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Sanctions on Russian academia: Are they efficient?

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Abstract: After more than three years of full-scale war in Ukraine, which started in February 2022, there is an absence of global consensus among academicians and organizations involved in academic activity on the efficiency of sanctions on Russian academia. This paper aims to examine the effectiveness of various sanctions imposed on Russian academia in response to Russia's unprovoked aggression against Ukraine. By analyzing data on the dynamics of scientific research dissemination through publications, the effectiveness of sanctions was examined using the Scopus database, its built-in tools, and SciVal, over the period 2013–2024, covering the pre-war, hybrid war, and full-scale invasion stages. The analysis revealed a significant (double-digit) decline across key metrics of publication activity affiliated with the Russian Federation. This includes actual and projected numbers of publications and citations, output of conference papers, as well as shifts in publication activity by subject area, institution, and international collaboration, particularly with main partner countries and regions. Results highlighted Russian academia isolation, lack of resources, and a decrease in international collaboration, research projects, and grant financing. These findings provide justification for increasing sanction pressure on Russian academia.

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1. INTRODUCTION

On February 24, 2022, the barbarian military invasion of Ukraine was started by the Russian Federation. As reported by the United Nations: “since the start of the war, the UN human rights office, OHCHR, has verified 29,579 civilian casualties, 10,242 people killed, including 575 children, and more than 19,300 injured, including 1,264 children” (UN, 2024). The United Nations recorded “eight million refugees across Europe, with a further five million internally displaced” (Naujokaitytė, 2023).

In 2022, Ukraine faced a sharp GDP decrease of 29.1% (Matters, 2023), followed by a modest rebound of 5.3% in 2023 (World Bank, n.d.) and extensive destruction across its civil infrastructure, including residential buildings, hospitals, educational facilities, and scientific institutions (Nazarovets & Teixeira Da Silva, 2022).

According to the interactive map of the Ministry of Education and Science of Ukraine (n.d.), as of May 2025, 3,676 education institutions have suffered bombing and shelling; 387 of them have been completely destroyed. Among them, more than 100 universities across Ukraine were significantly damaged (mostly in the Kharkiv, Kherson, and Odesa regions, and the city of Kyiv), and three of them were completely destroyed (in the Donetsk and Kherson regions). In particular, in April 2025, a terrible tragedy occurred at Sumy State University, where some of the authors of this study work. Two targeted missile strikes attacked the city center, as a result, 34 people were killed and 119 injured, and the university buildings were severely damaged (the Congress Center and Academic Building 2) (SSU, 2025).

There is evidence that “5% of scientific employees and 8% of scientific and pedagogical employees who work in higher education institutions left the territory of Ukraine and went to other countries” (Naujokaitytė, 2023).

In response to Russia's unprovoked and unjustified military aggression, a vast array of sanctions has been imposed by international organizations, corporations, and coalitions. Collectively, more than 22,000 sanctions are currently in force, marking the highest number ever recorded globally: three times as many sanctions as Iran and more than five times the volume applied to Syria or North Korea (Castellum, 2024).

International sanctions against Russian academia involve a range of measures, including bans on the supply of equipment and technology, termination of cooperation in projects and grants, suspension or reduction of funding, restrictions on academic mobility, limited access to international databases, and constraints on the ability to publish research findings, among others (Plastun, 2025).

The study conducts a comprehensive overview of the grey literature and Scopus-indexed papers in 2013–2024 with the content and bibliometric analysis highlighting the pros, cons, and measures in sanctioning of Russian academia after the invasion of Ukraine. This might be an essential element in discussing sanctions against Russian academia.

An important disclaimer: All results and conclusions are based on data related to affiliations with the Russian Federation. Being labelled as a Russian academic does not mean the person is linked to the Russian government. This distinction is clear between the Russian regime, which is recognized as an aggressor involved in war, not about nationality. The term "Russian Federation" refers to the Russian regime, not to individuals or Russian scholars, just because they are Russian. Therefore, this paper focuses on addressing the Russian regime and not labelling Russian scholars.

2. LITERATURE REVIEW

Sanctions on Russia in general and Russian academia in particular are controversial. In case of a huge number of general sanctions imposed by Western countries three years ago, their efficiency is questionable, as they are unilateral and fragmented (Szyszczak, 2025).

