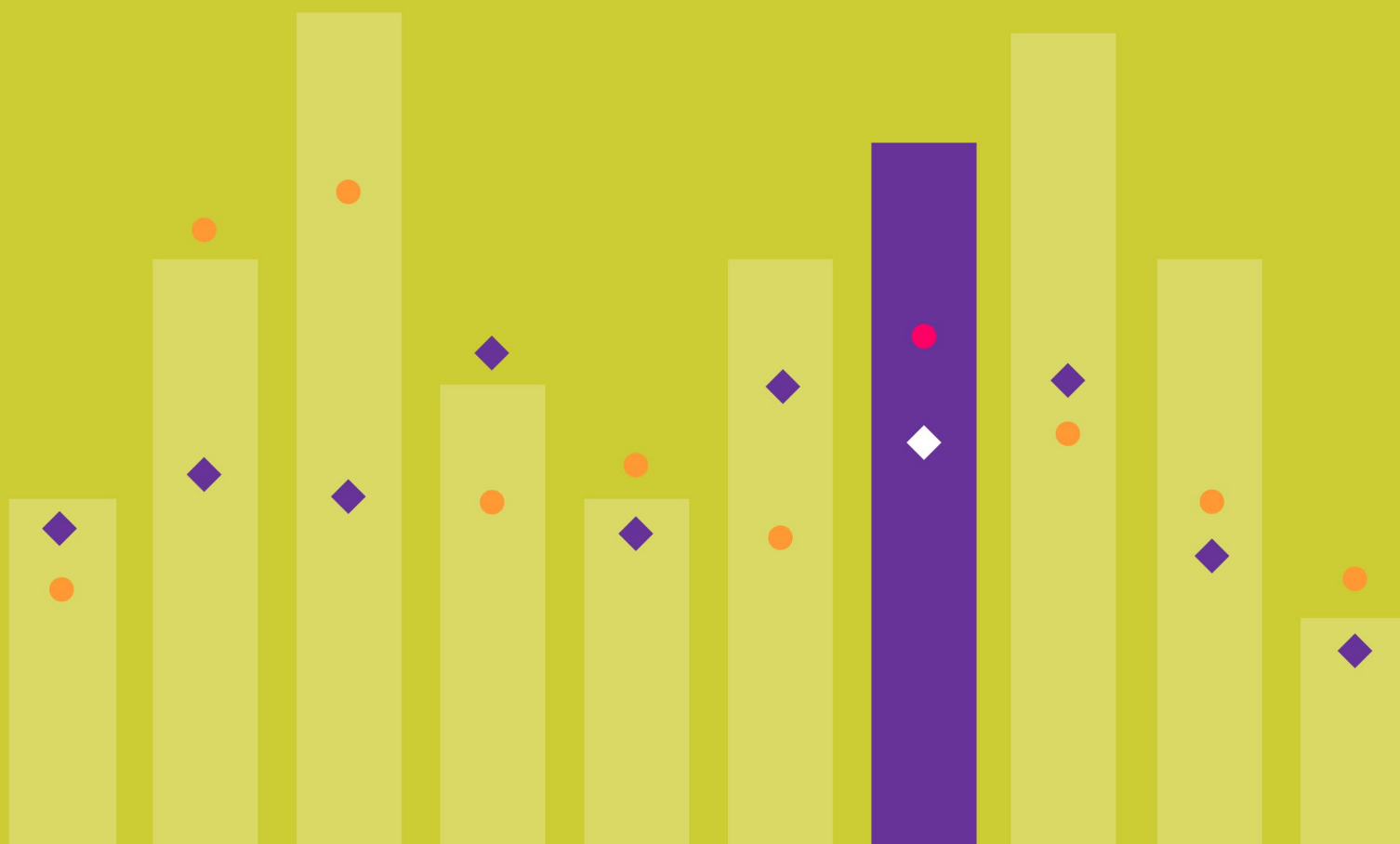# The scientific position of France in the world and in Europe

Analysis of various corpora
of publications and European projects

Observatoire des sciences et techniques

The scientific position of France in the world and in Europe

Analysis of various corpora of publications and European projects

December 2024

Table of contents

Executive summary

Analysis of France's scientific position is based on a wide range of data, particularly concerning research staff, publications, participation in European research projects and certain international university rankings.

Data from scientific publications allow the most detailed observations to be made along different lines of analysis. This explains why they are widely used to study the relative positions of countries or research institutions. However, the use of publication data has been criticised, either because the selected corpus does not sufficiently cover the output of a country or discipline, or, conversely, because a very large corpus would not allow a fair comparison between English-speaking and non-English-speaking countries. Furthermore, the increase in the number of publications worldwide in recent years has raised questions about the rigorous implementation of peer review by certain journals.

In order to contribute to the debates on the relevance of bibliometric analyses and the biases they may present, the report looks at France's position based on different corpora. The total, or main, corpus includes around 3 million annual publications worldwide, a second corpus is restricted to publications in English and two more selective corpora are made up based on sets of scientific journals. The report also provides elements of comparisons based on the OpenAlex database and the French repository HAL. The analysis measures the variation in indicators relating to France depending on the corpus considered - whether for all disciplines or for certain fields of research. Particular attention is paid to fields in the humanities and social sciences where the issue of the language of publication is of particular importance in various non-English-speaking countries.

The proportion of French scientific articles in English is increasing but remains below the world average

Over the last fifteen years, the share of English in scientific articles has continued to increase, both worldwide and in most countries. This phenomenon can be observed in various publication databases, although the dominance of English appears to be less pronounced in the largest ones. The share of other languages varies even more depending on the database used.

In the main corpus of the report, over the most recent years, France has a share of articles not written in English of just over 5%, like Germany, but higher than the other European countries with the exception of Spain. This share is also higher than the share observed worldwide, which fell below 3% in the early 2020s.

Among research-intensive countries, France's position has slipped since 2010

France remains one of the countries with the highest number of academic researchers. They are more numerous in Germany and, to a lesser extent, in the UK, but, while Italy and Spain have fewer researchers, they produce a slightly higher number of publications than France. The Netherlands, Switzerland and Sweden also have a high number of publications relative to their number of researchers.

The erosion of France's global share of publications that started in the 200S, has continued over the last decade. Between the beginning and the end of the 2010 decade, France's share of publications fell by a quarter in the total corpus, to 2.4% in 2017-22, and by just under a quarter in the English corpus, to 2.3%. At the same time, the share of publications from Germany fell by a sixth; in 2017-22, it was 3.9% of the total corpus and 3.7% of the English corpus.

Within the total corpus of publications, the decline in France's impact indicators observed since the middle of the 2010s is confirmed. In 2016-21, among the countries with the most publications, Switzerland, the Netherlands, the United Kingdom and the United States had impact indicators 30 to 40% above the world average. Their results for the share of publications in the decile of most-cited publications are even slightly higher. On both indicators, Germany, Australia, Canada, Italy and China are between 10% and 30% above average, while France is at the world average.

France's position varies according to the corpus of publications and the indicators that are considered

France's position varies according to the corpus, but also according to the issues and the indicators considered. Considering all research are, a less coverage of French publications by a selective corpus results in an improvement in some indicators relative to the international position of France.

In 2017-22, France's share is slightly lower in the English corpus than in the total corpus but, at 2.3%, it is higher than those of Spain and Russia, which places it 11th among the countries publishing the most, whereas it is 13th in the total corpus. France's position is even more favourable in the corpus of the decile of most-cited journals: with 2.7% of world publications, it ranks 8th, behind India. Within the particularly selective corpus of five prestigious mathematics journals, France has a remarkable position; with nearly 14% of articles, it ranks 2nd behind the United States, whose share exceeds 41%.

Within the English corpus, France has an impact index higher than the world average and higher than its index in the total corpus. The improvement in impact indices within the English corpus is stronger for various fields in the humanities and social sciences. The higher impact of French publications measured in the English corpus can be explained by various factors. Publications in English have a wider audience around the world and, as they are more widely read, they may be more widely cited. French publications in English are also more often international co-publications, which helps to increase their audience. These factors can be combined with publication in more demanding journals and different research questions, which may be of greater interest to an international audience.

In the corpus of the most cited journals, France's share is higher than in the total corpus, but its impact index calculated within this selective group is lower: at 0.91, it is on a par with India, behind Canada. Similarly, within the even more selective corpus of prestigious mathematics journals studied, France ranks 2nd for the number of articles but 7th for the impact index.

International comparisons show that, in France, indicators for disciplines in the humanities and, to a lesser extent, the social sciences are particularly sensitive to corpus. Thus, while France and Germany have the same proportion of publications in a language other than English, these are more concentrated in the humanities and social sciences (HSS) in France and, within these disciplines, in certain fields of research. At the same time, France's share of the most cited journals is much lower for the humanities (1.6%) than overall (2.7%); the gap is less pronounced for the social sciences. This disparity, to the disadvantage of the HSS within the corpus of most cited journals, is not observed for Germany. Thus, considering a corpus providing a broad coverage of French publications or, on the opposite, studying a more selective corpus matters more when it comes to HSS disciplines.

France's disciplinary profile is partially modified according to the corpus being considered

France has a specific disciplinary profile, different from that of China and emerging countries, but also different from that of the United States and research-intensive European countries. This disciplinary profile, identified by previous analyses, is confirmed by this report. Mathematics remains France's leading discipline of specialisation, with a share of its publications 70% higher than that of the discipline in the world total, i.e. an index of 1.7. This high level of specialisation remains and even increases in the other corpora. The other disciplines with specialisation indices of 1.2 are fundamental biology, physics, Earth and Universe sciences, as well as humanities. Specialisation in fundamental biology and physics remains stable in selective corpora. On the other hand, specialisation in the Earth and Universe sciences is declining in the most cited journals. Finally, it disappears in the humanities, both in the English corpus and in the corpus of the most cited journals (the index drops from 1.2 to 0.7 or 0.6). The report nevertheless shows that, while the share of English in French publications remains the lowest in the humanities and social sciences, it has risen sharply between 2010 and 2022 (from 31% to 53%).

Conversely, in the national repository HAL, a focus on journal articles and conference proceedings shows a strong representation of the SSH disciplines. Comparing the main journals found in HAL with those in the main corpus concludes to frequent differences.

The disciplinary profile of France's ERC projects is consistent with the disciplinary profile of its publications

France's scientific profile as measured by scientific publications is consistent with its profile at the European Research Council (ERC).

The previously identified disciplines with a cross-corpora specialization belong to the Physical sciences and Engineering ERC panel, more specifically mathematics and physics sub-panels, and Earth and Universe sciences to a lesser extent. In other disciplines covered by this panel, France has a modest or neutral specialisation. Yet it is in this panel that France performs best at the ERC, in terms of applications as well as funded projects and success rates.

In Life Sciences, France's performance is at the ERC average for applications, projects and success rates. This also corresponds to France's position as analysed on the basis of publications in the fields of fundamental biology and medical research - the position in applied biology and ecology being more corpus-dependant.

France's performance is weaker in the ERC SSH panel, which is consistent with observations based on publications. In the main corpus, France is specialized in the humanities, but not in the social sciences - which account for a larger proportion of world publications. Furthermore, France does no longer appear specialised in the humanities in the selective corpus. Similarly, the impact indices of French publications in the social sciences and humanities are often lower than those in other disciplines. These indicators are therefore consistent with the relatively low number of applications in ERC SH panel and lower success rates.

