POLISH NATIONAL AGENCY FOR ACADEMIC EXCHANGE

ACADEMIC COOPERATION

BETWEEN POLAND AND COLOMBIA

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INTRODUCTION

The aim of this study is to present an overview of academic cooperation between Poland and Colombia. Academic cooperation is understood here in a broad context, both individual and institutional.

The study is exploratory and practical in nature and provides answers to the following questions:

- What is the volume of publications written in Polish-Colombian co-authorship?
- What are the dominant subject areas in this field?
- How intense has this cooperation been over the years?
- Which higher education institutions in Poland cooperate most intensively with their Colombian counterparts?
- Which Polish universities host the most students/researchers from Colombia?

The study is addressed to the academic community in the broad sense and the environment of higher education and science institutions, as well as to the creators of national international policy in the field of academic cooperation.

The study uses data from the following databases: SCOPUS[1] , OECD, UNESCO, and POLon.

Due to the small number of Colombian students and employees studying or working at Polish universities, this study limits the presentation of data to that which is necessary to ensure the anonymity of these individuals.

This study is another in a series of analyses available on the NAWA website.

[1] Access to the SCOPUS database and SciVal tool under a national license provided by the Ministry of Science and Higher Education

1 POLAND AND COLOMBIA – BASIC DATA AND INFORMATION

The key challenges for the Colombian government's higher education policy are: increasing enrollment and improving equality in access to universities, improving the quality and relevance of education to the needs of the economy and society, and better management and financing of the sector. The OECD and the World Bank highly value the Colombian government's efforts in the field of higher education, in particular: the increase in university enrollment, the diverse institutional landscape, comprehensive and advanced evaluation systems, and the commitment to data-driven decision-making.

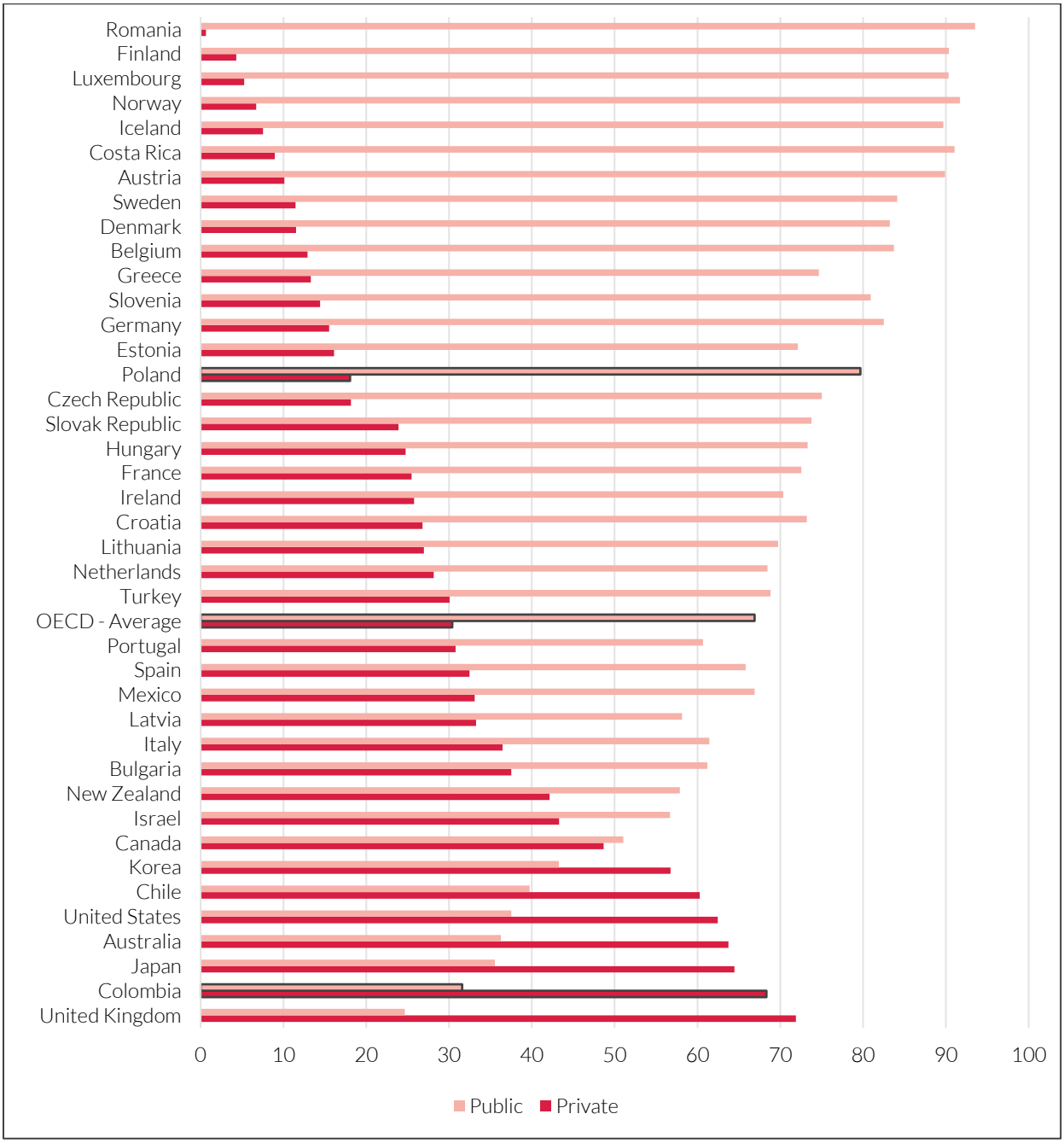
There are four types of higher education institutions in Colombia:

