; Bentley, 2012; Mauleón & Bordons, 2006) and citation rates (Dion et al., 2018; Dolan & Lawless, 2020).

The trend is similar in the Russian academic system. Russia is ranked first globally for the share of women faculty in tertiary education, occupying approximately 60% of general academic staff (Rudakov & Prakhov, 2021). However, Russian women are less represented at the higher academic ranks and in academic management (Bagirova & Surina, 2017). Women, dominating at the first stages of their careers, become significantly less represented at the subsequent ranks (HSE, 2020). Indeed, women mostly occupy lower positions such as associate professors, lecturers, and assistants (Sterligov, 2017). The share of women in lower academic professions exceeds the number of men about twofold. Senior academic positions, on the contrary, are generally held by men.

These indicators of gender inequality directly impact the general role of women in the Russian academic system. Some studies demonstrate that in the 2010s, women scholars in Russia lag behind men in all scientific fields in terms of "relative contribution to scientific output across disciplines" (Lewison & Markusova, 2011; Paul-Hus et al., 2015, p. 1551). However, these results were mainly obtained based on natural sciences and STEM, where the gender imbalance traditionally seems more evident. In recent years, significant changes have taken place in Russian academia: (1) the development of research at universities; (2) the new funding formats (e.g., mega grants, longer research grants from the Russian Science Foundation); (3) the invitation and return of leading international researchers to leading research centers. Such modernization has contributed to the growth of young researchers into the academic system and the active development of new research fields and disciplines that were not widely represented in the traditional structure of research in Russia. Thus, an up-to-date large-scale assessment of the situation with gender inequality in science is needed today.

This study explores the current gender situation in Russian academia through the analysis of Russian scholars' publication production. It answers the following research questions: (1) What gender disparities occur in the Russian academic system? (2) What research fields are more and less inclined to gender gaps? (3) What is the difference between men and women scholars in Russia in terms of publication production?

To answer these questions, the research examines the publications of Russian scholars as it is the most critical indicator of research production (Ramsden, 1994). There is a growing body of research describing gender disparities in science by analyzing academics' research production indicators (see, e.g., Larivière et al., 2013; Paul-Hus et al., 2015; Nielsen, 2016a; Bendels et al., 2018; Abramo et al., 2021). Recent bibliometric studies have displayed three different patterns relevant in the context of academic production indicators through a gender lens. This research examines the Russian case to identify which pattern the Russian case is.

The empirical analysis focuses on the publications of Russian scholars published between 2017 and 2019. The study of research fields, which are more and less inclined to gender gaps, is based on the WoS Essential Science Indicators database with 22 research fields. Overall, this article is an attempt to get closer to understanding the gender disparities in academics' research performance and academia in general, present in most countries and particularly in Russia. The contribution of this research is twofold. First, by analyzing the gender aspects of Russian academics' research production, this article contributes to the literature on the gender factor as a component of academic career analysis in Russia, an under-researched but essential topic. Second, analyzing the current situation of Russian academics' research production, this article develops the literature on gender factors within bibliometrics studies and contributes to the assessment of gender differences in the context of publication performance.

The article is organized as follows: In the next part, we explain the publications' choices as indicators of research production. Then, the article characterizes the results of studies of gender differences assessment in terms of research performance. The methodological part describes the data collection and its subsequent analysis. The results describe the gender gaps in terms of research contributions of Russian academics and show how publication production differs for men and women authors from Russia. In conclusion, possible explanations of women's and men's research production indicators in Russian academia are presented.

Publications as the indicator of research production

It is widely accepted that research activity is regarded as one of the main objectives of knowledge production. Research provides new knowledge and approaches that can be transferred into tangible and intangible practice. In the context of academic research measurement, the principal indicator is productivity. In general terms, research productivity is defined as "the output produced in a given period per unit of production factors used to produce it" (Abramo & D'Angelo, 2014, p. 1131). It also determines "how reputations are earned, grants acquired [and] promotions awarded" (Bentley & Blackburn, 1992, p. 698).