Evidence on sanctions in academia is limited. Plastun et al. (2024) discovered that Russia has tried to manipulate official inflation data post-2022 to create an "illusion of stability" despite the clear economic impact of sanctions, including those affecting science and technology sectors. Nikolsko-Rzhevskyy et al. (2025) proved the fragility of Ukrainian and Russian national academic systems in the face of territorial conflict. Guariglia et al. (2025) documented a significant decline in the quantity and quality of research produced by authors based in occupied regions, though the rise in the quantity of papers published by authors based in annexed Crimea.

Controversial and questionable are also the arguments in favor and against sanctions in academia. Arguments in favor of sanctioning include accountability for all Russian sectors, including science and education, using them as a political signal to oppose war and aggression, and a tool for eroding the country's economic, intellectual, and technological foundation. This position is consistent with the analysis by Plastun et al. (2023), who emphasize both the necessity of isolating Russian scientific potential and the ethical dilemmas this creates for the global research community.

Arguments against sanctions include the privileged status of the Russian science, which is out of politics, its foundational role in the free flow of thoughts and global science, and finally, the inefficiency of sanctions.

Approximately 70% of the 240 individuals who identified themselves as researchers said they agree that "scientific relations with Russia should be sanctioned in some manner." Another 21% disagreed, and the remaining 9% were not sure (Science|Business, 2022). As a result, a lot of measures to punish/restrict Russian academia were adopted on different levels: country and regional, scientific project, corporate sector, and supply chain.

Following Russia's full-scale invasion of Ukraine, numerous countries and international organizations implemented sanctions targeting scientific cooperation with Russian institutions *at a country level*. In June 2022, the US announced the closure of federally funded research partnerships with Russia (Ambrose, 2022; The White House, 2022). The G7 science ministers pledged to restrict government-supported collaborations involving Russian entities (G7 Science Ministers, 2022). The European Commission froze all agreements with Russian partners and suspended payments under programs like Horizon 2020 and Horizon Europe (Upton, 2022a), where Russia previously participated in 138 projects and received €14 million. Germany immediately halted all joint educational and research activities (Havergal, 2022a), while the UK withdrew funding from projects with ties to Russian institutions and banned new collaborations (Havergal, 2022b). The Netherlands, Denmark, Latvia, Lithuania, and Finland all froze academic ties, suspended exchanges, and prohibited new partnerships with Russia and Belarus (Upton, 2022a, 2022b; Ministry of Education and Culture, 2022). Similarly, Norway cancelled cooperative calls for research proposals (Moe, 2022), Poland ceased collaboration across academic sectors (Polskie Radio, 2022), and Canada urged scientists to avoid links with Russian industry (Hudson, 2022).

At the regional level, trade-related aspects of sanctions and Russian countersanctions are also significant. As Krivko et al. (2023) demonstrate, Russia's "unfriendly country list" and import bans have led to shifts in trade flows and increased regional economic fragmentation. There is also a broader trend of deglobalization processes in Russia's academic and financial sectors. Hakobyan and Margaryan (2025) found that it has also affected regional financial stability, especially in countries such as Armenia that are economically linked to Russia. The financial isolation of Russia is also reflected in the decisions of multinational banks to curtail or exit operations in the country, with ESG concerns playing a significant role in this process (Rohov et al., 2024).

In response to Russia's continued military aggression, several international scientific collaborations have been suspended *at the project level*. CERN officially terminated its cooperation agreement with the Russian Federation starting from November 2024 (World Nuclear News, 2024). The European Space Agency (ESA) also ended its joint work with Roscosmos on ExoMars and the lunar projects Luna-25, Luna-26, and Luna-27 (Universe Space Tech, 2022; The European Space Agency, 2022). The EU-backed CREMLINplus initiative dissolved its partnership with Russian participants (Cremlin Plus, n.d.). Massachusetts Institute of Technology suspended the project on Moscow's western outskirts development (Basken, 2022). Closure of bilateral projects with Russia is also detected in Australia (Ross, 2022) and Germany (German Research Foundation Deutsche Forschungsgemeinschaft (Matthews et al., 2022) and the German-built eROSITA telescope project (Pultarova, 2022)).

The *corporate sector* has also responded, with multinational corporations adjusting their social responsibility strategies and withdrawing R&D operations from Russia, as highlighted by Kharchenko et al. (2024). Major global tech firms imposed corporate sanctions in science. Mostly in 2022, research centers and facilities were closed all over Russia by Dell Technologies (RFE/RL, 2022), Nvidia and Siemens (Leave Russia, n.d.a, n.d.b), IBM (Leave Russia, n.d.d; Vigliarolo, 2022), and SAP (TAdviser, n.d.). Intel sold its facilities in Russia in 2023 (Palyvoda, 2024). Nokia closed its laboratories at Skolkovo and St. Petersburg and officially exited the Russian market (Leave Russia, n.d.c; Nokia, n.d.).