1) universities - offer academic bachelor's, master's, and doctoral programs, and are involved in scientific and technological research
2) university institutions - offer undergraduate programs up to the professional degree level and a type of graduate program known as a "specialization" (a career-related qualification level above the bachelor's level but below the master's level),
3) technological institutions - offer programs up to the level of technologist (distinguished from the professional technical level by its scientific basis) and may extend beyond this level to the professional degree level, provided that the programs are taught as "propaedeutic cycles" (students first obtain a professional title at the technical level and then at the technologist level, gradually acquiring broader and higher knowledge and skills in the same field of education),
4) professional technical institutions - offer training at the professional/technical level for a specific job or career[2] .

Below are graphs showing the percentage distribution of public and private expenditure on higher education, the share of people with higher education by age group, and the international mobility of students in OECD countries. All indicators presented refer to average levels for OECD countries, including Ireland and Poland. Unfortunately, the latest available data is for 2020, which is particularly important in the case of financial data, an area in which events related to the COVID-19 pandemic and Russian aggression in Ukraine were of particular significance.

[2] OECD/International Bank for Reconstruction and Development/The World Bank (2012), Reviews of National Policies for Education: Tertiary Education in Colombia 2012, OECD Publishing. http://dx.doi.org/ 10.1787/9789264180697-en

Graph 1 Expenditure on tertiary education (public and private) as a % of total expenditure for this purpose (2020)



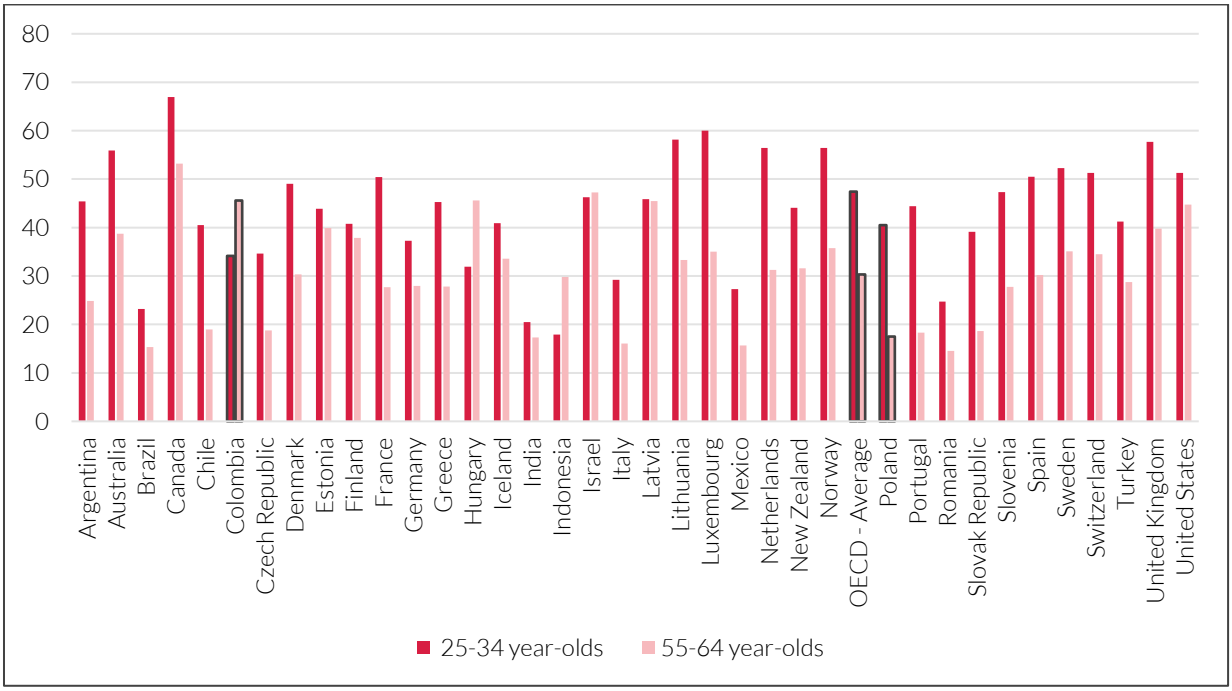
Source: OECD (2024), Spending on tertiary education (indicator). doi: 10.1787/a3523185-en (Accessed on June 10, 2025)

The above chart presents a measure of public and private expenditure on tertiary education as a percentage of total expenditure on education. According to the OECD, expenditure on tertiary education is defined as total expenditure on the highest level of education, including private expenditure on schools, universities, and other private institutions providing or supporting educational services. This expenditure is measured as a percentage of total expenditure on education. At the tertiary level, educational institutions in OECD countries are mainly publicly funded, although there are significant and growing levels of private funding. At this level, contributions to the costs of education by individuals and other private entities are increasingly seen as an effective way to ensure that students have access to funding regardless of their economic status. "Households" refer to students and their families. "Other private entities" include

private companies and non-profit organizations such as religious organizations, charities, and business and employee associations. Expenditures by private companies on vocational training for pupils and students are also taken into account, along with expenditures on research and development by educational institutions.
In OECD countries, higher education institutions are mainly financed from public funds, although there is a significant and growing level of funding from households and other private entities (NGOs, unions, associations, foundations, etc.). Low public spending on higher education forces a higher level of private funding. In OECD countries, the average level of public funding is 67%, and private funding is 30%. Against this background, the proportions of funding sources in Norway, where public expenditure is 92%, and Finland, Luxembourg, Austria, and Iceland (90% each) are noteworthy.