Despite existing methodological and theoretical deficiencies, publication indicators are "commonly applied in the individual assessment of scientific recognition and predictions concerning future performance" (Nielsen, 2016a; Zuckerman, 1988, p. 2045). Bazeley (2010) claims that implementing an alternative system consisting of different quality and broader impact and volume measures has failed. For this reason, traditional measures of research performance are based on bibliometric measures such as a source of publications, citations, or both (Nygaard & Bahgat, 2018). Additionally, in some cases, the assessment of the quality of activity and indicators of the researchers' reputation is applicable in research performance analysis (Bazeley, 2010). Therefore, publication counts continue to be a widely used parameter to assess research production (see, e.g., Aksnes et al., 2019; Baskurt, 2011; Nielsen, 2016a).

From about the mid-1970s, numerous studies have been carried out on research productivity and production (Nygaard, 2017). The individual researcher is usually the basic level for analyzing academic research production (Carayol & Matt, 2004). Research production demonstrates the researcher's engagement with scientifically informed activity without considering the resources spent on it (Cooper et al., 2021). Each academic's academic potential and impact are valued from research or scientific production (O'brien & Hapgood, 2012; Nielsen, 2016a). Researchers' production is often measured by calculating the number of publications, especially those in international journals (Litwin, 2014; Nygaard & Bahgat, 2018).

Various studies have used bibliometric analyses to examine the status of women in academia (see, e.g., Hesli & Lee, 2011; Peñas & Willett, 2006; Rørstad & Aksnes, 2015) and to observe the research production patterns through research publications in a country

(Cooper et al., 2021; Ingwersen & Larsen, 2014; Nygaard, 2017). Therefore, in this paper, publications are considered as an essential indicator of academics' research production. Publications are analyzed as the measurement counts of research production and gender as its contributing factor.

Academic production through a gender lens

Numerous studies have used publications, citations, or both to examine the status of women in academia (Cooper et al., 2021; Nygaard & Bahgat, 2018). The bibliometric literature suggested three patterns of results for gender inequality in academia through academic production indicators: (1) women have lower research production compared to men; (2) women's research production is approximately at the same rates as men's; (3) women academics' production is higher than male. The present study explores which type of gender disparities interpretation the Russian case relates to.

Previous and recent studies on gender and publishing have shown that women researchers publish less than male (Mitchell & Martin, 2018; Stack, 2004; Witteman et al., 2019). Most studies generally agree that women have lower publication rates and that men perform better in comparison to their women colleagues (Astin & Davis, 2019; Bentley, 2012; Cole & Zuckerman, 1984; Mauleón et al., 2008; Hesli & Lee, 2011; Larivière et al., 2013; Rørstad & Aksnes, 2015). Men also receive substantially more citations per paper than women scholars (Cole & Singer, 1991).

These findings strengthened the assumption that women's underrepresentation at higher academic ranks might be explained due to their inferior research production. Cole and Zuckerman (1984) entitled this gender gap in research performance as the 'productivity puzzle' based on this tendency. The term suggests that women's lack of recognition through citations must be caused by publication rate discrepancies (Cole & Zuckerman, 1984). In a frequently cited paper, Larivière et al. (2013), based on an analysis of 5,483,841 research papers and review articles with 27,329,915 authorships, finds men dominate scientific production in nearly every country. Several analogous studies also suggest significant gender differences for individual research production within different countries (e.g., Aknes et al., 2011; Busolt & Kugele, 2009; Mayer & Rathmann, 2018; Padilla-Gonzalez et al., 2011; Shin et al., 2014).

The same findings are relevant for diverse research fields. Prior work has found that research performance gaps are present in almost all spheres of academia (Boring, 2017; Jagsi et al., 2009; Ferber & Brün, 2011; Caplar et al., 2017). Mauleón et al. (2013), for instance, reveal a gender gap favoring men in high-quality Spanish journals in all scientific fields. Kyvik (1990) investigates that scientific production discrepancies had been the least in natural science (women published 20% fewer articles), while men in social science, humanities, and medicine were 30–35% more productive than women. Dolan & Lawless (2020) highlight two realities of gendered patterns in research productivity.