Supply chain level disruptions critically affected equipment, reagents, and materials procurement procedures for Russian institutions. Before the full-scale war at the beginning of 2022, up to 80% of equipment tenders were won by foreign companies (Voronin, 2022), and dependence of the "life sciences" on Western reagents was about 90% (Vedeneeva, 2022).

A substantial share of research equipment used in Russia is sourced from European and American laboratories. According to COMTRADE data, in 2020, approximately 13.8% of Russia's imported scientific equipment originated from Germany, while 6.1% was supplied by the United States (Balatsky et al., 2022;

Lenchuk, 2022). Following the invasion, the European Union imposed restrictions on the export of various categories of technical equipment to Russia. In response, major companies such as Zeiss, Nikon, and Thermo Fisher Scientific either halted or suspended their supplies to Russia.

This paper aims to examine the effectiveness of sanctions on the aforementioned levels imposed on Russian academia in response to Russia's unprovoked aggression against Ukraine.

3. METHODOLOGY

The easiest way to assess the impact of the sanction on Russian academic publication activity is to explore bibliographic databases. The largest and most famous databases to date are Scopus and Web of Science (WoS). For now, Scopus is bigger than WoS. It has 1.8 billion cited references dating back to 1970, 84 million records, 17.6 million author profiles, more than 25,000 active titles, and 7,000 publishers (Elsevier, 2022). The journals' coverage is higher than in WoS (42,000 vs. 34,200) and broader (including life sciences, humanities, etc.), which is vital for comparison. The content of these databases overlaps significantly. Moreover, Zhang et al. (2024) stated that the productivity of Russian science, as measured within Web of Science, has dramatically decreased since 2022 after several years of growth. That is why, in this paper, data from Scopus are the object of analysis.

A general overview of the publication on sanctions against Russia in academia was made with the Scopus built-in instruments, and SciVal is utilized to analyze the sanction impact on publication activities. In addition, a lot of information is extracted from polls and publications in the press.

The period of analysis is 2013–2024 (2013 was the last year before the occupation of Crimea and the creation of the so-called Donetsk People's Republic (DPR) and the Luhansk People's Republic (LPR), 2014–2022 were the years of Russian hybrid war in Ukraine, and 2022–2024 was the period of sanctions after the full-scale invasion). The data were collected on May 1, 2025. The country/region group in the SciVal entity list is used for analysis, including bibliometrics, contribution, research fields, collaboration, impact, and funding pillars as key characteristics of Russian academia.

In contrast to our previous bibliometric research, where we examined the main trends in the scientific landscape on the topic of the Russian-Ukrainian war (Ostapenko et al., 2023), this study focused on a specific paper sample. The sample includes 1,204,679 papers cited 9,388,708 times with a 0.67 Field-Weighted Citation impact affiliated with the Russian Federation. The process of research includes the following steps:

- exploration of the general consequences of the sanction in the academic sphere;
- quantitative analysis of the publication activity with the Russian Federation's affiliation (number of papers and conferences affiliated with the Russian Federation, number of citations, and number of views);
- quality analysis of the publication activity with the Russian Federation's affiliation (subject areas, institutions, collaborating countries/regions).

To estimate the potential impact of international sanctions on Russia's publication activity, a trend-based extrapolation approach was applied. This method relies on the average annual growth rate of publication output observed during the pre-sanctions period (2013–2021). Assuming this growth trend had continued uninterrupted, the expected number of publications for 2022 and 2024 was projected.

4. EMPIRICAL RESULTS AND DISCUSSION

Since the start of the full-scale aggression (war), Ukrainian journals and publishers have ceased all forms of collaboration with Russian institutions and researchers. Isolated instances of such cooperation — which occurred not out of ideological alignment but rather due to oversight — were met with strong public condemnation and were promptly terminated.

However, beyond the borders of Ukraine, most of the journals and publishers did not provide any restrictions against Russian academicians. The Journal of Molecular Structure is the only journal that openly banned authors with Russian affiliations (Matthews, 2023). Of course, there were rumors about silent bans (rejections of papers), but this is hard to prove.