In Colombia, the higher education system is based on a combination of public and private funding and has difficulty achieving an adequate level of expenditure. This is typical of countries with large cohorts of young people, where higher education has become more egalitarian[3] . In Poland, public expenditure on higher education is 80%, while in Colombia it is 32%.

Graph 2 Percentage of people with higher education by age group (2022)



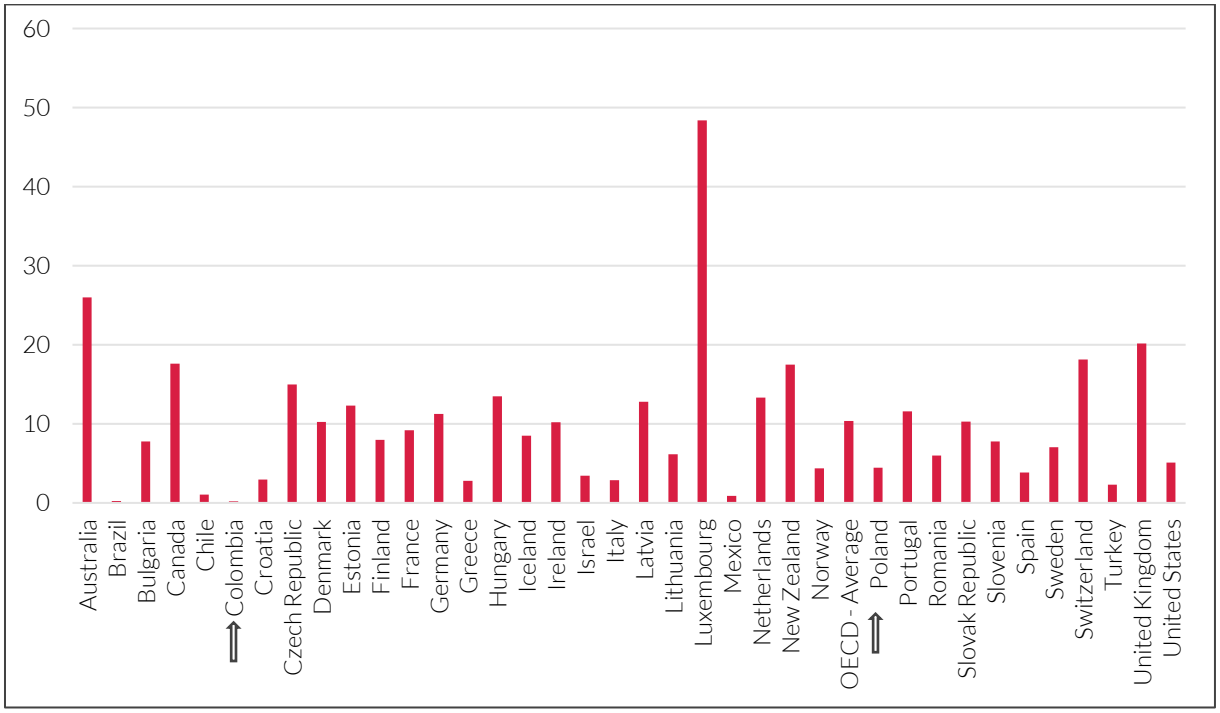
Source: OECD (2024), Population with tertiary education (indicator). doi: 10.1787/0b8f90e9-en (Accessed on June 10, 2025)

The population with tertiary education is defined by the OECD as people who have completed this highest level of education, by age group. This includes both theoretical programs leading to advanced research or professions requiring high qualifications, such as medicine, and more

[3] OECD/International Bank for Reconstruction and Development/The World Bank (2012), Reviews of National Policies for Education: Tertiary Education in Colombia 2012, OECD Publishing. http://dx.doi.org/ 10.1787/9789264180697-en

vocational programs leading to the labor market. This is measured by the percentage of the population of the same age who hold a higher education diploma.
In OECD countries, the average level of enrolment in the younger age group is 47% and in the older age group 30%. In countries such as Korea, Canada, Japan, Ireland, and Luxembourg, the percentage of people with higher education in the 25-34 age group is at least 60%, while in Poland it is 40% and in Colombia 34%. In the older age group, every second Canadian (53%) and Japanese (48%) has completed higher education. In Poland, only 18% of people between 55 and 64 have completed higher education, and in Colombia, 46%.

Graph 3 Student mobility indicator (2020)



Source: OECD (2024), "International student mobility" (indicator), https://www.oecd.org/en/data/indicators/international-student-mobility.html (Accessed on June 10, 2025)

This indicator shows the number of foreign higher education students admitted as a percentage of all students enrolled in the host country. Foreign students are those who have previously received education in another country and are not residents of the country where they are currently studying. While the average percentage of foreign students in OECD countries is 10%, in Poland it exceeds 4% and in Colombia it is 0.22%. Among the OECD countries, Luxembourg has the highest percentage of foreign students (48%).