Such patterns lead to a significant disparity, as women authors are presented in just one-third of submitted manuscripts. However, no evidence is observed of apparent biases in the review or publication process. Therefore, consensus on the existing gender differences in academics' publication activity has not been reached.

Several studies reported minor or no gender differences in publication production (see, e.g., Maass & Casotti, 2000; Mauleón et al., 2008; Slyder et al., 2011; Sotudeh et al., 2018). Sotudeh & Khoshian (2014) analyze women's performance in Nano Science and Technology and conclude no substantial differences between men and women in terms of their research production. Similarly, Borrego et al. (2010), based on the analysis of PhD graduates who had obtained their degrees at Spanish universities between 1990 and 2002, identify no considerable distinctions in men's and women's research productivity.

Only a few studies have explored gender issues in the scientific performance of Russian scholars (Krasnyak, 2017; Lewison & Markusova, 2011; Paul-Hus et al., 2015). Lewison and Markusova's (2011) research, based on WoS listing of Russian authors in 1985, 1995, and 2005, found that women's general research output and citation scores were lower than those for men in almost all fields and years. Another study addresses gender disparities in Russian publications published between 1973 and 2012 and concludes gender equality is far from being achieved (Paul-Hus et al., 2015). Similar conclusions on the existing gender gap are made based on the selected Russian academic journal analysis (Krasnyak, 2017). According to the author, women academics are underrepresented in particular research fields (e.g., history, physics), while some research fields (psychology, biochemistry) are closer to achieving gender equality.

Recent bibliometric papers demonstrated that there had been a significant development in women's publications over the years (Mairesse & Pezzoni, 2015; Nielsen, 2016b). Overall, the review of the literature indicates that gender affects research production. As there are different studies and their interpretations concerning men's and women's research production, one of the research goals is to examine the relationship between research production and gender. Thereby, this paper explores differences in research production by gender in the Russian academic landscape, contributing to the literature on existing gender disparities in scientific production counts.

Data and analysis

Data collection

Data for this study are drawn from Web of Science (WoS, Science Citation Index Expanded, Social Sciences Citation Index, and Arts & Humanities Citation Index) and InCites databases. An advanced search by fields (1) Research Areas; (2) Location; (3) Publication Date; (4) Document Type was conducted. All 'article' and 'review' documents published between 2017 and 2019 were included in the analysis. The timeline is to analyze the current situation in Russian academia while having fully indexed articles. All published papers under consideration included at least one author affiliated with a Russian organization. Using this search strategy, 121,953 papers were found. Full paper information containing the authors' full names, their institutional affiliations, the year of publication, and the addresses and email addresses were extracted as a bibliographic corpus in a table format.

Within 121,953 papers with at least one Russian author, there were plenty of co-authors from other countries. We have created a special pattern to search for Russian authors via address data to extract authors from Russia. The analysis of Russian men and women academics' relative contribution to published papers is based on the proportion of articles and reviews published by authors from Russia. The analysis is based on the full counting method—one of the most popular approaches in calculating bibliometric indicators (Perianes-Rodriguez et al., 2016; Waltman & Van Eck, 2015). This means that a publication co-authored is fully assigned to each co-author with a weight of one. Overall, there were 171,296 unique authors and 602,907 authorships from Russia.

The analysis of research fields that are more and less inclined to gender gaps is based on the Essential Science Indicators (ESI) scheme with 22 research fields. Each paper was assigned to one of 22 research fields to analyze each research field separately. All fields used are listed in Table 1, containing the number of publications with at least one Russian author for each. Men and women authors' production was assessed for each gender, comparing the number of articles published by one author for 2017–2019. Thereby, to estimate the number of men and women authors from Russia in each field and to compare their production in terms of the articles published, we applied the Author Name Disambiguation procedure and calculated the number of unique authors for whom we calculated the number of articles he/she has published for the years 2017–2019.