Still, publication activity suffered a severe decline with the Russian Federation's affiliation after 2021–2022. Figure 1 provides the dynamics of key metrics (number of publications affiliated with the Russian Federation, number of citations, and number of views) for 2013–2024. It is worth noting that during the hybrid war, the number of publications, their citations, and views steadily increased. They reached their peak in 2021, when there were 137.5 thousand publications; the most citations and views were observed in 2020 (1,102,231 citations and 3,619,050 views).

The number of publications affiliated with the Russian Federation in 2022, based on the rate of change, decreased by 14% in 2022 (compared with 2021) and by another 26% in 2024 (compared with 2021). For citations, the decline was much larger, with citations down 34% in 2022 compared to 2021 and 89% in 2024 (compared to 2021). Views also fell 81% in 2024 compared to 2021.

It is important to note here that a certain amount of time passes between the date of submission of the manuscript and the date of its publication (several months or even more, depending on the journal), which introduces a certain amount of error. The citation count in SciVal reflects the total number of citations received by publications from a given publication year, regardless of when those citations occurred.

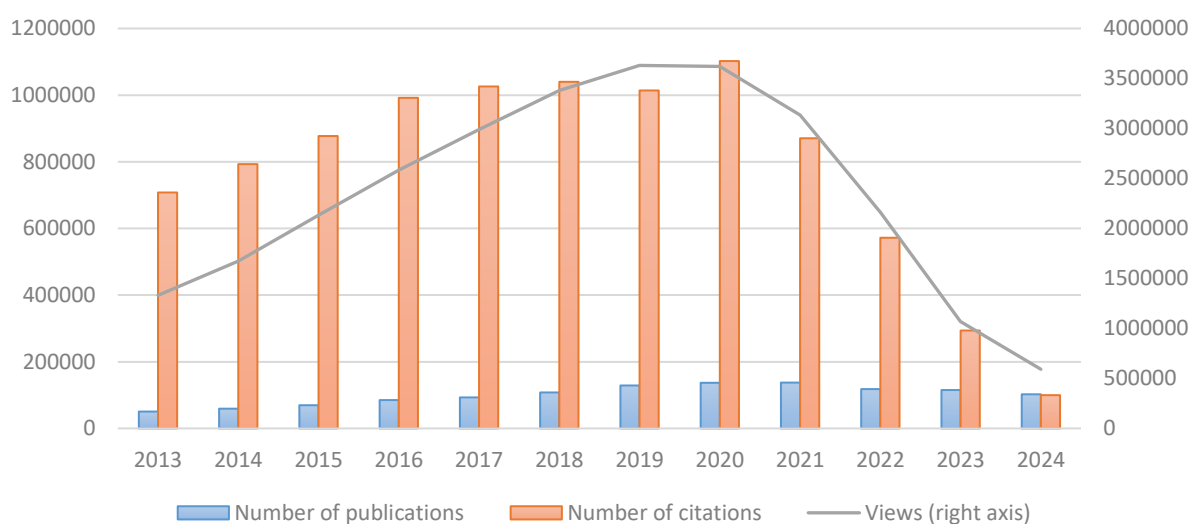


Figure 1. Key indicators of publication activity affiliated with the Russian Federation for 2013–2024

Source: Built-in Scopus instruments and Scival.

Based on the average growth rate during 2013–2021 (13.3%), the number of publications in 2022 should be 155,814 instead of the actual 118,054, and 185,784 instead of 102,434 in 2024 (Figure 2). This means up to 45% (!) of publications were lost in 2024 because of sanctions.