According to data from the POLon system, in the 2023/2024 academic year, foreign students studying in Poland are predominantly citizens of Ukraine (47%), Belarus (11%), and Turkey (5%). Colombians constitute a group of less than 171 students. Foreigners most often study management (16%), computer science (13%), and medicine (6%). Colombians, on the other hand, are most numerous in computer science (14 people) and management (less than 10 people) at Polish universities.

Foreign academic teachers constitute less than 3% of the total number of teachers in Poland. Among foreign employees who conduct scientific activities in various fields and are employed as academic teachers, the largest groups are citizens of Ukraine (26%), India, and Italy (8% each). Most of them hold a doctoral degree (64%) and represent the fields of exact and natural sciences (31%),

social sciences (23%), and engineering and technical sciences (21%). There is a group of 10 scientists from Colombia working in Poland.

Due to the small number of Colombian citizens studying or working at Polish universities, the names of the universities with which they are associated will not be given.

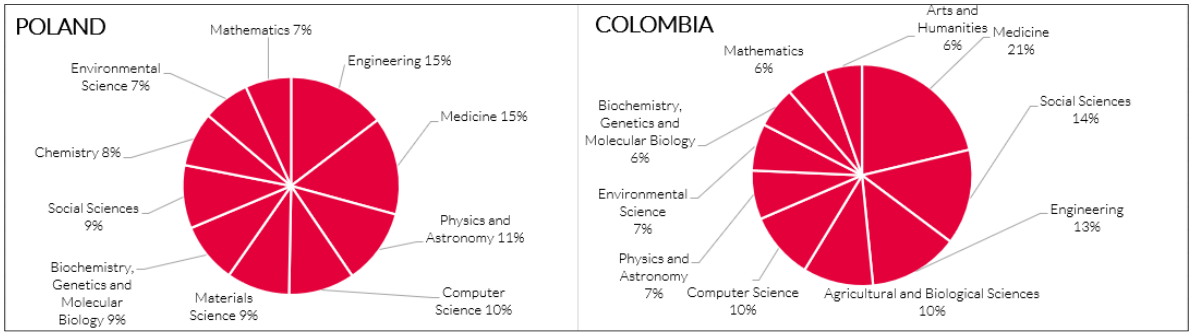
Table1 Comparison of the number of publications by Polish and Colombian scientists (2017-2024[4])

Year of publication	Number of publications	
	Poland	Colombia
2024	63,272	18,917
2023	61,309	18,244
2022	62,101	18,084
2021	65,418	18,580
2020	61,201	17,558
2019	57,430	15,658
2018	53,605	13,725
2017	50,712	12,334
Total	475,048	133,100

Source: SCOPUS-SciVal [accessed on April 16, 2024)

The pool of indexed publications for 2017-2024 by scientists affiliated with Polish institutions is more than three times higher than that of Colombian institutions. However, in the analyzed period, the average annual increase in the number of publications in Poland is 3%, and in Colombia - 6%.

Graph 4 Publications by Polish and Colombian scientists by areaof knowledge (%) – comparison

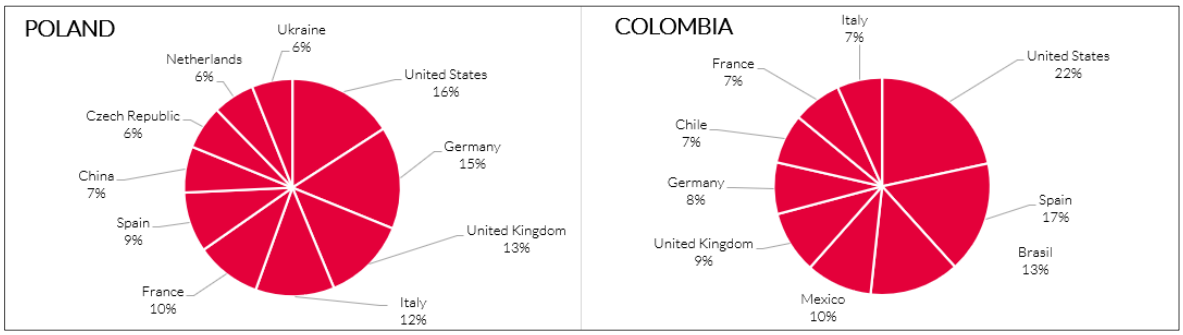


Source: SCOPUS-SciVal [accessed on May 16, 2025)

The above graph shows the subject areas of publications in which at least one author indicated a Polish or Colombian affiliation. Publications by Polish scientists are most often in the fields of engineering and medical sciences (15% each), physics and astronomy (11%), and computer science (10%). Colombian authors, on the other hand, mainly publish in the fields of medicine (21%), social sciences (14%), and engineering (13%)

[4] Data for 2024 are being updated on an ongoing basis, so it is to be expected that in the second half of 2025 there will be increases in both the number of publications and their citations.

Graph 5 Countries of origin of co-authors of publications by Polish and Colombian scientists – comparison (%)



Source: SCOPUS-SciVal [accessed on May 16, 2025)

Polish and Colombian scientists most often publish with their American counterparts. Colombians most often cooperate with co-authors from their geographical region (Latin America) or those who speak the same language (Spain). Polish scientists co-author with Colombians in 2.7% of cases, which places Poland in 25th place among other countries (a total of 3,579 Polish-Colombian publications were produced).