Author name disambiguation

One common challenge in collecting and analyzing bibliometric data is the matching problem. Multiple names and their different spellings can refer to the same author. Correctly identifying the authors and unmistakably attributing to a given author all their scholarly output is basic to bibliometric research (Fournier et al., 2020). For example, one might conclude "Shevchenko Vladislav V.", "Shevchenko V.V.", and "Shevchenko Vladislav Vladimirovich" are different authors, when in fact they are the same person. A well-known approach to solving this issue is Author Name Disambiguation. We used the Python library (dedupe) to disambiguate authors' names and unite or differentiate authors with the same surnames, names, and initials. We identified 2053 authors (1.2%) with the same surnames but with different names and initials and their spellings (e.g., Dmitrii and Dmitry, Tatyana and Tatiana). Within one particular research field, all such cases were assigned as one author if there were sufficient data to disambiguate their names.

Gender assignment

To infer the gender of authorships we utilized a method that combines the result of surname gender-specific suffixes and name-based gender detection service (Genderize). First, we determined surnames for each authorship which contains gender-specific suffixes. Surnames with

Table 1 List of research fields with numbers of papers with at least one Russian author in 2017–2019

Field	Number of papers	Field	Number of papers
Physics	28,277	Environment/Ecology	2716
Chemistry	25,187	Social science	2153
Materials science	10,026	Computer science	1894
Geoscience	8357	Pharmacology & toxicology	1518
Engineering	7969	Neuroscience & behavior	1481
Mathematics	6563	Microbiology	1165
Clinical medicine	5783	Agricultural science	1036
Biology & biochemistry	4823	Psychiatry/Psychology	930
Plant & animal science	4465	Immunology	571
Space science	3499	Economics & business	568
Molecular biology & genetics	2887	Multidisciplinary	85

'a' suffixes were associated with female gender. The others were marked as male gender, except the surnames ended with 'ai', 'an', 'ar', 'ch', 'er', 'id', 'kh', 'od', 'oi', 'ts', 'ub', 'un', 'k', 'o', 's', which were identified as unknown. Some surname endings were identified with the Slavic name suffixes database, others—manually by the authors. An analogous approach has been already applied in the analysis of Russian researchers' activity by (Lewison & Markusova, 2011). This assigned gender to 89% of authorships. To minimize the number of unknown authorships and to confirm the accuracy of gender determination by surnames, name-based gender detection service Genderize was additionally applied. 4171 unique first names were extracted for Genderize detection. 10% of names were manually analyzed to verify the accuracy of the Genderize results. Overall, after two steps of gender detection, we identified 90.1% of authorships (543,363) to whom a gender was assigned. 9.9% or 59,574 of authorships were marked as unknown and excluded from the analysis. Thus, the further analysis was based on 543,363 authorships and 156,620 authors.

Results and discussions

This result section, first, presents the general gender division of men and women authors from Russia. Using bibliometric data from WoS and InCites databases, we assess whether men and women are represented differently in research fields. Next, we explore the differentiation between men and women academics in Russia in terms of publication production. Finally, we present the average number of publications per men and women academics from Russia.

Men and women among Russian authors

To evaluate the gender situation in the Russian academic system, we assessed the relative contribution of men and women to all articles and reviews published by Russian authors in the years 2017–2019. The analysis demonstrates the evident gender disparities among Russian authors and authorships in 2017–2019 (Table 2). Women are underrepresented in the contexts of unique authors from Russia and overall. Among 156,620, there are 98,037 men authors (63%) and 58,583 women authors (37%). This indicates that women are less represented among academics from Russia who publish papers in journals indexed in the WoS database.

The disparity is more evident among the 543,363 authorships from Russia. The share of men's authorship is 73%; the share of women's is 27%. This bibliometric trend could suggest the evident gender gap in terms of the research performance of scholars from Russia. In general, women's research production is lower than their male counterparts. One of the explanations for this result may be that women publish fewer articles in those research fields with a relatively higher number of papers in general. Correspondingly, men and women researchers are unevenly distributed across fields (Table 2), and there are relatively more women in fields where the number of published papers is lower. Some studies also show that men are

Table 2 Presence of men and women authors and authorships

	Men (%)	Women (%)
Unique authors	98,073 (63%)	58,583 (37%)
Authorships	396,544 (73%)	146,819 (27%)

disproportionately represented among the most prolific researchers in STEM disciplines (Aguinis et al., 2018), thus influencing the general gender productivity gap.