Conclusion and further development with open publication databases

The report shows that a country's scientific position varies from one corpus to another depending on the characteristics under consideration - world share of publications, rank, impact indices or disciplinary profile. Thus, while France has more publications in the largest corpus, it has a less favourable position than in the selective corpora in terms of world rank or impact indices. The analysis focused in particular on France's position in certain disciplines and comparisons with a number of European countries. It could be expanded by using different publication databases. With this in mind, the development of the OpenAlex database is a tremendous opportunity in that it has a broader coverage than historical databases and allows international comparisons.

Explorations of the OpenAlex database and the bibliometric literature that reports on it, as well as analyses based on national repository such as HAL, suggest that the use of this new data source should be developed along two complementary lines. Firstly, improving the reliability of the metadata describing the documents in OpenAlex. This is currently underway and could benefit from the combined efforts of OurResearch, which is developing OpenAlex, and user communities. Secondly, the value of the analyses will depend on the definition of a corpus of scientific publications suitable for international comparisons. Against a backdrop of the development of predatory journals, and even more generally of publications that do not follow a satisfactory peer review process, it is crucial to carefully specify the criteria defining what can be considered a scientific publication. On this second point, it will be useful to combine the lessons learnt from countries that have drawn up typologies of journals with international reflection. While this approach seems simpler for journal articles and conference proceedings, it could eventually be developed for book chapters and books

Introduction

Over the last ten years or so, various studies have been carried out to analyse France's scientific position in the world, with some of the results converging. The analyses are based on a wide variety of data, such as R&D expenditures, scientific publications and participation in European projects. Many of the studies present descriptive statistics and international comparisons, but some have developed analyses and evaluations of public policies. This introduction summarises a series of results in order to situate the contribution proposed by the present analysis.

France's scientific position in the world since 2000

Since the turn of the century, France, Japan and the United States have seen the smallest increase in the number of scientific publications among the leading countries. As a result, France's rank among the main publishing countries has slipped, not only with respect to major emerging countries, but also to high-income countries such as Italy, Spain and Canada[1]. Most countries' publications are increasingly the result of international collaboration, but France stands out for having a relatively high proportion of international co-publications, given its size. At the start of the 2020s, this share stood at 63%[2].

France has joined the global movement in favour of open access to scientific publications. In 2022, the open access index for its publications, which takes into account their disciplinary structure[3], is 30% above the world average, like Germany and Spain, while the UK is 40% above and the US at the average. At 1.5, the open access index for CNRS and Inria publications is 50% above the world average and equivalent to those of their counterparts abroad (OST-DEO 2023, 2024).

France's disciplinary profile appears stable, at least for the last twenty years. Like that of other high-income scientific countries, it is quite diversified, but it has some specific features. France's share of world scientific publications is high in mathematics and Universe sciences, while it is lower than that of the United States, Japan and various European countries in many areas of the life sciences (OST 2018, 2021). Within the humanities and social sciences as a whole, France's degree of specialisation varies greatly and appears to be higher in the humanities. These characteristics of France's disciplinary profile are also reflected in the country's applications for European Research Council grants[4]. However, they deserve to be observed over a more recent period and at different levels of detail in order to check their robustness.

The trend in the scientific impact of French publications, as measured by the citations they receive, reversed in the mid-2010s. Until 2015, the standardised impact indicator rose to exceed the world reference value (1), before falling back. The indicators relating to the percentile or decile of the most cited publications show similar trends (OST 2018, 2021, OECD 2024).

Overall, global analyses and the study of specific scientific fields, such as artificial intelligence[5], suggest that French scientific publications have evolved less rapidly than those of other countries. In fact, since the beginning of the century, the rapid increase in publications from countries that were catching up scientifically and the development of new areas of research have led to a strong dynamic in world publications and a change in their disciplinary structure.

Position of French research institutions and France

Research institutions, and universities in particular, are the subject of international comparisons using a variety of methods. The so-called Shanghai and Leiden rankings focus on assessing the results of research activities. The former calculates a composite score based on indicators relating both to past research or reputation (prizes awarded to alumni or professors) and to the university's publications. The second offers separate rankings based on different bibliometric indicators and focuses on the four-year periods

---

[1] Total publications, including the small share from companies. The results are similar for the two international databases, WoS and Scopus; see OST (2021), Stephen and Stahlschmidt (2022), OECD (2024).

[2] It is 65% in the UK, 58% in Germany and 51% in Italy (Lahatte et al. 2024, OECD 2024).

[3] For the calculation of this standardised index by discipline, whose world average is 1 by construction (OST 2020).

[4] For France as a whole, see OST (2021) and for the CNRS, OST-DEO (2023).

[5] See Lahatte and Sachwald (2023).

preceding each edition. In both cases, France presents results that distinguish it from countries with which it is regularly compared (see appendix 7). Firstly, it has a relatively small number institutions included: 25 in the Shanghai 2024 ranking and 32 in the Leiden ranking. This means that France has significantly fewer institutions ranked than the largest countries, as well as a number of European countries (UK, Germany, Italy, Spain) and even Canada and Australia. Although France has a modest proportion of its universities included, the first, Paris-Saclay, is among the top 20; the United Kingdom has 3 out of 62 universities ranked, i.e. a slightly higher proportion. France has 4 universities in the top 100, Germany 4 out of 51 ranked, and the UK 8 out of 62. In the Leiden ranking, 15 French institutions out of 32, or 47%, have a share of their publications in the most cited decile in the world that exceeds the 10% threshold. This share is lower than that of many of the leading countries in terms of the number of institutions ranked.

The unequal positions of French institutions in the rankings appears to be consistent with the conclusion of a study of the impact of support programmes for universities of excellence in France and Germany[6] . This study concludes that the programmes have stimulated the beneficiaries' international co-publications and have enabled them to better preserve their international position than non-supported institutions. The positions of French universities also reflect a specific feature of the national research system, where joint laboratories with research organisations make a variable contribution depending on the university[7]. The largest universities and those that are best represented in the rankings share a significant proportion of their laboratories with research organisations. In addition, some laboratories are also shared between universities. This structure explains why some universities share many publications with other French research institutions (OST 2024). It also explains the result of a Europe-wide study which found that the ratio between the number of authors affiliated with universities in publications and the number of university staff is high and quite variable in France (Lepori et al. 2023).

Objectives and organisation of the analysis

This new report on the scientific position of France has two main objectives. The first is to update previous analyses based on two types of data: scientific publications and participation in European research programmes, in particular European Research Council (ERC) projects. The second objective consists in observing France's publications on the basis of different corpora: the largest corresponds to the OST publications database, one corpus is restricted to English-language publications and two corpora are focus selections of scientific journals and conference proceedings. In particular, the aim is to observe the extent to which indicators relating to France change according to the corpus - whether for all disciplines or for certain fields of research. The originality of the approach lies in measuring the influence of the corpus on several components of France's position and not just on one type of indicator such as the number of publications or their impact. The analysis pays particular attention to social sciences and humanities for which the language of publication is of particular importance, both in France and in other non-English-speaking countries. Finally, still with a view to assessing the influence of corpora, a number of indicators are calculated for the OpenAlex open database and the French HAL repository. This report thus offers analyses that complement those previously carried out on French institutions as part of the Hcéres evaluations of organisations and universities[8] or explorations based on open databases (OST 2024a).

The first part looks at scientific publications by language. It presents changes in the share of English and other languages at world level, by major discipline and for the main countries of publication. A comparison with the OpenAlex database is proposed at the aggregate level. The second part examines France's position in more detail, based different corpora of publications. It highlights the specific nature of humanities and social sciences disciplines, particularly in France. The third part analyses France's participation in the European Union's research framework programmes. It compares France's disciplinary profile in the corpus of European Research Council projects with the disciplinary profile of its scientific publications. The conclusion underlines that the scientific position of a country varies according to the corpus in a differentiated way depending on the characteristics considered, and proposes to deepen the approach by mobilising more widely open publications databases. Seven appendices present the data sources and methods used, as well as additional data.

---

[6] Carried out as part of the evaluation of French policy (Carayol and Maublanc 2025).
[7] See, for example, Aubert (2008), IGF - IGAENR (2014), Gillet (2023).
[8] OST produces indicator reports to support the evaluation of organisations and research summaries for universities (published on the Hcéres website).

1. World scientific publications by language

Since the beginning of the 20th century, the share of English in scientific communications has increased significantly, particularly in journal articles and conference proceedings. The proportion of publications written in other languages than English (OLE) in the world varies according to the data source (Archambault et al. 2006, Larivière and Riddles 2021, Céspedes et al. 2024), but using the same source, the Web of Science, the trend is clear, whether in the physical sciences, the life sciences or the social sciences. The two world wars interrupted the process, but from the aftermath of the Second World War to 2015, the share of OLE publications fell from 15% to 2% for the natural sciences (Liu 2017). In the social sciences, the share of OLE publications first increased after the Second World War, before falling from 10% in the 1970s to 3% in 2015. The evolution has been different in the humanities that have been observed since the 1970s: the share of OLE publications in the world first increased with the number of publications, reaching over 30%, before decreasing to 24% in 2015 (Liu 2017). These evolutions were calculated without including the 'Emerging sources' index (ESCI) of the Web of Science (WoS) database, which contains a larger share of SSH disciplines or characterised by national dissemination. The inclusion of this complementary index, which has existed since 2005, increases the global corpus of publications by 11%, and more significantly the number of publications from certain non-English-speaking countries[9]. In this of the report, the total corpus includes the publications from this index.

This first part looks at the evolution of the share of OLE in world publications up to the early 2020s, specifying the variations between disciplines and between countries. Previous analyses have highlighted the fact that the dominance of English in the global corpus weighs heavily on the measurement of the impact of publications from non-English-speaking countries such as France and Germany, and from various emerging countries (Van Leeuwen et al. 2001). In addition, some analyses have highlighted the interactions between the language of publication and national journals that are relatively little cited internationally (Van Raan et al. 2011, Zitt et al. 2003). It therefore seems important to compare the position of countries according to whether it is observed on the basis of the total world corpus or on the basis of the corpus of English-language publications alone.

1.1 Publications and co-publications by language and discipline

The dynamism of research worldwide is reflected in an increase in number of scientific publications. Between 2010 and 2022, the number of publications rose by 81% to almost 3 million per year (Figure 1). This dynamic can be explained by several long-term trends, including the development of new journals and international co-publications that may have many authors from different countries (OST 2018). At the same time, the languages in which publications are written are changing. The share of English continues to increase, although its measurement varies according to the data source; it tends to be lower in the largest databases. For example, in 2019, the share of English in scientific articles was 73% in the OpenAlex database (Box 1), 93% in the Dimensions database (Larivière and Riddles 2021) and 96% in the main corpus of this study from the OST-WoS database (Figure 1).

Figure 1 highlights the change in the share of journal articles and conference proceedings[10] written in a language other than English (OLE) in the main corpus of this report; it has fallen from in 2010 to 2.2% in 2022. Since the end of the 2010s, the proportion of OLE publications indexed in OpenAlex has also fallen, although it remains significantly higher, at 16.5% in 2022 (Box 1).

Within OLE publications, the share of different languages varies over the decade. Figure 2 shows that this shares are only partially correlated with those of countries in world publications. For example, while the rise in the importance of Spanish can be understood as a function of the publication dynamics of Spanish-speaking countries, the development of other languages, such as Russian and Chinese, appears to be multifactorial (see figure 8 below).

---

[9] For details of the addition of the ESCI index to the OST publications database, see Appendix 1.
[10] These are the main types of scientific publication used in the analysis (see appendix 1).