2 POLISH-COLOMBIAN SCIENTIFIC COOPERATION (2017-2024)

This section analyzes the publication cooperation of scientists affiliated with Polish and Colombian scientific institutions. Only those publications were taken into account where at least one author indicated affiliation with both the Polish and Colombian academic communities.

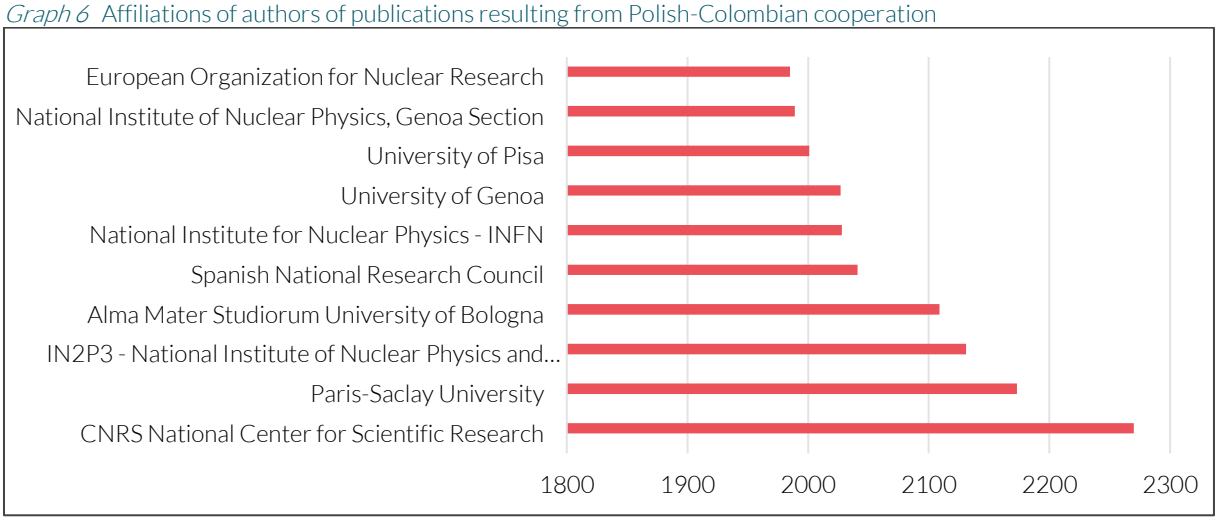
Table 2 Joint Polish-Colombian publications in the SCOPUS database

Year of publication	Number of publications
2024	597
2023	521
2022	375
2021	428
2020	405
2019	407
2018	445
2017	401
Total	3,579

Source: SCOPUS-SciVal [accessed on May 16, 2025)

The largest year-on-year change in the number of joint publications occurred in 2023 (39% compared to 2022). The final result for 2024 also looks promising, as in mid-2025, when not all publications have been registered in the SCOPUS database, we are already seeing a 15% increase compared to 2023.

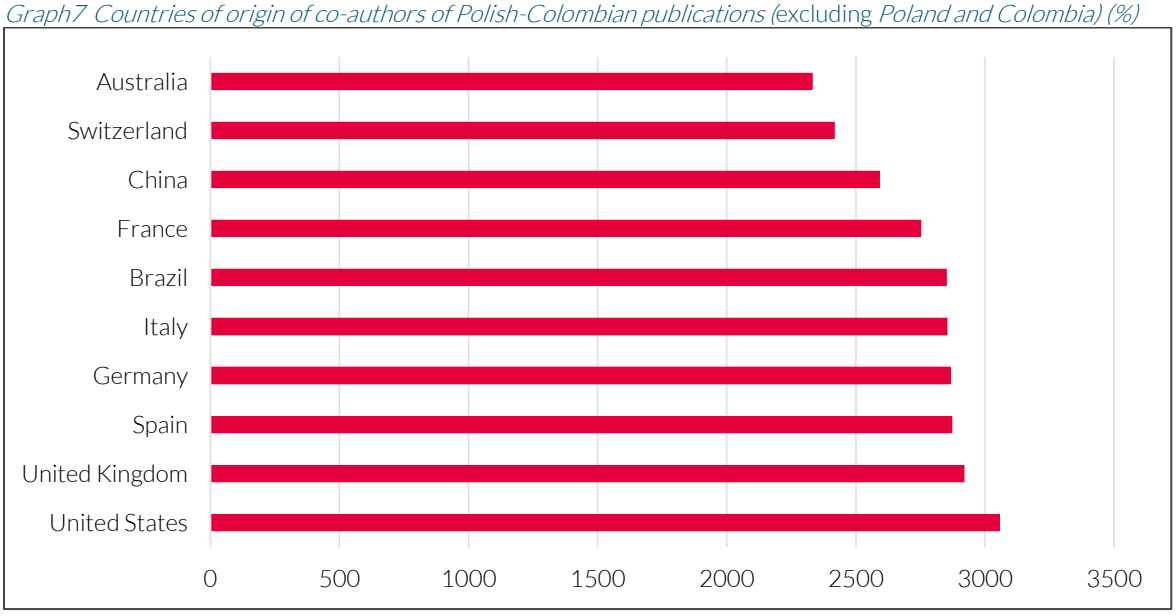
Graph 6 Affiliations of authors of publications resulting from Polish-Colombian cooperation



Source: SCOPUS-SciVal [accessed on April 16, 2025)

The most common affiliations of co-authors of publications are institutions from Western Europe and the Americas, as reflected in the graph below.