Traditionally, STEM fields in which Russia has been historically very active (Paul-Hus et al., 2015), such as Mathematics, Physics, Engineering, are male-dominated (Baird, 2018; Burke et al., 2007; Xie & Shauman, 2003). Currently, the number of papers by Russian authors in these fields is comparatively high (see Table 1). The gender gap in authorships might be due to the dominance of STEM publications, where women are traditionally underrepresented, among other research fields.

Men and women scholars' representation in research fields

Figure 1 shows the presence of men and women authors and authorships by all research fields, except Multidisciplinary which had insufficient publications for the analysis. Thus, only 21 fields had enough papers to determine with certainty the presence of men and women academics from Russia and were included in the analysis.

The proportion of female research production ranges between 13 and 52% of authorships, all disciplines taken together. However, this proportion slightly increases for women authors—17% and 56%. As observed with the percentage presence of men and women authorships and authors (Fig. 1), the significant disparity is due to the evident gender gaps in some particular research fields in terms of both authorships and authors. Physics, having the most papers in the analyzed period, demonstrates the greatest gender imbalance in authorships, while Immunology, having an equal share, has significantly fewer articles published (see Table 1).

Figure 1 also compares the percentage presence of men and women authorships and authors from Russia. For each research field, it shows that women authors presented better

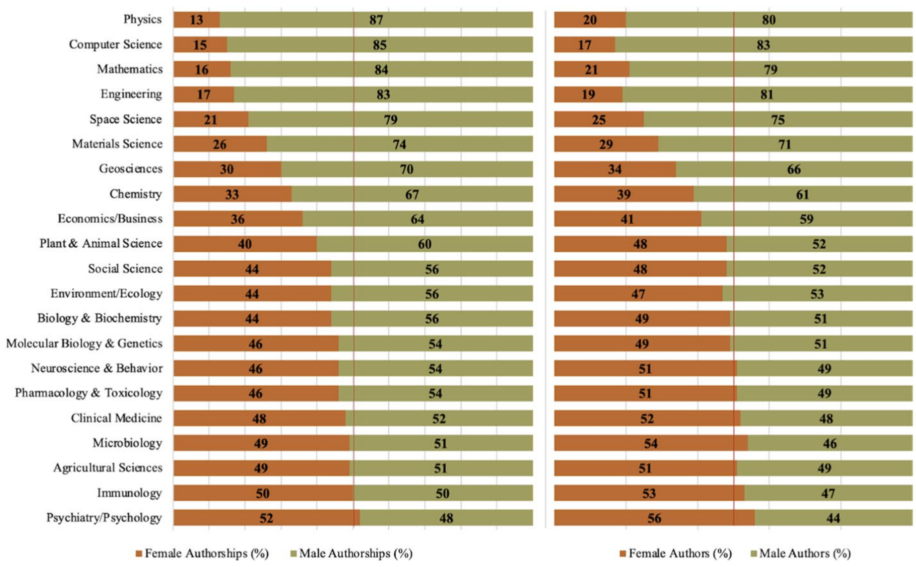

Fig. 1 Percentage of male and female authorships and authors from Russia in 21 research fields in 2017–2019

than authorships, even in STEM fields. The difference ranges from 2–3% in most areas, e.g., in Molecular Biology & Genetics, Immunology, and Computer Science, to 7% in Physics and 8% in Plant & Animal Science. This trend is likely due to women's lower research production, expressed in fewer papers published by women in all research fields. Meaning that in terms of publication activity, women are better represented in academia than they perform there. We should nonetheless acknowledge that the relevance of two dimensions of gender disparities, different representation and performance, is indisputable.

The extent of the gender gap in terms of research production generally varies significantly by discipline. As expected, women are presented less in all STEM research fields. Mathematics, Engineering, and Physics are fields in which Russia has specialized and Fig. 1 confirms the significant disparity in the context of research production between men and women in these traditionally women underrepresented disciplines. In terms of authorships, the largest difference is found in Physics (13%). For authors, the lowest share of women is in Computer Science (17%). This bibliometric trend could suggest that female research production is lower than their presence in all STEM disciplines.