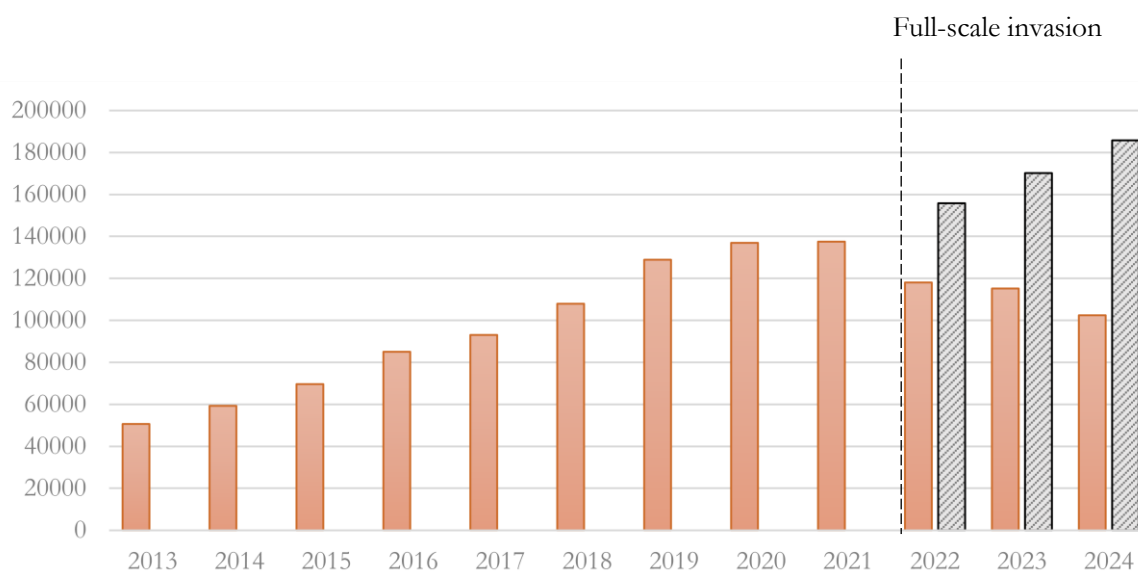


Figure 2. Real and projected number of publications affiliated with the Russian Federation for 2013–2024

Source: Built-in Scopus instruments, Scival, and authors' calculations.

Even worse was the situation with the number of citations (Figure 3). In 2022, compared with 2021, it has dropped by 36% and in 2024, by 89% (actual 99,845 instead of 940,829).

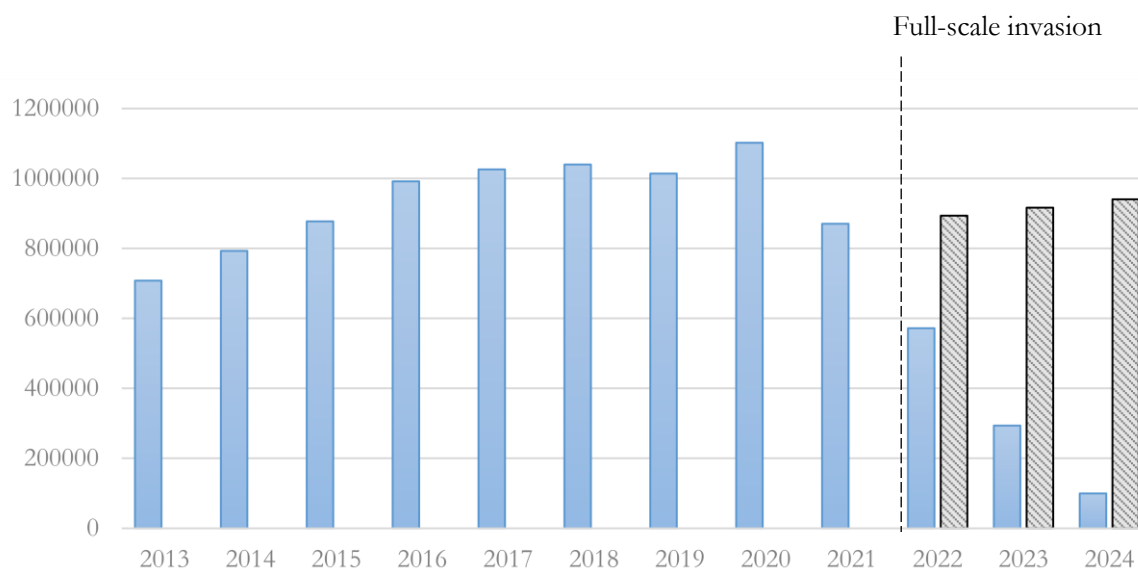


Figure 3. Real and projected number of citations affiliated with the Russian Federation for 2013–2024

Source: Built-in Scopus instruments, Scival, and authors' calculations.

One of the soundest examples (and the most expected because of rogue-state status) is the proportion of academic conference papers with a Russia-affiliated author, which fell by 57% in 2022, with a further drop in 2024 (see Figure 4). For example, the Journal of Physics Conference Series (by the United Kingdom)

accepted 5,912 papers from Russian scientists in 2021, 1023 in 2022 (Matthews, 2023), and only 213 in 2024. The decrease was by 83%. The same trend is observed for the Iop Conference Series Earth And Environmental Science (also by the United Kingdom): in 2021, there were 5712 papers, and in 2024, 68.