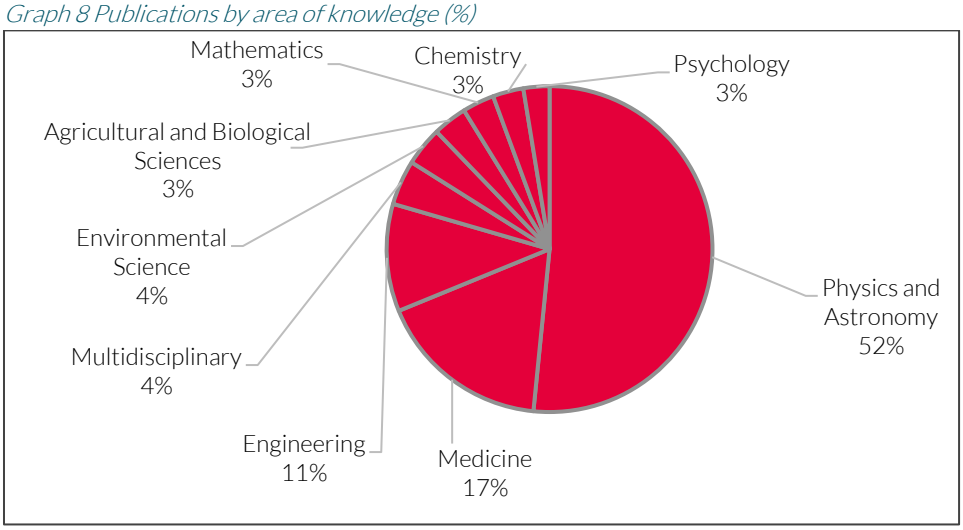
*Graph7 Countries of origin of co-authors of Polish-Colombian publications (*excluding *Poland and Colombia) (%)*



Source: SCOPUS-SciVal [accessed on April 16, 2025)

For the most part, the countries of origin of co-authors of Polish-Colombian publications coincide with those indicated in Chart 5, where both countries are presented separately. The country that is not found in Chart 5 is Australia. Chinese scientists who are frequent co-authors of Polish scientists (Graph 5) are also present in Polish-Colombian publications (Figure 7). In addition, among the 10 agencies that most frequently fund these publications through grants is the National Science Foundation of China (see Graph 9).

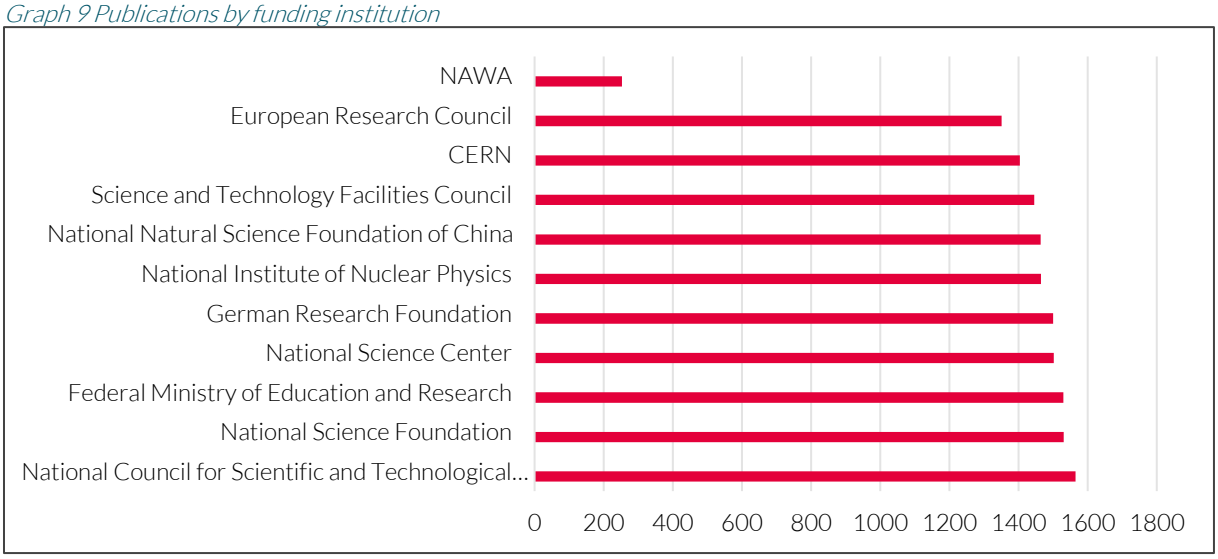
Graph 8 Publications by area of knowledge (%)



Source: SCOPUS-SciVal [accessed on April 22, 2025)

The topics of joint publications most often fall within the field of physical sciences and astronomy (which is the domain of Polish scientists) and medicine and engineering, which are strongly represented in both countries (see Graph 4).