By contrast, women are more prominent in other research fields, such as Agricultural Science, Microbiology, and Clinical Medicine. Women's and men's authorships are approximately equally active in Molecular Biology & Genetics, Neuroscience & Behavior, and Pharmacology & Toxicology and maintained the share at 46% and 54%, respectively. Immunology is the only discipline where men's and women's authorship status representation has an equal share of both genders. The only research field where the number of female authorships exceeds males is Psychiatry/Psychology.

However, in terms of the authors from Russia, women's presence increases to reach and sometimes exceeds men's. We see a slightly higher presence of women authors than their male colleagues in more research fields: Neuroscience & Behavior, Pharmacology & Toxicology, Clinical Medicine, Microbiology, Agricultural Science, Immunology, and Psychiatry/Psychology. However, we should recognize that the total number of papers in most of these fields (e.g., Psychiatry/Psychology, Immunology, and Agricultural Science) is relatively small (see Table 1), which explains the total substantial gender disparities among academics from Russian.

The trend displays the possible division of some research fields into three groups: (1) male-dominated disciplines (STEM: Physics, Computer Science, Mathematics, Engineering, Space Science, Materials Science); (2) areas that tend to equity (Pharmacology & Toxicology, Neuroscience & Behavior, Clinical Medicine); (3) female-dominated fields (Psychiatry/Psychology, Immunology). These results allow us to partly confirm the traditional division of research fields into female-dominated and male-dominated (Paul-Hus et al., 2015; Zaharova et al., 2017) and add alternative category—'Areas tend to equity' and new areas inside such a division.

Authors' research production

Figure 2 shows that women are less productive than men in all research fields. The percentage of women authors with only one paper published in 2017–2019 exceeds that of men in all disciplines. However, the share of women decreases and becomes lower compared to men when the number of published papers increases. This implies that women scholars from Russia publish fewer papers than men in all research fields on average. There are three research fields—Chemistry, Physics, and Space Sciences—in which the share of women authors with five or more publications is significantly higher than in any others:

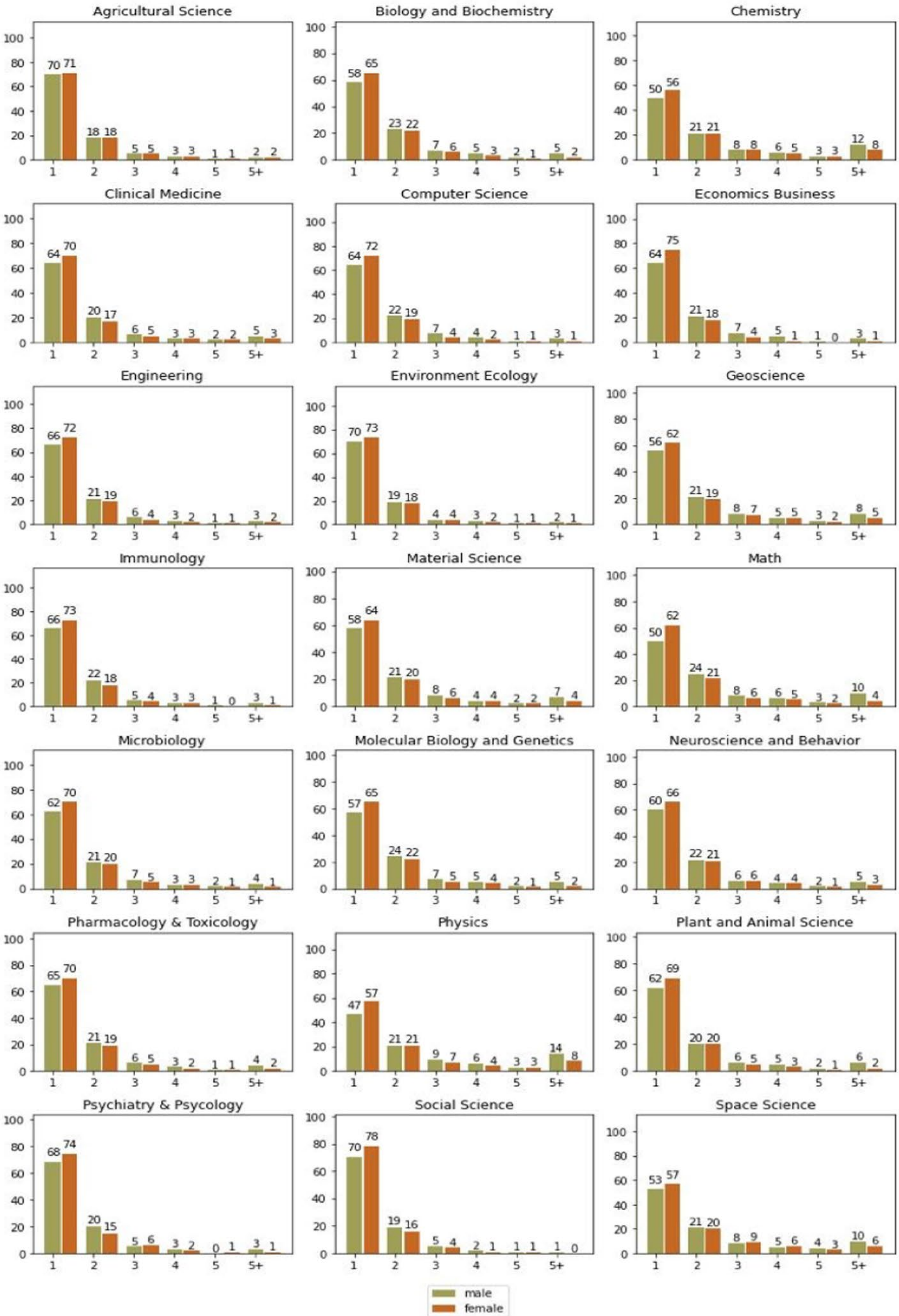

Fig. 2 The share of men and women authors with different numbers of papers published in 2017–2019

8%, 8%, and 6% correspondingly. This might be explained by the greater internationalization of these fields and participation of the Russian academics to these big and even mega projects regardless of their gender.

Figure 3 also displays the gender difference between authors' research production of men and women in all research fields. The mean number of papers published by women scholars is lower than men in all disciplines. The gap between women's and men's average publications is the largest in Physics, Chemistry, and Mathematics. Even in those research fields where women have attained gender parity in terms of their presence (e.g., Immunology, Psychiatry/Psychology), they publish, on average, fewer papers than men.

The greatest gender disparity is evident for academics with five or more published papers for the three years (Fig. 2). The share of women authors with five or more papers published is comparatively low in all disciplines and is 2% on average; the share is 6% for men. This implies that women account for a smaller proportion of published articles due to their lower research performance and presence in most research fields (Fig. 1).

This trend might be explained by the fact that in Russia, women academics, dominating at the first stages of their careers, become significantly less represented in subsequent ranks (Bagirova & Surina, 2017; HSE, 2020). Speaking to the connection of this problem to bibliometric indicators, some studies find gender gaps among the most productive scientists in their fields in some cases can be higher than for the general population of researchers (see, e.g., Abramo et al., 2009; Aguinis et al., 2018; Kelchtermans & Veugelers, 2013; Sá et al., 2020). This implies that the gaps between scholars with four or more published papers are likely due to the gender disparities among elite scientists who are men rather than women.