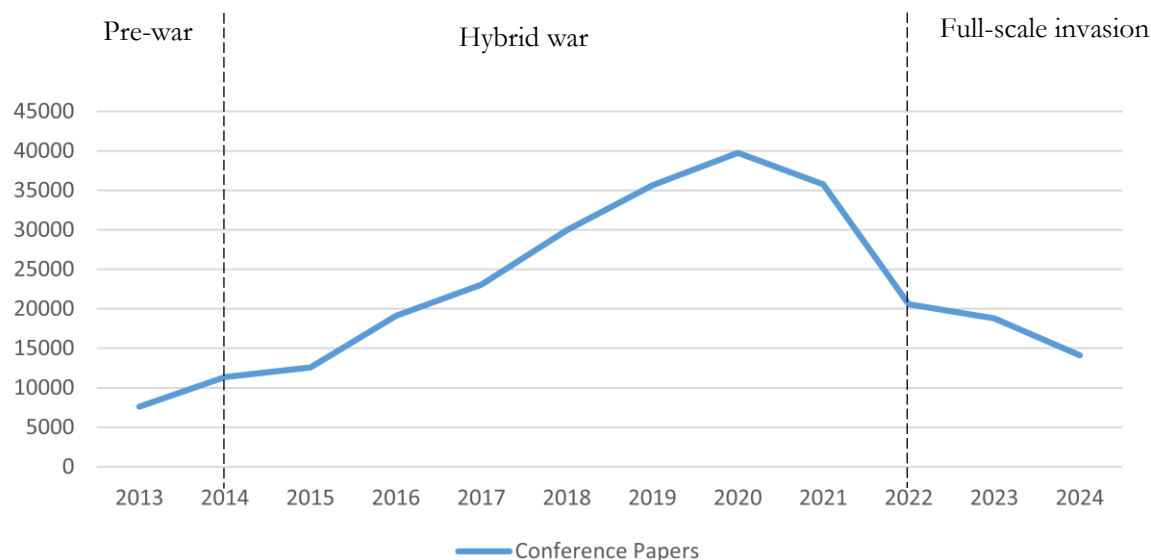


Figure 4. Conference papers outputs with Russia-affiliated authors in 2000–2024

Source: Built-in Scopus instruments.

Based on the subject area analysis, the biggest losses (more than 40% decrease in number of publications) in academic activity in 2022 were generated in energy, earth and planetary sciences, and environmental science (Table 1). Physics and astronomy have lost 19.59% in Scholarly Output after the invasion, economics, econometrics, and finance – 17.29%. As of 2024, compared to 2021, almost all subject areas had a decline in publication activity, most notably: environmental science (–50.59%), earth and planetary sciences (–47.13%), decision sciences (–44.84%). On the other hand, areas such as dentistry and agricultural and biological sciences have a recovery in their Scholarly Output (+21.48% and +2.55%, respectively).

Table 1

Changes in publication activity by subject areas affiliated with the Russian Federation

Subject area	2022/2021	2023/2022	2024/2023	2024/2021
Agricultural and Biological Sciences	–10.27%	5.89%	7.93%	2.55%
Arts and Humanities	–6.96%	4.60%	–6.08%	–8.59%
Biochemistry, Genetics, and Molecular Biology	0.63%	4.39%	–14.52%	–10.20%
Business, Management, and Accounting	–13.01%	–6.36%	–7.62%	–24.75%
Chemical Engineering	4.69%	2.33%	–19.69%	–13.97%
Chemistry	1.97%	–0.77%	–7.96%	–6.87%
Computer Science	–10.17%	–5.25%	–26.93%	–37.81%
Decision Sciences	–11.31%	–35.51%	–3.56%	–44.84%
Dentistry	15.19%	0.96%	4.46%	21.48%
Earth and Planetary Sciences	–41.69%	17.76%	–22.99%	–47.13%
Economics, Econometrics, and Finance	–17.29%	–9.43%	–17.09%	–37.89%

Energy	-43.78%	73.65%	-31.72%	-33.34%
Engineering	-6.70%	-4.33%	-19.46%	-28.11%
Environmental Science	-40.80%	17.62%	-29.03%	-50.59%
Health Professions	-4.08%	0.16%	-0.05%	-3.97%
Immunology and Microbiology	-7.35%	4.02%	-4.75%	-8.20%
Materials Science	-10.42%	-9.63%	-11.04%	-27.99%
Mathematics	-7.78%	2.61%	-11.02%	-15.80%
Medicine	-4.24%	-2.21%	-5.45%	-11.46%
Multidisciplinary	18.31%	-44.43%	24.24%	-18.31%
Neuroscience	-5.77%	-11.39%	-15.98%	-29.85%
Nursing	0.59%	-7.89%	-9.52%	-16.18%
Pharmacology, Toxicology, and Pharmaceutics	-5.35%	-13.35%	-14.05%	-29.51%
Physics and Astronomy	-19.59%	-5.70%	-13.39%	-34.33%
Psychology	0.12%	1.48%	-5.79%	-4.28%
Social Sciences	0.08%	-4.75%	-6.37%	-10.74%
Veterinary	11.54%	-21.12%	9.84%	-3.37%

Source: Scival and authors' calculations.