Figure 1. Number of world scientific publications and OLE share, 2010-22*.
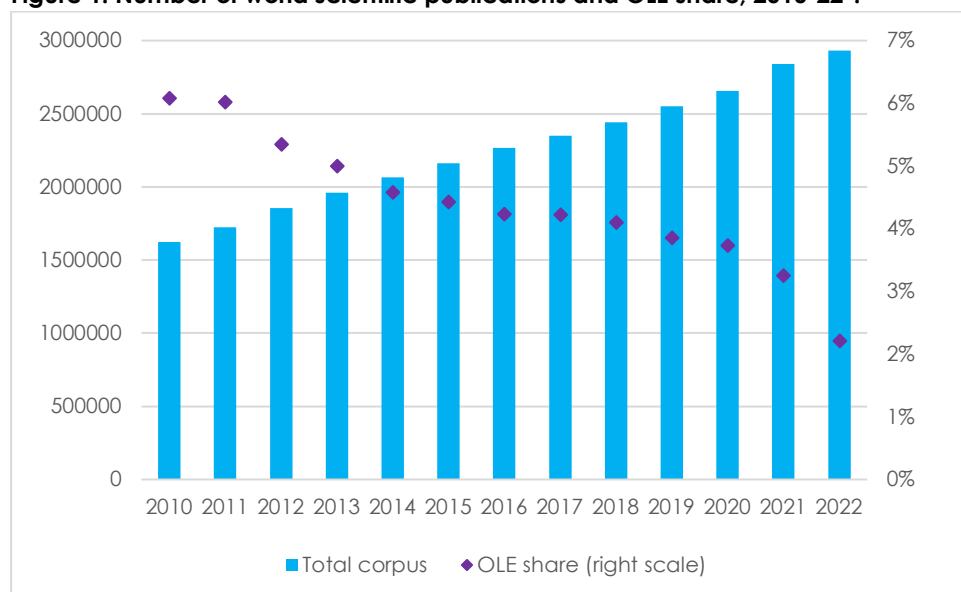
* Full year at 95%.
Source: OST database, Web of Science, OST calculations

Figure 2. Distribution of world OLE publications by language, total corpus, 2010-22*.
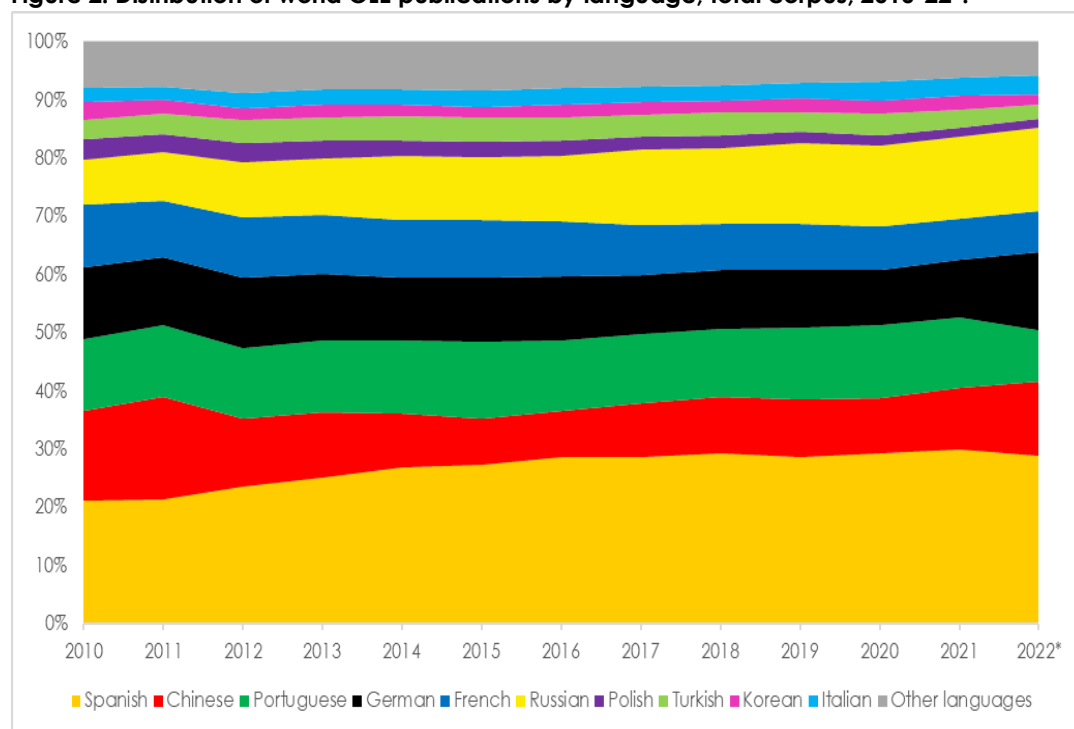
* Full year at 95%.
Source: OST database, Web of Science, OST calculations

Box 1 presents the distribution of journal articles by language of publication as it appears in the OpenAlex database and allows us to discuss some of these factors in the evolution of languages of publication. The distribution of OLE publications is very different and varies greatly between 2010 and 2022. The shares of French, German and Spanish within OLE publications are similar to those in figure 2, but compared with English, they have a larger share in OpenAlex. The share of French in 2021, for example, is less than 1% in the main corpus of this report, but almost 3% in the OpenAlex corpus. On the other hand, French and German have smaller shares of the OpenAlex corpus than Indonesian and Portuguese, which are

respectively the 1st and 3rd OLE languages[11] . It should also be noted that in the Dimensions database, the distribution of OLE publications by language is even different, with Chinese notably absent among the main languages other than English and a smaller share of Spanish (Larivière and Riddles 2021).

Box 1. Journal articles by language in OpenAlex

Figure E1.1 shows that the number of journal articles indexed* by OpenAlex increases until 2016, reaching 7 million, before fluctuating and falling in 2021 and 2022 (5.5 million). It should be noted that all journal articles, conference proceedings, books and book chapters are also indexed in OpenAlex. The proportion of articles written in a language other than English (OLE) tends to decrease, but at 16.5% in 2022, it remains much higher than its share in WoS (2.2%).

Figure E1.1: Number of journal articles in OpenAlex and OLE share, 2010-22
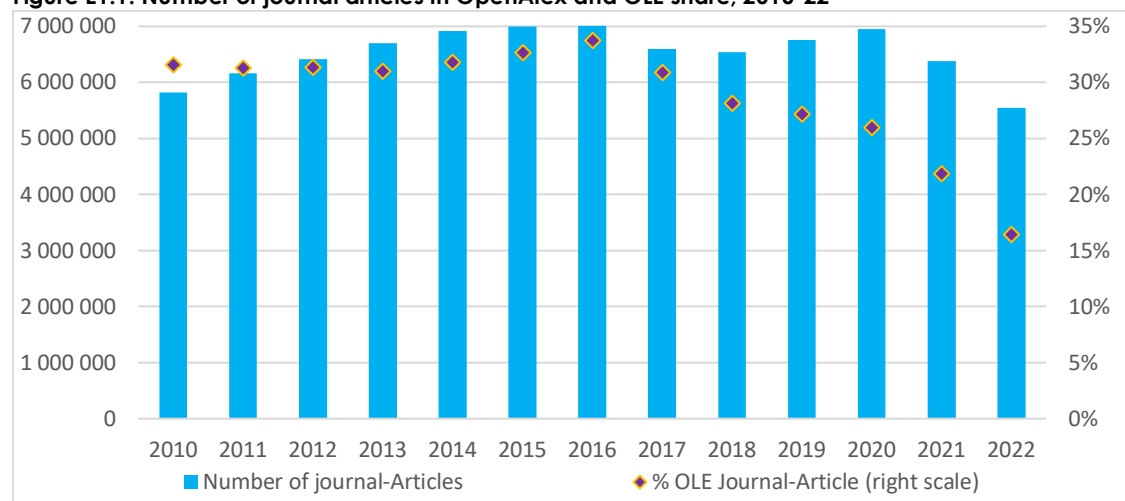
Figure E1.2: Distribution of OLE articles by language, OpenAlex database, 2010-22

---
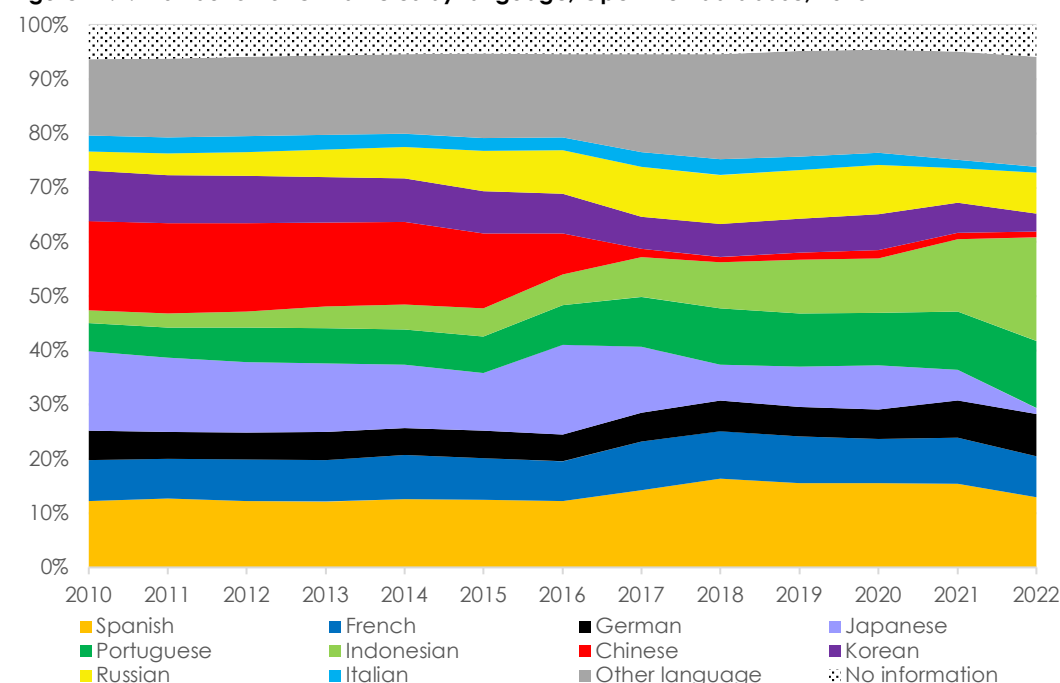
[11] On the specific case of Indonesian and publications from Indonesia in OpenAlex, see Simard et al (2024).

Figure E1.2 shows that the distribution of OLE articles by language is quite different from that of the WoS presented in figure 2, even if the position of some of them is similar. Spanish is the leading language, slightly less strongly than in the WoS. French and German come next, almost equally strong. Chinese, on the other hand, disappeared rapidly from 2016 and Japanese from 2017. Conversely, the share of Indonesian increases sharply between 2017 and 2022, becoming the leading language outside English. Portuguese is also growing in importance, becoming almost as important as Spanish. As in WoS, the share of Russian increased in the 2010s

Note that in OpenAlex, the share of languages other than English varies depending on the type of document. For example, German is more important for book chapters than for articles, and French has a very high share of preprints (of different document types).

* Appendix 3 provides various methodological details on the database and clarifies the definitions.
Sources: OpenAlex database, Nov. 2024 and OST database, WoS, OST calculations

A comparison of the distribution of article languages in the different databases highlights the importance of data collection methods. Access to data and the existence of open national repositories seem to play an important role in the case of OpenAlex, just as the journal selection process plays a central role in WoS. Appendix 4 illustrates the case of the HAL repository, where the proportion of publications in French is much higher than in the global corpus.