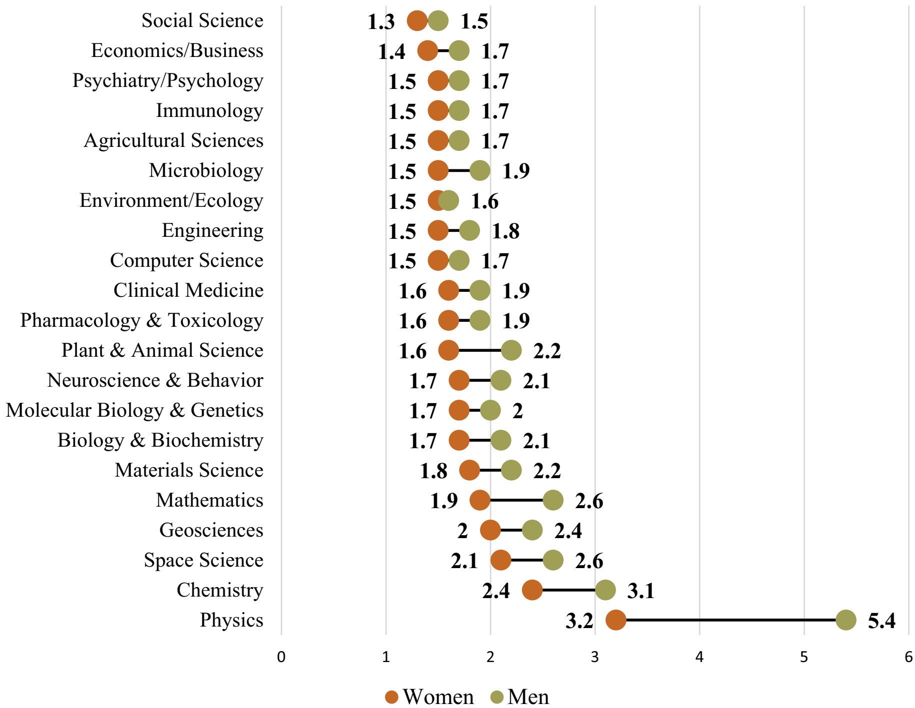

Fig. 3 Mean number of publications in WoS per men and women author in all research fields in 2017–2019

In some cases, the head of the department is included in all research from that department, and these are usually men.

Conclusions

The analysis of Russian academics' research presence and performance over the period 2017–2019 has shown that gender disparities remain in Russian academia in terms of bibliometric indicators. Women remain underrepresented in terms of their presence and performance in all disciplines, and generally in academia. This finding echoes previous studies that indicate that women publish less than men (Astin & Davis, 2019; Cole & Zuckerman, 1984; Cooper et al., 2021; Larivière et al., 2013; Lewison & Markusova, 2011; Paul-Hus et al., 2015; Rørstad & Aksnes, 2015). Thereby, we can conclude that the Russian case relates to the pattern of academic production indicators, showing that women have lower research output than males.

Our results show that men outperform women in the number of publications in all research fields, despite being less presented in some disciplines (see Fig. 1). Regarding research fields that are more or less inclined to gender gaps, our analyses divide disciplines into three groups: (1) male-dominated disciplines (STEM: Physics, Computer Science, Mathematics, Engineering, Space Science, Materials Science); (2) areas tend to equity (Pharmacology & Toxicology, Neuroscience & Behavior, Clinical Medicine); (3) female-dominated fields (Psychiatry/Psychology, Immunology). Overall, Physics, Computer Science, Mathematics, Engineering are more inclined to gender gaps, while Immunology, Pharmacology & Toxicology, Neuroscience & Behavior, on the contrary, are less inclined to such gaps.

The results also show that research fields in which women have the highest authorships (e.g., Immunology, Psychiatry/Psychology) do not have the highest number of published papers. As a result, we observe the overall gender gap between men and women academics from Russia, despite some areas having relative gender parity and even more women authors there. Our results also demonstrate that, overall, in all research fields, women's mean number of publications is lower than analogous indicators for men (Figs. 2 and 3).

The results show that the assumption, expressed by Paul-Hus et al. (2015), that the share of women in the Russian scientific community will increase due to a more governmental interventionist approach to the Russian academic system has not been justified since gender disparities in Russian academia remain widespread. We can associate these findings with the lack of gender policy in Russian political and science systems as the state elites are currently more interested in women as mothers than women as leaders and scientists.

This research also has certain limitations. First, our sample is limited by the WoS database. It means the analysis includes not all Russian publications but only published in journals included in three WoS indexes. Thus, the results of this study describe only that part of Russian publications that was published in the international journals and is visible to the global academic community. Future research may examine the gender division of authors among other databases also covered local journals. Second, the analysis does not take into account women authors who could change their family name due to the married during the analyzed period. The number of papers published for such authors can be reduced and slightly influence the gender division. However, the proportion of women authors who changed their family name during the analyzed 3-years period should not be large, so we believe that they could not affected the results dramatically.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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