A similar analysis of the case of institutions showed that in the top 10 Russian academic institutions, seven have lost from 20% to 40% of scholarly output and from one-sixth to one-fifth of authors (Table 2). An interesting observation is that in the top 10 institutions in the government sector, 40% demonstrated a decline in scholarly output, but in the academic sector, there were 80%.

Table 2

Institutions with the biggest losses in academic activity

Institution	Scholarly Output (growth %)	Authors (growth %)
St. Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO)	-41	-26.5
Novosibirsk State University	-34.5	-22.4
Moscow Engineering Physics Institute	-30.8	-25.6
Tomsk State University	-24.4	-13.8
Moscow Institute of Physics and Technology	-20.8	-14.3
Ural Federal University	-20.5	-14.8
Peter the Great St. Petersburg Polytechnic University	-19	-20.5
Kazan Volga Region Federal University	-17.7	-14.5
St. Petersburg State University	-13.2	-7
Lomonosov Moscow State University	-6.6	-4.2

Source: Scival and authors' calculations.

A downward trend is also observed in different forms of collaboration among Russian scientists (Figure 5). In 2022, both international and national collaborations, as well as single authorship, fell by 12%. Only institutional collaboration decreased by 20%. In 2024, compared to 2021, the decline continues, in particular in the international collaboration (by 34% lower).

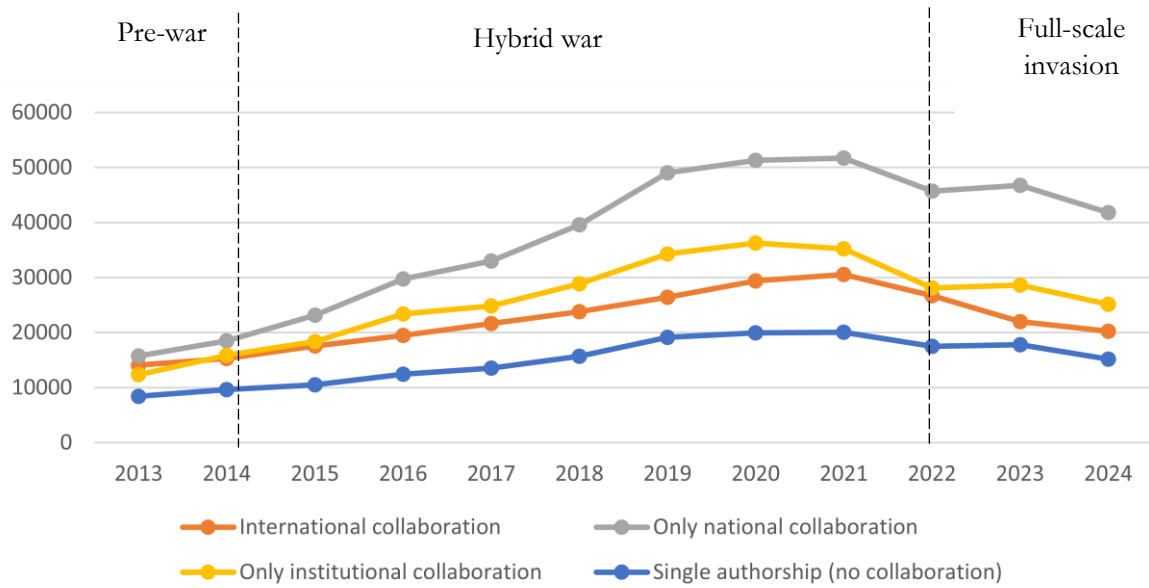


Figure 5. Changes in collaboration metrics by the Russian Federation scientists for 2013–2024
 Source: Built-in Scopus instruments, Scival, and authors' calculations.