Figure 3 shows that the proportion of international co-publications worldwide is much higher for the English corpus (26% in 2020-21) than for the OLE corpus (6%)[12] . The share of international co-publications is nevertheless tending to increase in both corpora - and even more strongly for publications written in languages other than English (by more than 40% since 2010, compared with for the English corpus)

Figure 3. Share of international co-publications by language, 2010-22*
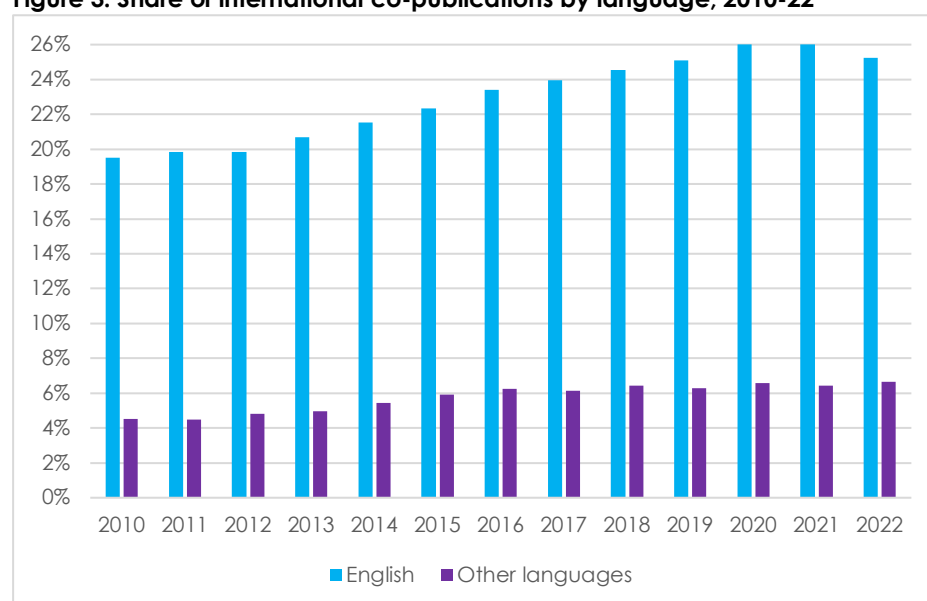
* Full year at 95%.
Source: OST database, Web of Science, OST calculations

The proportion of open access publications is also higher in English-language publications, although the gap with OLE publications has been narrowing since 2010 (Figure 4). The proportion of open access publications now exceeds 50% of the total corpus and exceeds 45% for OLE publications[13].

---

[12] The higher proportion of international co-publications in the English corpus will be detailed for certain fields and countries in part 2.
[13] When calculated in the Scopus database, this share is similar in 2022, at 51% (NSF 2023).

Figure 4: Share of world open access publications by language, 2010-22*
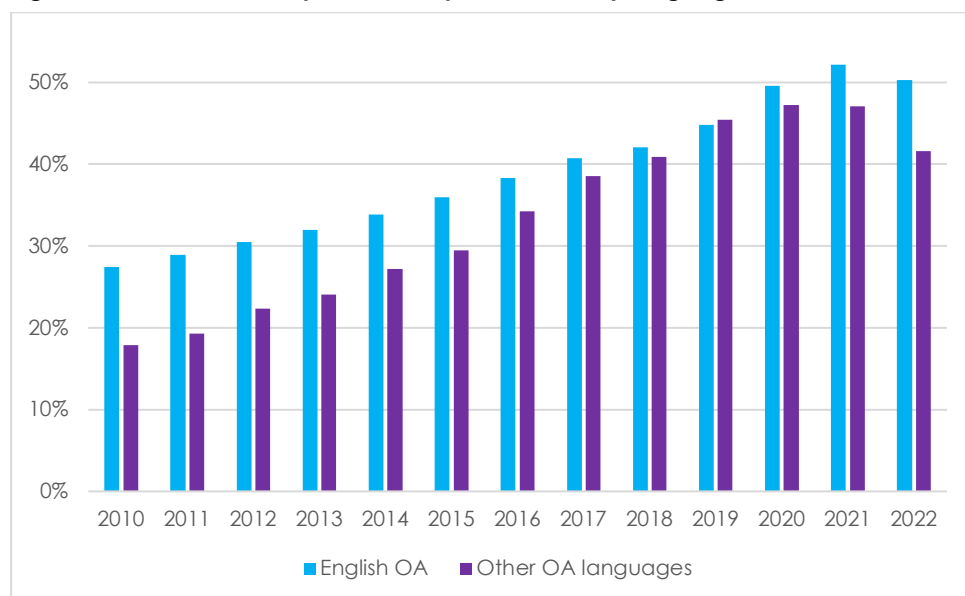
Figure 5 shows that both the volume and growth of publications between 2010 and 2022 vary greatly from one discipline to another.

Figure 5: Number of world publications and growth, by discipline, 2010-22*
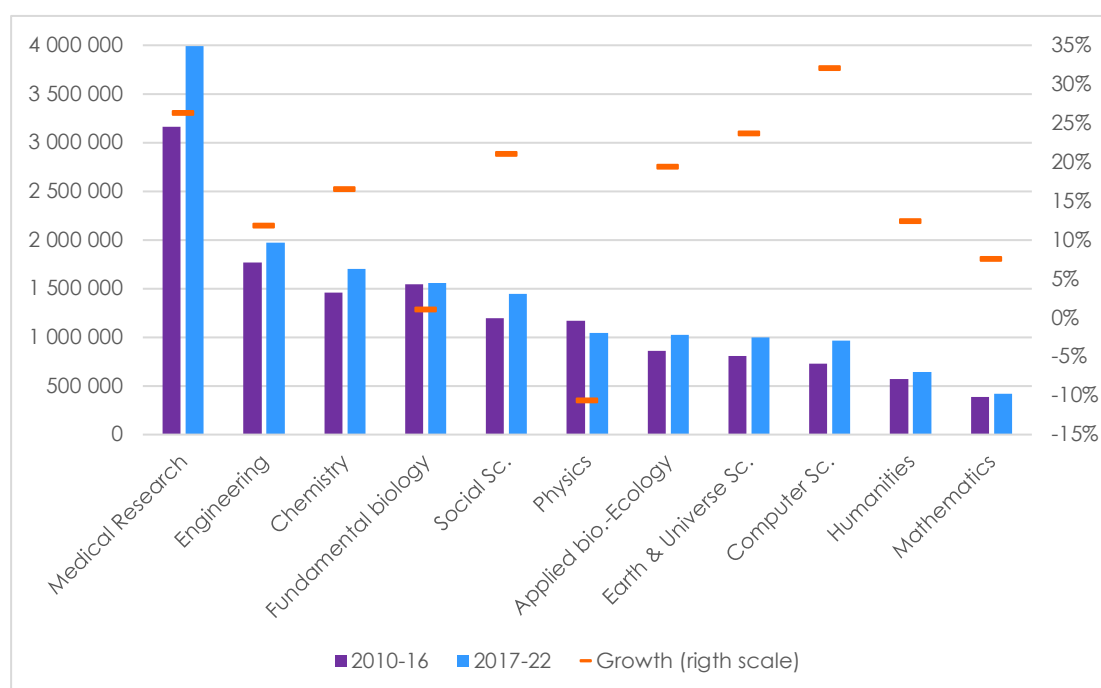
The use of English in scientific publications tends to increase in all disciplines, but at very different levels (figure 6). The proportion of OLE publications remains by far the highest in the humanities, at 26%. In the social sciences, it has fallen from 12% to 9% over the last decade, a reduction by a quarter. Applied disciplines working partly on issues of local interest have seen a more rapid decline in the share of OLE publications - from 5% to 2% for applied biology and medical research. In the physical sciences, engineering sciences and fundamental biology, the share of OLE publications was already below 5% in 2010-16 and is now below 2%. It is less than 1% in Mathematics.

Figure 6: Share of OLE in world publications by discipline, 2010-16 and 2017-22*
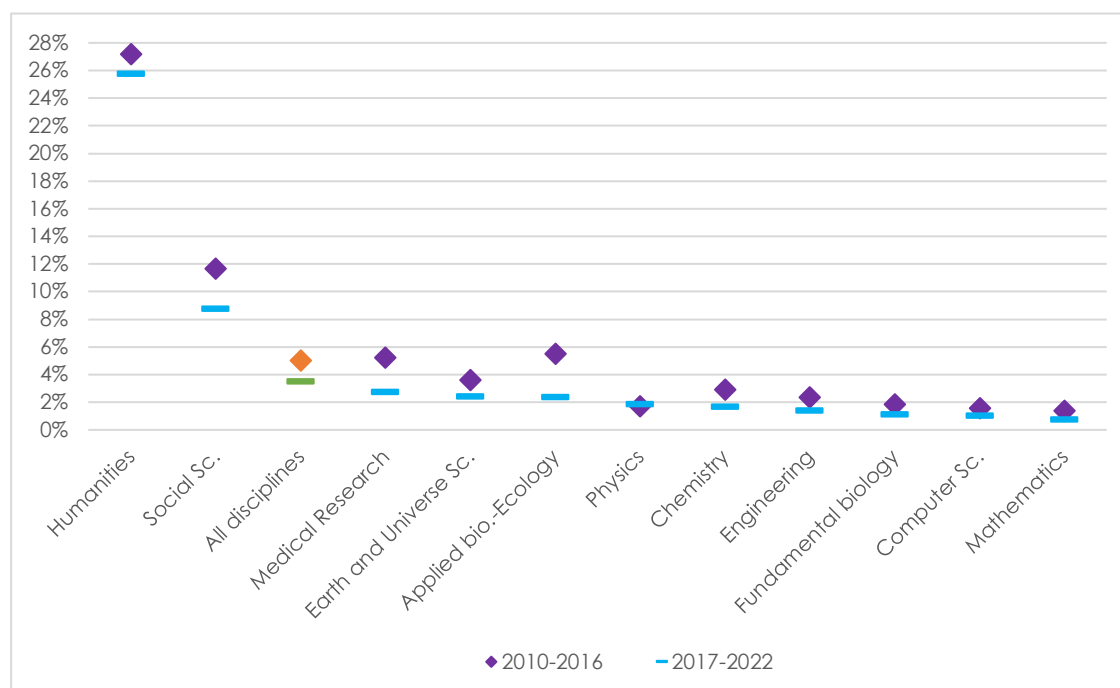
* Full year at 95%.
Source: OST database, Web of Science, OST calculations

In Earth and Universe sciences, the share OLE of 2.4% in 2017-22 is the average between that of sciences of the Universe, less than 1%, and that of Earth sciences, which are fairly diverse and have a higher a OLE share.

1.2   Top twenty countries by number of publications

At a very general level, the countries that publish the most are those that invest the most in research, both public and private, and have the highest number of researchers in public R&D activities[14] . The number of researchers itself depends on a combination of factors, including the size of the country and national wealth

There is a clear correlation between the number of researchers in research institutions and the number of publications, but the relationship between the two indicators varies from country to country (figure 7). Figure 7 shows that in Europe, for example, Germany and, to a lesser extent, the UK have more researchers and publish significantly more papers than France. In terms of the number of researchers, Italy, the Netherlands and Sweden publish relatively more scientific papers than other European countries.

Figure 7 focuses on the relationship between staff and the number of publications, ignoring the disciplinary and qualitative dimensions. The observation of the relative position of countries must be complemented by an analysis of these dimensions. This section examines the interactions between language of publication, disciplinary profile and impact indicators. The issue of peer review and its quality is addressed in two appendices: appendix 2 compares the share of articles published in MDPI and Frontiers journals between countries, and appendix 4 analyses the publications from France indexed in the HAL repository and in the main corpus of this report.