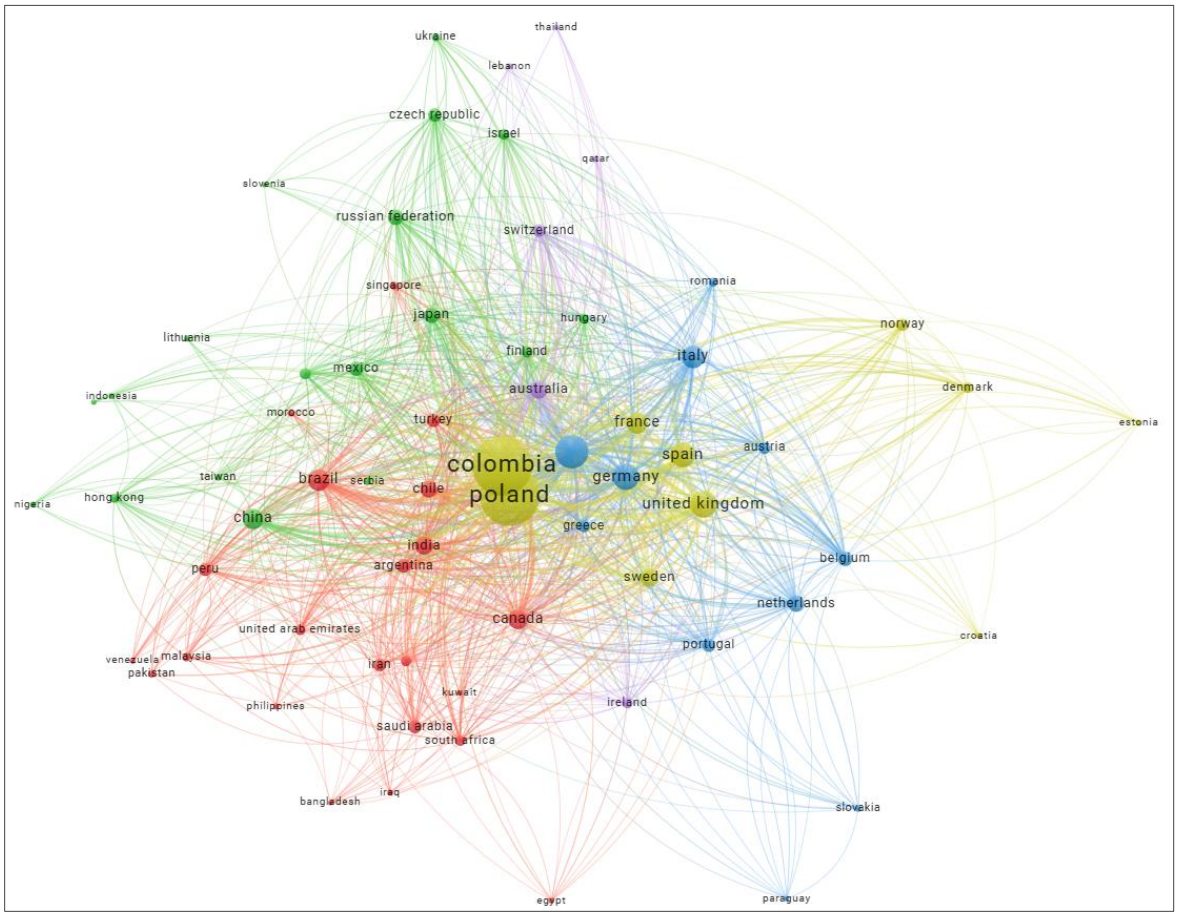
Graph 9 Publications by funding institution



Source: SCOPUS-SciVal [accessed on April 22, 2025)

Polish-Colombian publications are most often co-financed by grant agencies from Europe, both Americas, and one Asian agency. NAWA co-financed 7% of joint publications.

Map 1 Map of connections between the countries of origin of co-authors of Polish-Colombian publications



Source: own study based on SCOPUS/SciVal [accessed on April 19, 2025]; visualization using the VOSviewer tool

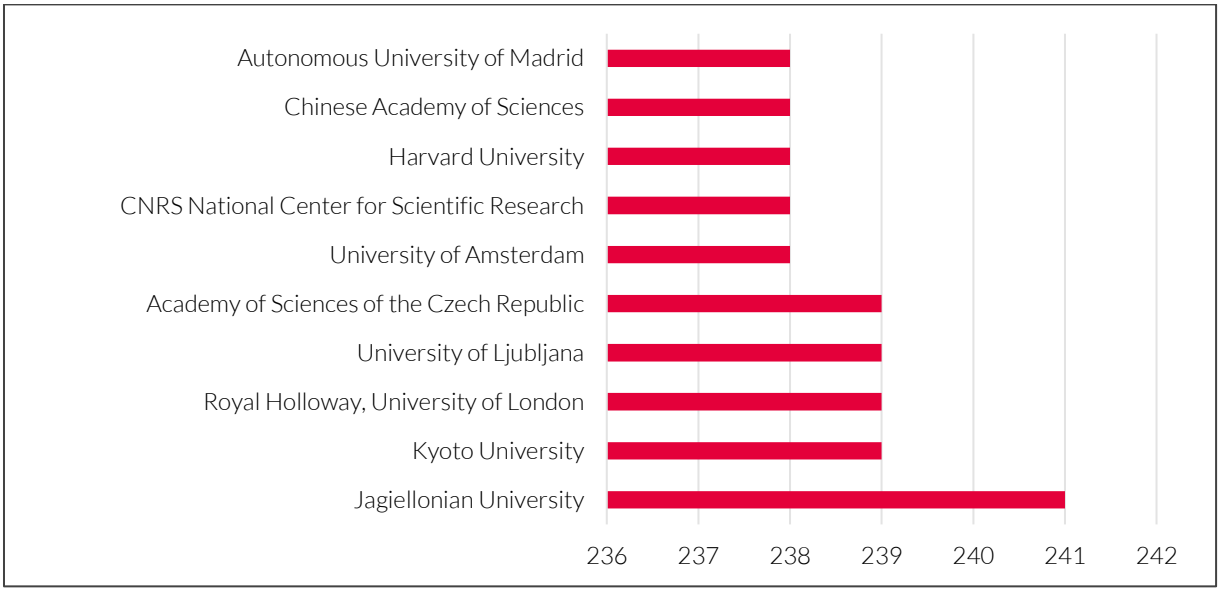
The above map shows that cooperation between scientists from the two countries led to cooperation with another 65 countries, which in turn translated into over 1,400 links between these countries.