Our results on collaboration metrics obtained from the Scopus database are in line with Zhang et al. (2024) from WoS, who detected a decline in the degree of international collaboration in fields of research that heavily rely on large multinational infrastructures established through state agreements.

From the point of view of collaborating countries/regions, the most important ones for academia nowadays are Europe, Asia Pacific, and North America (Table 3). At the same time, geographical tendencies observed in economic and political spheres are typical of science: growth of collaboration with China, India, and Turkey, and decline with Western countries.

Table 3

Region totals	Collaborating Countries	Co-authored publications	Collaborating countries/regions	
			The biggest collaborating countries	
			Countries	Papers
Africa	57	7,242	Egypt South Africa Nigeria	2,559 1,611 609
Asia Pacific	47	42,000	China India Japan	12,389 6,086 4,219
Europe	47	63,885	Germany The United Kingdom France	16,093 10,983 9,936
Middle East	18	16,132	Saudi Arabia Turkey Iran	4,417 4,337 3,385
North America	27	24,074	The United States Canada Mexico	18,088 4,835 2,279
South America	18	5,592	Brazil Chile Colombia	3,422 1,541 1,116

Source: Built-in Scopus instruments and Scival.

In the top 20 countries by co-authored publications after the invasion, 19 (95%) decreased activity, and only India increased (even in this case, growth was close to 0%). The most significant drop in the top 20 is observed in Ukraine (70%), Poland (54%), and Germany (47%).

These results are consistent with the findings of Matthews (2023), Zhang et al. (2024), and Plastun (2025), all of whom report a significant decline in publication activity in Russia. This decline may be attributed not only to international sanctions but also to a number of additional factors. They include reduced research funding, brain drain due to the emigration of highly qualified scientists, limited access to international collaboration and data infrastructure, reputational isolation within the global academic community, and increasing political control over academic institutions and research agendas within Russia.

The Russian war against Ukraine has devastated Ukraine's scientific activity as well. It has led to a substantial decline in research activity, especially within the natural sciences, engineering, and social sciences. Scholars based in occupied territories have experienced pronounced reductions in both publication output and participation in international collaborations (Guariglia et al., 2025).

Findings reveal that sanctions against Russian science are quite efficient and provide evidence in favor of further efforts in this direction. At the onset of Russia's full-scale invasion, Dmytro Chumachenko, in an Open Letter from Scientists of Ukraine, provided a comprehensive list of such efforts. These included cutting Russian access to research databases and publishers, banning their participation in international grants and exchange programs, boycotting scientific events in Russia, and excluding Russian scholars from journal editorial roles (Chumachenko, 2022).

Additional measures should include preventing the use of science by Russia as a tool of propaganda (for example, by restricting the dissemination of politically motivated research originating from Russian institutions that supports or justifies the war). Moreover, it is necessary to ensure compliance with international law by Russian academics (for example, by prohibiting the mislabeling of Ukrainian territories as part of Russia in affiliations and within the content of academic papers). Finally, one should exclude Russian academic institutions involved in propaganda or war support from the international academic organizations.

5. CONCLUSION

This paper explored the effectiveness of various sanctions imposed on Russian academia in response to Russia's unprovoked aggression against Ukraine. The effectiveness of these sanctions was analyzed by checking the number of scientific publications by Russian researchers and the level of interest in these publications within the global academic community.

Analysis of publication activity showed a reduction of metrics during 2022–2024, such as the number of publications, citations, views, and proportion of academic conference papers with a Russia-affiliated author. Specifically, the total number of publications decreased by 14% in 2022 and by 26% in 2024, relative to 2021 levels. The decline in citation impact has been even more substantial, with citations falling by 34% in 2022 and by 89% in 2024 compared with 2021. Moreover, article views dropped by 81% in 2024, further indicating a significant reduction in international engagement with Russian-affiliated research.

Despite the efficiency, the sanctions imposed on Russian science cannot be described as global, systematic, or consistent. In most cases, they represent only isolated elements of what could be a broader and more effective sanctions strategy. Additional measures could include initiating a new wave of academic debate on sanctions against Russian science, developing coordinated sanctions policies by the EU, US, and other partners, and reviewing collaborations with Russian academic institutions and journals to prevent support for the war or violations of academic integrity in scientific papers. Moreover, excluding from indexing any papers that mislabel Ukrainian territories as part of Russia, banning the responsible authors

and journals, and redirecting previously allocated academic funding for Russia into a special fund to support Russian scholars in exile are necessary.

These measures could increase the pressure on the Russian Federation in general and might speed up the end of the war.

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