---

[14] See, for example, the influence of R&D expenditure (OST 2018) or the income level of countries (NSF 2023).

Figure 7: Number of researchers and number of publications, selection of countries, 2017-22
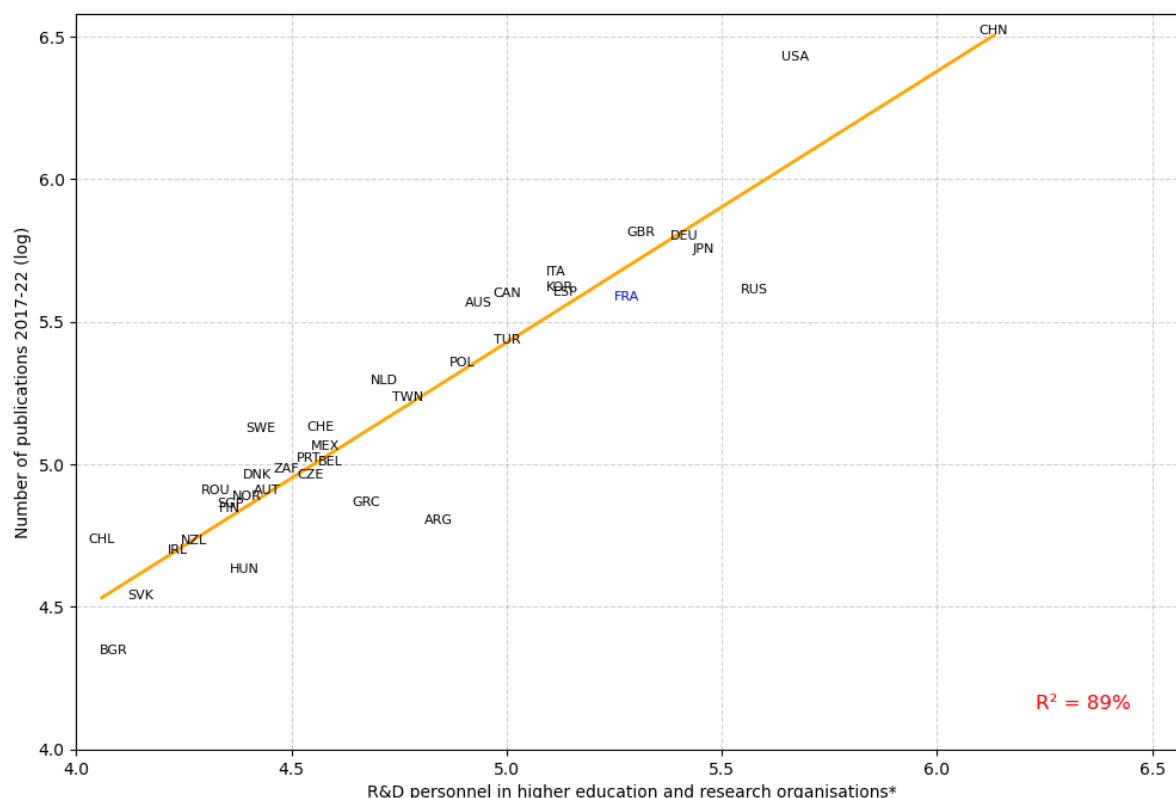
*Staff and publications variables are expressed in logarithms. A value of 4 corresponds to 10^4 = 10,000 in linear scale, a value of 5 corresponds to 10^5 = 100,000. Fractional counting. * Total R&D personnel in FTE: government and higher education sector.*

Note. The number of researchers was not available for 3 of the main publishing countries: India (3th), Brazil (12th) and Iran (16th), see figure 8.

Sources: OECD-MIST and OST Database, Web of Science, OST calculations

1.2.1 Share of countries publishing the most, by language

Figure 8 shows the evolution of the global share of the top countries by number of publications since 2010. China's share of publications is ahead of that of the United States from 2018[15] . By 2022, China's share will be 20%, compared with 19% for the United States. India's share overtook those of the UK and Germany in 2015, with Japan overtaking them in 2014. Over the period, Italy remained in 7th position, while France gradually moved up from 6th to 13th position, with a share close to that of Brazil at the start of the 2020s. Russia improved its position in the second half of the 2010 decade, before falling back to 14th.

Non-English-speaking countries behave very differently when it comes to publications written in a language other than English (OLE), as Figure 9 highlights. Among the countries producing the most publications, four had a share of OLE above 10% in 2017-22: Russia (14%), Brazil and Mexico (13%), and Spain (12%). Since 2010, Russia's share of OLE has fallen the least and is now the highest in the sample. In Turkey and Poland, the share of OLE publications has fallen sharply, reaching 6% and 4% respectively in 2017-22.

---

[15] China's overtaking of the United States was recorded in the Scopus database in 2016 (Tollefson 2018, NSF 2023).

Figure 8: World share of scientific publications, total corpus, top 20 countries, %, 2010-22*
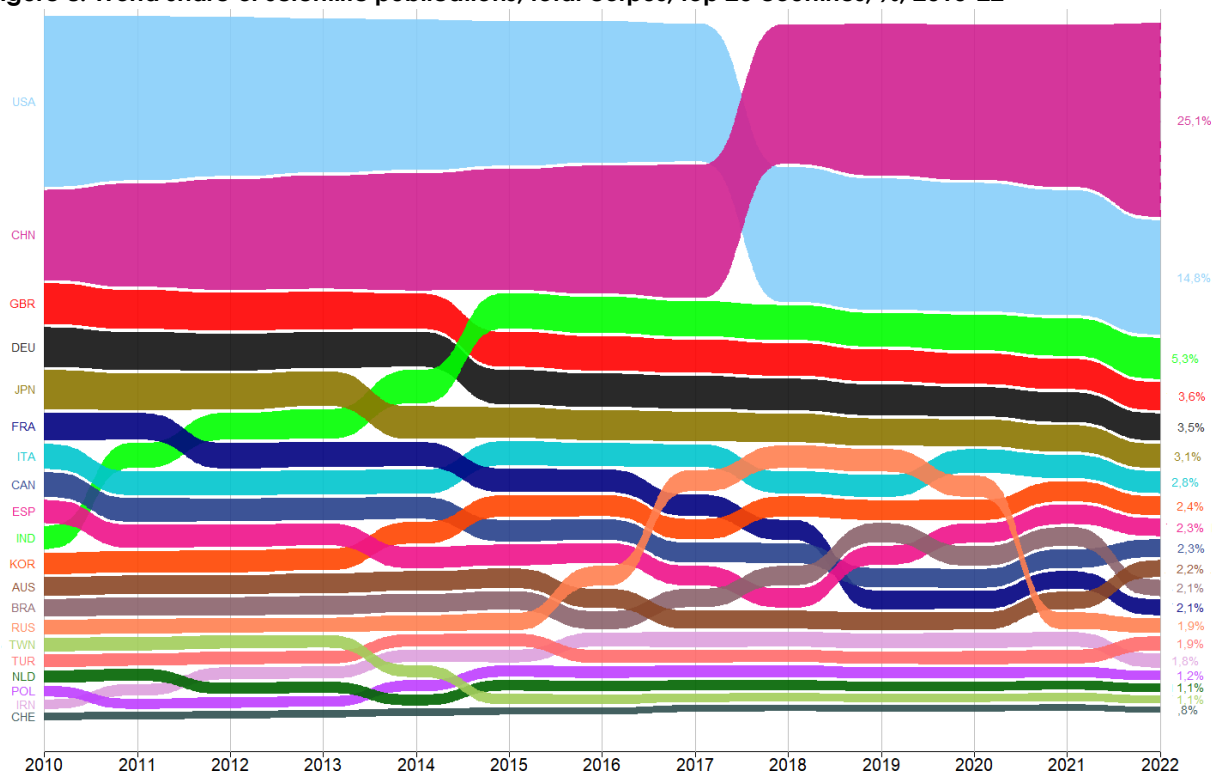
* Full year at 95%
Source: OST database, Web of Science, OST calculations

Figure 9: Share of OLE publications in the total corpus, leading countries, 2010-16 and 2017-22
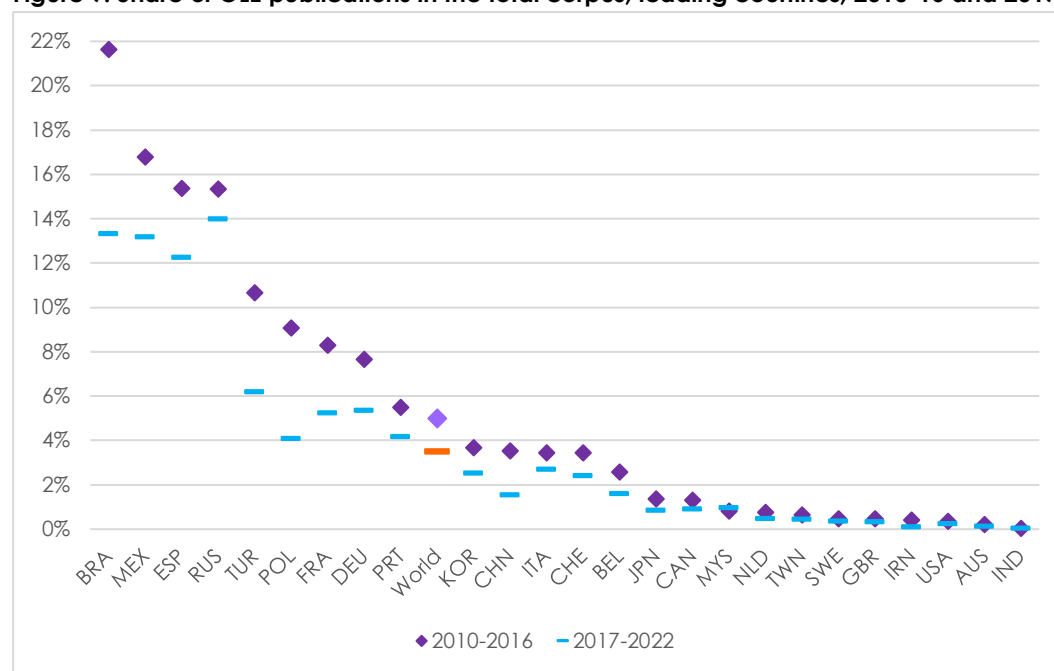
* Full year at 95%.

Source: OST database, Web of Science, OST calculations

France's (5.3%) and Germany's (5.4%) share of OLE publications remains slightly above the world average of 3.5%. Italy was already at this level in 2010-16 and its share of OLE publications is now below 3%, as is Switzerland's, while Belgium's is below 2%. China's share of OLE publications has halved over the decade

and now stands at 1.5%[16]. English-speaking countries, as well as Japan and various European and emerging countries, have a share of OLE publications of less than 1%. This is also the case in Canada, where the share of OLE publications fell from 1.3% in 2010-16 to 0.9% in 2017-22.

Table 1 shows the evolution of the share of English by discipline for a number of non-English-speaking European countries. It shows that, as is the case for disciplines worldwide (figure 6), the three disciplines where the share of English remains below the average for all disciplines combined are the humanities, the social sciences and medical research (in green).

Table 1. Share of publications in English, selection of European countries and evolution[§] 2010 - 2022*.