3 NAWA'S CONTRIBUTION TO POLISH-COLOMBIAN SCIENTIFIC COOPERATION

This part of the analysis aims to show not only the impact of NAWA funding on publications where at least one author is affiliated with a Colombian and Polish institution, but also to show NAWA's global contribution to scientific publications.

A bibliometric analysis based on the SCOPUS database shows that the first publications in which NAWA had a financial stake appeared in 2019.

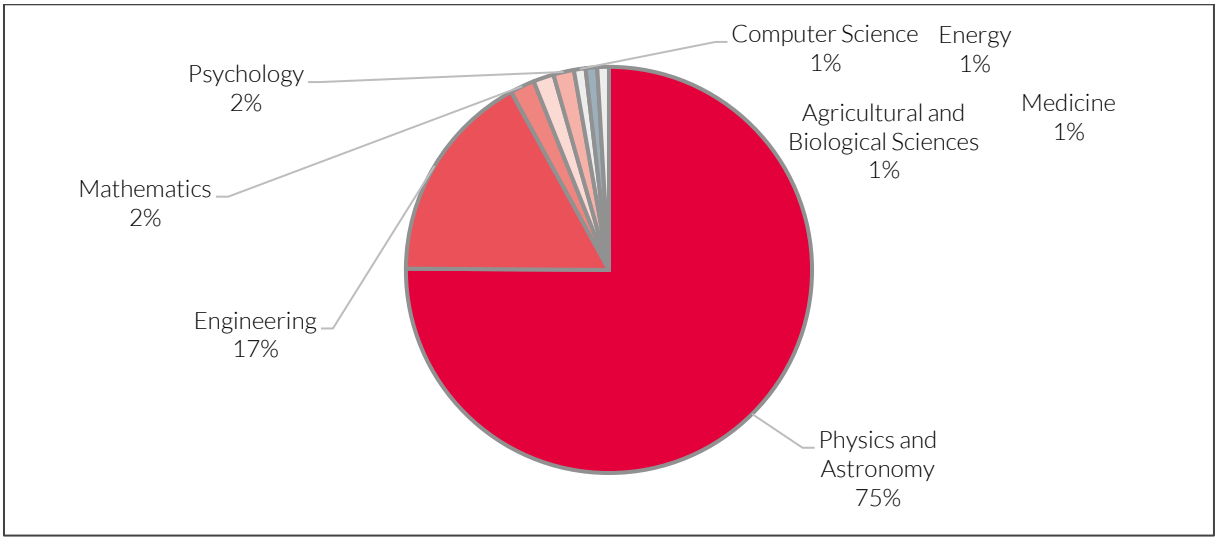
Graph 10 Affiliations of authors of publications co-funded by NAWA



Source: SCOPUS-SciVal [accessed on April 16, 2025)

The authors of Polish-Colombian publications co-financed by NAWA are most often affiliated with the Jagiellonian University and other European centers. Among the most popular affiliations, there is also one American, one Japanese, and one Chinese.

Graph11 Publications co-funded by NAWA by subject area



Source: SCOPUS-SciVal [accessed on: 22.04.2025)

Three-quarters of publications co-financed by NAWA concerned the field of physics and astronomy, which dominates both among the most frequently addressed topics in publications by Polish scientists and in publications resulting from Polish-Colombian cooperation (see Graphs 4 and 8).

CONCLUSIONS

The above analysis leads to the following conclusions:

1) mutual Polish-Colombian international exchange of scientists and students needs to be strengthened (from the Polish perspective, we observe only a few groups of scientists and students from Colombia studying or working in our research centers),
2) in Colombia, there is a low percentage of public expenditure on higher education, hence the low enrollment rates in both the younger and older cohorts of citizens, and one of the lowest shares of foreign students among students in OECD countries (see Graphs 1-3),
3) The most productive areas of Polish-Colombian scientific cooperation seem to be physics and astronomy, which are the domain of Polish authors, as well as medicine and engineering, which are strongly represented in both cases (see Graphs 4 and 8).
4) The example of China shows how focusing on cooperation with a given country, supported by funding for this cooperation, brings another country (in this case Colombia) into the orbit of cooperation.