Discipline	France		Germany		Spain		Italy		Poland	
	Share 2022	22/10	Share 2022	22/10	Share 2022	22/10	Share 2022	22/10	Share 2022	22/10
Fundamental biology	98.3%	1.05	98.6%	1.02	98.2%	1.04	99.7%	1.02	99.1%	1.08
Medical research	93.4%	1.35	84.8%	1.12	92.3%	1.31	99.3%	1.08	98.6%	1.40
Bio. app. - ecology	98.0%	1.09	95.9%	1.14	98.7%	1.02	99.7%	1.01	99.1%	1.13
Chemistry	99.7%	1.01	99.2%	1.03	99.7%	1.02	99.6%	1.00	98.4%	1.08
Physics	99.9%	1.00	99.0%	1.00	99.4%	1.01	99.9%	1.00	97.7%	1.02
Earth & Universe Sc.	98.6%	1.03	97.6%	1.02	97.2%	1.01	99.6%	1.03	98.1%	1.16
Engineering sciences	99.8%	1.01	95.8%	1.09	98.8%	1.02	99.9%	1.01	94.0%	1.20
Computer Sc.	99.8%	1.01	99.3%	1.00	98.6%	1.01	99.7%	1.01	99.1%	1.00
Mathematics	99.0%	1.06	99.7%	1.01	99.9%	1.01	99.8%	1.00	100.0%	1.01
Humanities	52.5%	1.72	80.4%	1.44	56.2%	2.53	61.2%	1.09	83.3%	1.91
Social sciences	88.3%	1.26	92.3%	1.19	75.9%	1.47	94.5%	1.25	96.8%	1.42
All disciplines	**94.7%**	**1.10**	**92.9%**	**1.06**	**89.0%**	**1.12**	**97.4%**	**1.09**	**97.1%**	**1.16**

§ Column 22/10 gives the ratio of the 2022 share to the 2010 share.
* Full year at 95%.
Source: OST database, Web of Science, OST calculations

The share of English has increased the most in the discipline where it was lowest in 2010, the humanities. This is particularly the case in France (from 31% to 53%), Poland and Spain. The share of English has also increased significantly in the social sciences, where it remains higher than in the humanities. However, the gap between the two disciplines is widest in France, Spain and Italy[17].

In order to measure the influence of the language of publication, the analysis compares the position of the different countries in the total corpus of their publications and in the corpus in English. Table 2 shows that countries' global share of publications varies according to the corpus considered. Countries where English is the language of the vast majority of publications see their share increase in the English corpus and, conversely, the share of non-English-speaking countries is generally lower. This is not the case for China, whose share of OLE publications is very low.

A decline in a country's global share of the English corpus may be accompanied by a rise in its ranking among the top publishers. This was the case for France during the second period. In 2010-16, France had a share of the total corpus of 3.2%, in 7th place, compared with 3.0% in the English corpus, where it ranked 8th behind Italy. In 2017-22, its share of the total corpus fell to 2.4% and its share of the English corpus to 2.3%. However, this is higher than that of Spain and Russia, placing France 11th in the English corpus, behind Australia, while it is 13th in the total corpus, behind Brazil. Germany's share of publications is also lower in the English corpus (3.7% instead of 3.9% in the total corpus), but in 2017-22 it ranked 5th in both cases. Between the two periods, France's world share decreased slightly less in the English corpus than in the total corpus.

---

[16] Chinese-language journals from the Clarivate Analytics index (Horta and Shen 2020) are not included in the OST database.
[17] Appendix 5 (part B) shows the evolution of the share of English in a number of European countries at a more detailed level within the humanities on the one hand and the social sciences on the other. It thus complements table 1 and the analysis in section 2.1 below.

Table 2. Share of countries with more than 1% of world publications, by corpus, 2010-22

Country (in descending order for total corpus 2017-22)	2010-16		2017-22*	
	Total corpus	English corpus	Total corpus	English corpus
CHN	14.7 %	14.8 %	20.4 %	20.8 %
USA	19.9 %	20.9 %	16.6 %	17.1 %
IND	3.9 %	4.2 %	4.7 %	4.9 %
GBR	4.8 %	5.0 %	4.0 %	4.1 %
DEU	4.6 %	4.4 %	3.9 %	3.7 %
JPN	4.4 %	4.5 %	3.5 %	3.6 %
ITA	3.1 %	3.1 %	2.9 %	2.9 %
KOR	2.8 %	2.8 %	2.6 %	2.6 %
RUS	2.1 %	1.8 %	2.5 %	2.2 %
ESP	2.8 %	2.4 %	2.5 %	2.1 %
CAN	2.9 %	3.0 %	2.5 %	2.5 %
BRA	2.4 %	1.9 %	2.4 %	2.1 %
FRA	**3.2 %**	**3.0 %**	**2.4%**	**2.3 %**
AUS	2.5 %	2.6 %	2.3 %	2.4 %
IRN	1.6 %	1.7 %	1.9 %	2.0 %
TUR	1.6 %	1.5 %	1.7 %	1.6 %
POL	1.4 %	1.3 %	1.4 %	1.4 %
NLD	1.5 %	1.5 %	1.2 %	1.2 %
TWN	1.5 %	1.6 %	1.1 %	1.1 %
CHE	1.0 %	1.0 %	0.8 %	0.8 %

* Full year at 95%.

Source: OST 2024 database, Web of Science, OST calculations

1.2.2 Disciplinary profile of countries by language

Table 3a shows the distribution of publications from the top publishing countries and the world by discipline, both in the total corpus and in the English corpus. In the global corpus, the share of disciplines varies little, with the exception of the humanities, whose share is 25% lower in the English corpus, where it represents 3.1% of publications. This observation at world level can be explained by the drop in the share of humanities in non-English-speaking countries, where it is more pronounced when OLE publications (shown in red).

The share of social sciences and humanities in the English corpus has fallen much more in France (-55%) than in Germany (-22%) and even more than in Spain (-54%), which has a significantly higher share of OLE publications. Among the countries presented, it is logically in Brazil that the share of humanities corpus has fallen the most in the English (-79%). But it is in Russia that the share of humanities is highest in the total corpus (9.3%), and it falls by 71% in the English corpus.

The decline in the share of the humanities, and to a lesser extent the social sciences, in the English corpus is logically accompanied by an increase in the share of other disciplines (in green). These increases may be modest and spread over several disciplines. For Brazil, Spain and Russia, they concern 6 to 7 disciplines. In the case of France, the increases in the share of certain disciplines are scattered and less than 10%.

The distribution of the share of disciplines in the English corpus influences the specialisation indices[18], globally and for certain countries. Table 3b shows that the changes are also logically concentrated in the humanities. As the share of humanities in the global English corpus has fallen, the specialisation index for English-speaking countries in humanities tends to increase: from 1.4 to 1.8 for the United States and the

---

[18] Ratio between a discipline's share of a country's publications and its share of the world total.

Netherlands, and from 2 to 2.5 for the United Kingdom. Conversely, the index decreases for countries the share of publications in the humanities of which falls more than in the rest of the world, such as Brazil, Russia and Spain.

As a result of the significant drop of its specialisation index in the English corpus, France no longer appears specialised in the humanities, with an index of 0.7. Italy, Russia and Turkey have also seen their specialisation index in humanities fall below the world average (to 0.9 or 0.8). The slight drop in the share of humanities in German publications (table 3a) is reflected in a stable specialisation index of 1.1. In the English corpus, the share of German publications in the humanities is higher than that of France, which is the opposite situation to the total corpus.

As with the share of publications (table 3a), there is little change in the specialisation indices for the other disciplines. Variations in the indices for the humanities and social sciences are reflected in variations in the opposite direction spread over several disciplines, which are quite small since the share of the humanities and social sciences in the total is fairly low in all countries. For France, the specialisation index increases modestly in various disciplines; in mathematics, the index rises from 1.7 in the total corpus to 1.8 in the English corpus. However, in France, Germany and Brazil, the specialisation index also falls in medical research - a discipline whose OLE share in 2017-22 is just below the world average.

Table 3a: Distribution of publications by discipline according to corpus, top publishing countries, in percent, 2017-22

Countries (by global share)	Fundamental biology		Medical research		Applied bio. Ecology		Chemistry		Physics		Earth and Universe Sc.		Engineering		Computer Sc.		Maths		Humanities		Social sc.	
	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.
CHN	9.3	9.4	17.6	17.8	5.4	5.5	18.8	18.6	8.6	8.3	7.3	7.2	17.8	18.0	8.1	8.2	2.3	2.4	0.8	0.7	4.0	4.0
USA	12.9	13.0	33.9	33.9	5.2	5.2	5.4	5.4	5.0	5.0	5.6	5.6	7.5	7.5	5.0	5.0	2.4	2.4	5.8	5.7	11.4	11.4
IND	7.2	7.2	19.4	19.4	6.8	6.8	17.2	17.2	8.3	8.3	5.7	5.7	19.2	19.2	8.9	8.9	2.7	2.7	0.7	0.7	3.8	3.8
GBR	10.2	10.2	28.7	28.8	4.5	4.5	5.6	5.6	4.7	4.8	6.0	6.0	8.8	8.8	5.0	5.0	2.0	2.0	8.0	7.9	16.5	16.5
DEU	12.2	13.0	25.4	22.9	5.2	5.3	9.9	10.6	8.6	9.2	5.9	6.3	10.7	11.0	6.5	7.0	2.8	3.0	4.5	3.5	8.4	8.1
ITA	10.3	10.6	32.6	33.4	6.2	6.4	6.0	6.2	5.6	5.8	7.2	7.4	11.4	11.8	5.2	5.4	2.9	3.0	5.0	2.8	7.6	7.2
JPN	13.4	13.4	32.7	32.8	4.4	4.3	11.8	11.6	10.6	10.7	4.9	4.9	10.2	10.2	6.3	6.4	2.1	2.2	1.0	0.9	2.6	2.6
KOR	10.3	10.6	28.4	28.6	4.3	4.4	13.8	13.5	9.2	9.2	4.2	3.9	14.7	14.5	7.2	7.4	1.9	1.9	1.4	1.4	4.6	4.6
CAN	11.1	11.2	30.0	30.1	6.7	6.8	6.0	6.1	3.7	3.8	6.7	6.7	10.9	11.0	5.5	5.6	2.2	2.2	5.4	5.0	11.9	11.6
ESP	8.9	10.4	24.3	25.1	7.5	8.8	7.2	8.5	4.2	5.0	5.9	6.9	8.5	10.0	4.8	5.7	2.4	2.8	10.5	4.8	15.8	12.1
RUS	7.0	7.3	6.8	6.3	4.5	4.7	15.7	18.2	16.4	19.3	9.0	10.0	13.6	15.0	3.4	3.9	4.5	4.9	9.3	2.7	9.8	7.8
FRA	**11.6**	**12.3**	**24.8**	**23.6**	**5.5**	**5.8**	**9.0**	**9.7**	**8.0**	**8.7**	**7.5**	**8.0**	**11.3**	**12.2**	**6.8**	**7.3**	**4.5**	**4.8**	**4.9**	**2.2**	**6.3**	**5.5**
BRA	9.9	11.4	25.6	28.1	17.9	19.9	7.0	8.0	3.4	3.9	6.0	6.5	7.7	8.8	4.1	4.6	2.0	2.3	6.1	1.3	10.4	5.1
AUS	9.1	9.1	31.6	31.6	8.2	8.2	5.5	5.5	3.0	3.0	6.8	6.8	8.4	8.5	4.8	4.8	1.2	1.2	5.0	5.0	16.4	16.4
IRN	7.9	7.9	24.9	24.9	6.7	6.7	16.9	16.9	5.3	5.3	6.4	6.4	18.9	18.9	3.6	3.6	4.5	4.5	1.3	1.3	3.6	3.6
TUR	5.7	5.8	36.4	37.5	7.6	7.9	9.0	9.6	3.6	3.9	4.5	4.7	11.9	11.8	4.1	3.8	4.2	4.5	4.2	2.5	8.9	8.2
NLD	11.2	11.2	36.9	37.1	4.5	4.5	4.5	4.5	3.8	3.8	5.8	5.8	7.6	7.7	4.5	4.6	1.5	1.5	5.9	5.6	14.0	13.9
POL	8.2	8.4	21.3	21.6	9.0	9.0	11.6	12.0	6.6	6.8	7.2	7.3	15.3	15.2	4.2	4.4	2.8	3.0	4.6	3.1	9.4	9.3
TWN	8.8	8.9	29.6	29.8	3.0	3.0	10.3	10.3	8.3	8.3	4.2	4.2	15.5	15.6	7.9	7.9	1.9	1.9	2.0	1.7	8.6	8.4
CHE	12.8	13.2	30.8	30.5	5.6	5.5	7.1	7.4	7.7	8.0	7.1	7.3	7.8	8.0	5.6	5.7	2.5	2.5	4.5	3.5	8.8	8.6
World	**9.9**	**10.1**	**25.3**	**25.5**	**6.5**	**6.6**	**10.8**	**11.0**	**6.6**	**6.8**	**6.3**	**6.4**	**12.5**	**12.8**	**6.1**	**6.3**	**2.6**	**2.7**	**4.1**	**3.1**	**9.2**	**8.7**

Table 3b: Discipline specialisation index by corpus, top publishing countries, 2017-22

Countries, order by world share	Fundamental biology		Medical research		Applied bio. Ecology		Chemistry		Physics		Earth and Universe Sc.		Engineering		Computer Sc.		Maths		Humanities		Social sc.	
	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.	Total	Eng.
CHN	0.9	0.9	0.7	0.7	0.8	0.8	1.7	1.7	1.3	1.2	1.2	1.1	1.4	1.4	1.3	1.3	0.9	0.9	0.2	0.2	0.4	0.5
USA	1.3	1.3	1.3	1.3	0.8	0.8	0.5	0.5	0.8	0.7	0.9	0.9	0.6	0.6	0.8	0.8	0.9	0.9	1.4	1.8	1.2	1.3
IND	0.7	0.7	0.8	0.8	1.1	1.0	1.6	1.6	1.3	1.2	0.9	0.9	1.5	1.5	1.5	1.4	1.0	1.0	0.2	0.2	0.4	0.4
GBR	1.0	1.0	1.1	1.1	0.7	0.7	0.5	0.5	0.7	0.7	0.9	0.9	0.7	0.7	0.8	0.8	0.8	0.8	2.0	2.5	1.8	1.9
DEU	1.2	1.3	1.0	0.9	0.8	0.8	0.9	1.0	1.3	1.4	0.9	1.0	0.9	0.9	1.1	1.1	1.1	1.1	1.1	1.1	0.9	0.9
ITA	1.0	1.1	1.3	1.3	1.0	1.0	0.6	0.6	0.9	0.9	1.1	1.2	0.9	0.9	0.9	0.9	1.1	1.1	1.2	0.9	0.8	0.8
JPN	1.4	1.3	1.3	1.3	0.7	0.7	1.1	1.1	1.6	1.6	0.8	0.8	0.8	0.8	1.0	1.0	0.8	0.8	0.2	0.3	0.3	0.3
KOR	1.0	1.1	1.1	1.1	0.7	0.7	1.3	1.2	1.4	1.4	0.7	0.6	1.2	1.1	1.2	1.2	0.7	0.7	0.4	0.4	0.5	0.5
CAN	1.1	1.1	1.2	1.2	1.0	1.0	0.6	0.6	0.6	0.6	1.1	1.1	0.9	0.9	0.9	0.9	0.8	0.8	1.3	1.6	1.3	1.3
ESP	0.9	1.0	1.0	1.0	1.2	1.3	0.7	0.8	0.6	0.7	0.9	1.1	0.7	0.8	0.8	0.9	0.9	1.0	2.6	1.5	1.7	1.4
RUS	0.7	0.7	0.3	0.3	0.7	0.7	1.5	1.7	2.5	2.9	1.4	1.6	1.1	1.2	0.6	0.6	1.7	1.8	2.3	0.9	1.1	0.9
FRA	**1.2**	**1.2**	**1.0**	**0.9**	**0.8**	**0.9**	**0.8**	**0.9**	**1.2**	**1.3**	**1.2**	**1.2**	**0.9**	**1.0**	**1.1**	**1.2**	**1.7**	**1.8**	**1.2**	**0.7**	**0.7**	**0.6**
BRA	1.0	1.1	1.0	1.1	2.8	3.0	0.7	0.7	0.5	0.6	0.9	1.0	0.6	0.7	0.7	0.7	0.8	0.9	1.5	0.4	1.1	0.6
AUS	0.9	0.9	1.3	1.2	1.3	1.3	0.5	0.5	0.5	0.5	1.1	1.1	0.7	0.7	0.8	0.8	0.5	0.5	1.2	1.6	1.8	1.9
IRN	0.8	0.8	1.0	1.0	1.0	1.0	1.6	1.5	0.8	0.8	1.0	1.0	1.5	1.5	0.6	0.6	1.7	1.7	0.3	0.4	0.4	0.4
TUR	0.6	0.6	1.4	1.5	1.2	1.2	0.8	0.9	0.6	0.6	0.7	0.7	1.0	0.9	0.7	0.6	1.6	1.7	1.0	0.8	1.0	0.9
POL	0.8	0.8	0.8	0.8	1.4	1.4	1.1	1.1	1.0	1.0	1.1	1.1	1.2	1.2	0.7	0.7	1.1	1.1	1.1	1.0	1.0	1.1
NLD	1.1	1.1	1.5	1.5	0.7	0.7	0.4	0.4	0.6	0.6	0.9	0.9	0.6	0.6	0.7	0.7	0.6	0.5	1.4	1.8	1.5	1.6
TWN	0.9	0.9	1.2	1.2	0.5	0.5	1.0	0.9	1.3	1.2	0.7	0.7	1.2	1.2	1.3	1.3	0.7	0.7	0.5	0.5	0.9	1.0
CHE	1.3	1.3	1.2	1.2	0.9	0.8	0.7	0.7	1.2	1.2	1.1	1.1	0.6	0.6	0.9	0.9	0.9	0.9	1.1	1.1	1.0	1.0
World	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**

Interpretation: indices that move by 10% or more are shown in red for falls and green for rises.
* Year complete at 95%; Source: OST database, Web of Science, OST calculations

Figure10 summarises the changes in the specialisation indices between the two corpora for France and Germany. It highlights both the overall more balanced nature of Germany's disciplinary profile and the greater change in France's profile between the two corpora. In medical research, however, the modest fall in the specialisation index concerns both countries.

Figure 10: Specialisation index for total and English corpora, France and Germany, 2017-22*.
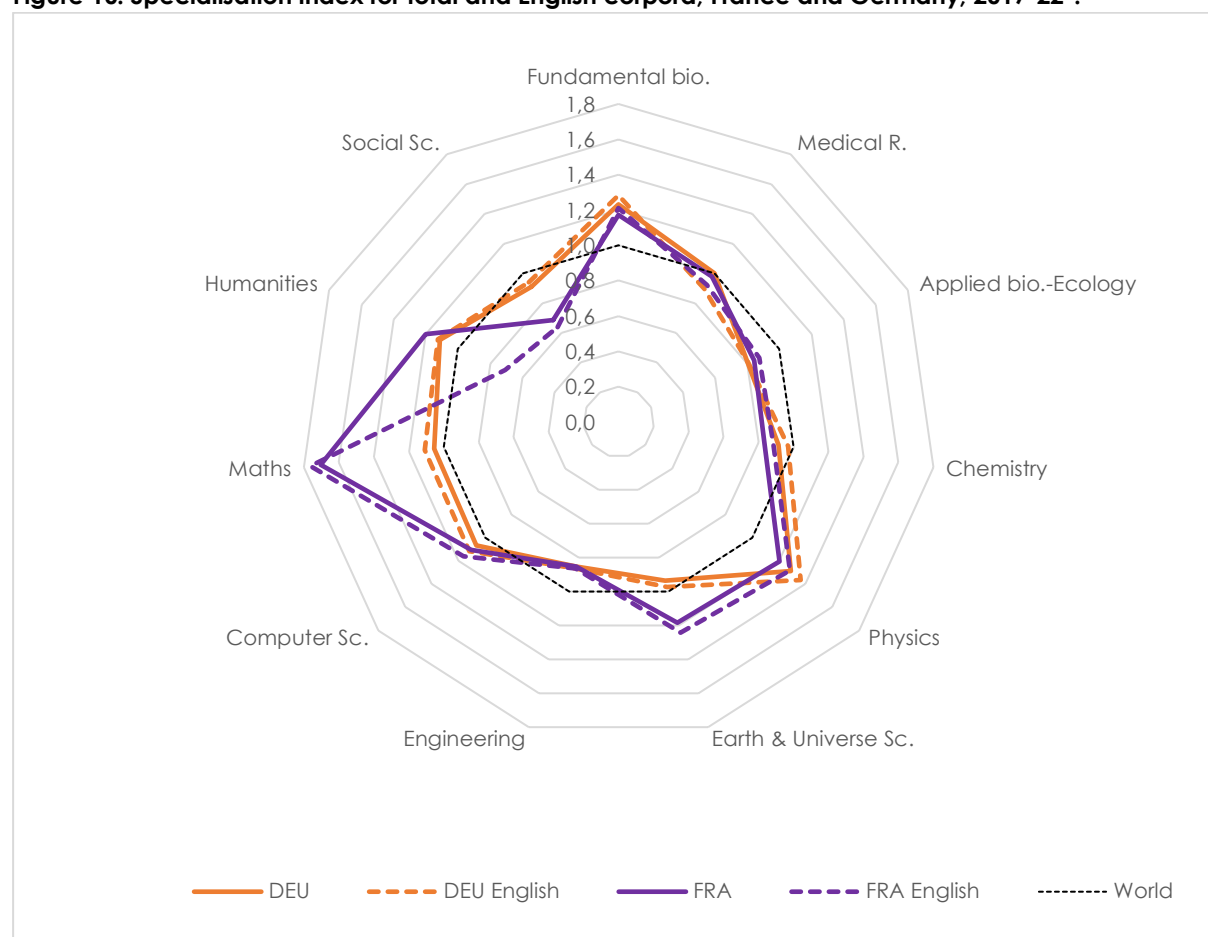
* Full year at 95%.
Source: OST database, Web of Science, OST calculations

1.2.3 Impact indicators by language

The asymmetric nature of the distribution of citations, which are concentrated in a small proportion of publications, means that comparisons between countries must combine a measure of the average scientific impact of publications with measures of the propensity of countries to produce some of the most cited publications in the world. These two types of indicators are calculated according to language.

Average impact indicator for publications

The impact of a country's scientific publications is measured using a standardised index to take account of differences in citation practices between disciplines and fields. For each article, a score is defined by the ratio between the citations it has received and the world average, taking into account its scientific category, the type of document and the year of publication. The impact index of a country's publications is determined by the average of its standardised scores[19].

---

[19] See Appendix 1 for more details.

Table 4 shows the impact index for all disciplines for the top twenty countries by number of publications. The index is provided for the total corpus and for English-language publications on the basis of standardised scores calculated for the total corpus[20]. The table shows that the index varies slightly depending on whether it is calculated on the total corpus or on the English corpus. Switzerland has the highest impact index for both corpora, at almost 40% above the world average. The impact indices of the Netherlands, the United Kingdom and the United States are between 25% and 35% higher than the world reference value in both corpora. However, they are 3% lower in the English corpus. Insofar as publications in English tend to be cited more than publications in other languages, this means that the average citations of British publications increase relatively less in the English corpus than those of other countries. This is also the case for Australia and Canada. The impact indices for Italy and South Korea, which have a slightly higher share of OLE publications (around 2.5%), remain stable.

Table 4: Impact index publications from the top 20 countries publishing in two corpora, 2016-21

Countries, descending order total impact	Total	English	% change	Countries, descending order total impact	Total	English	% change
CHE	1.37	1.37	0 %	ESP	0.91	1.01	11 %
NLD	1.34	1.30	- 3 %	KOR	0.86	0.86	0 %
GBR	1.32	1.28	- 3 %	TWN	0.83	0.80	-4 %
USA	1.28	1.24	- 3 %	IRN	0.82	0.79	-4 %
AUS	1.22	1.19	- 3 %	IND	0.78	0.75	-4 %
DEU	1.10	1.14	4 %	JPN	0.74	0.73	- 1 %
CAN	1.10	1.07	- 3 %	POL	0.70	0.71	1 %
ITA	1.09	1.09	0 %	TUR	0.64	0.66	3 %
CHN	1.05	1.03	- 2 %	BRA	0.62	0.71	15 %
FRA	**0.99**	**1.04**	**5 %**	RUS	0.47	0.49	4 %

Interpretation: indices rising by 5% or more are shown in green.
Source: OST database, Web of Science, OST calculations

The impact index for countries with a relatively high proportion of OLE publications increases in the English corpus. The index of publications increases by 10% for Spain, and even by 15% for Brazil. It increases by 5% for France and 4% for Germany; as a result, the gap in impact indexes between the two countries remains at around 10%. On the other hand, as China's impact index falls by 2%, France's index joins that of China. Overall, Germany remains in 7th in terms of impact index, while France drops from 10th to 9th in the English corpus

The higher impact indices observed in the English corpus for countries with a high proportion of OLE publications can be explained by a series of complementary factors. Firstly, publications in English have a wider audience in the world than OLE publications; they can therefore be more widely read and possibly more cited. In addition, publications in English are much more often international co-publications (figure 3). This may be due to the needs of joint research work within an international team, but it is also conducive to dissemination in different countries. These characteristics may be combined with different publication venues, varying in editorial requirements. Lastly, they may in some cases be combined with research subjects of publications in English that are more likely to be of interest to an international audience[21]. The observation of certain characteristics of publications in English from non-English-speaking countries could also result from a selection bias, with the option of publication in English being chosen when the work presents favourable characteristics (Larivière 2018).

---

[20] The value associated with the world in the English perimeter is not equal to 1. To take into account the specificities of this perimeter and to have the value 1 as the world reference, the index relating to the English corpus is the ratio between the country MNCS and that of the world.

[21] These considerations have been made explicit in the design of national directories which have introduced a classification of local publications, as in Finland and Norway (Pölönen et al. 2021, Sivertsen 2018).

Most frequently cited publications

The decile of the world's most cited publications (top 10%) is used to approximate the notion of excellence[22]. The ratio between each country's share of publications in the top 10% and that of the world defines the activity index in the most cited decile (table 5).

The activity index for countries with a low proportion of OLE publications decreases very little between the two corpuses (from 0 to 4%). On the other hand, the index increases for countries with OLE above the world average. This is particularly the case for Brazil, Spain and Russia. As with the average impact, the index of activity in the top 10% increases by 5% for France and 4% for Germany - the gap between the two countries is thus maintained in the English corpus (16%). On the other hand, the greater increase in Spain's activity index reduces the gap in favour of France from 12% to 3%. France remains in 11th position, contrary to the improvement observed in the average impact index (table 4).

Table 5: Activity index in the decile of most cited publications by corpus, 2016-21

Countries, descending order index on total	Total	English	% change	Countries, descending order index on total	Total	English	% change
CHE	1.51	1.51	0 %	ESP	0.86	0.98	14 %
NLD	1.46	1.42	- 3 %	IRN	0.79	0.76	- 3 %
GBR	1.41	1.36	- 4 %	KOR	0.78	0.78	0 %
USA	1.37	1.32	- 4 %	TWN	0.71	0.69	- 3 %
AUS	1.29	1.25	- 3 %	IND	0.69	0.67	- 3 %
ITA	1.13	1.13	0%	JPN	0.60	0.59	- 2 %
DEU	1.12	1.17	4 %	TUR	0.53	0.55	4 %
CHN	1.12	1.10	- 2 %	POL	0.52	0.53	2 %
CAN	1.10	1.07	- 3 %	BRA	0.46	0.54	17 %
FRA	**0.96**	**1.01**	**5 %**	RUS	0.30	0.32	7 %

Interpretation: indices rising by 5% or more are shown in green
Source: OST database, Web of Science, OST calculations

Figure 11 provides an analytical view of the position of countries by citation class and highlights that trends tend to be stronger in the most extreme citation classes. It shows seven disjoint citation classes, from the first percentile of most-cited publications to the class of least-cited publications - including those not cited. For each country, the figure shows the difference between the activity indices calculated on the English corpus and on the total corpus, by class; it is ordered according to the value of the first class, i.e. according to the variation in the activity index in the top 1%.

Countries with a high proportion of OLE publications improve their profile in the English corpus. Spain, for example, sees its activity index improve in the first six citation classes, while it falls sharply in the class of the least cited publications. The effect is the opposite and not as strong for countries with a low share of OLE. For example, the United Kingdom with a low proportion of OLE has a negative gap for the first six citation classes and a positive gap for the least cited.

Germany is in second position on the figure, as it is the country that most improves its activity index in the most cited percentile, after Spain and before Brazil. Germany improves its position more than France over the first two citation classes (from the 1st to the 5th percentile); conversely, France improves its position more from the 6th percentile upwards.

---

[22] See methodology appendix.

Figure 11: Variation in activity indices by citation class (value in English corpus - value in total corpus), selected countries, 2016-21
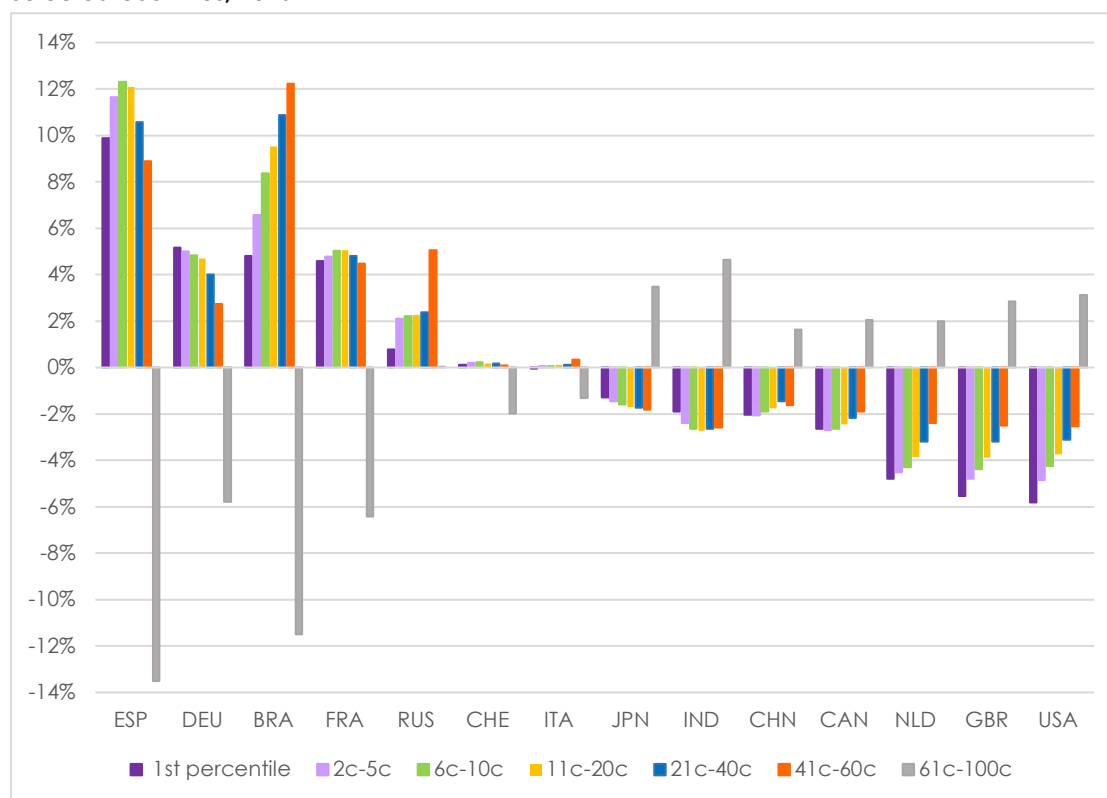
Interpretation. After the first percentile (or top 1%), "c" designates the percentiles or percentiles. The last class includes publications receiving no citations.
Source: OST database, Web of Science, OST calculations

2. France's position according to various corpora

France's scientific position is examined in more detail along two axes: a selection of scientific categories within the three disciplines where the share of OLE publications is highest, and a selection of publications according to the journals in which they appear.

2.1 Top areas of publication in SSH and medical research

France's position is analysed in greater detail for the three main disciplines where the proportion of OLE publications is highest: humanities, social sciences and medical research. For each discipline, the analysis focuses on the ten disciplinary categories in which France has the most publications. It provides the world rank of the category in terms of number of publications, as well as the proportion of French publications in English. The specialisation and impact indices are calculated on the total corpus of publications and on the corpus restricted to publications in English. The proportion of international co-publications is compared between OLE publications and publications in English.

Details of the indicators for France are provided in tables 6a to 6c; the cases of Germany, Spain and the United Kingdom are presented in appendix 5 and used to highlight convergences or divergences with France.

These analyses identify a diversity of situations within the three disciplines and between non-English-speaking European countries. A few general results can be highlighted before going into more detail on certain categories. Firstly, the fine categories have distinct profiles within each disciplinary field, in particular, with a highly variable share of publications in English: from 10% to 89% in the humanities, from 51% to 96% in the social sciences and from 80 to 96% in medical research. These proportions of publications in English also vary between France, Germany and Spain - and in different proportions

depending on the discipline. Generally, the proportion of publications in English is higher in the humanities and social sciences in Germany than in France, and in France than in Spain. In several fields of medical research, on the other hand, Germany's share of publications in English may be slightly lower than France's[23]. Cases where the proportion of publications in English is high are less concentrated in SSH in Germany. This higher concentration of OLE publications in SSH for France had already been noted in the analysis by major discipline (see table 3a above).

2.1.1 The case of France

In the humanities and social sciences, history is the category with the most publications, both worldwide and in France (Table 6a, columns 1 and 2). It is also a field where the proportion of publications in English is among the lowest worldwide (Liu 2017). For France, 25% of publications are in English, one of the lowest shares within the categories in Table 6a. As a result, the share of publications in French history falls significantly in the English corpus and the specialisation index is halved, from 1.8 to 0.9. While France appears to be highly specialised in history in the total corpus, it is not in the corpus of English-language publications. On the other hand, France's publications in English have an impact index 80% higher (0.9) than that of its total publications in history (0.5). These trends between the total corpus of French publications and the corpus in English are similar for the other categories with a low proportion of publications in English: a drop in the specialisation index and an increase in the impact index. This is particularly the case for Literature in Romance Languages, the 7th most important field in terms of the number of French publications in the humanities, but not one of the top 10 fields worldwide. France's specialisation index reaches 3.5, but is halved when calculated on the English corpus. Symmetrically, the impact index rises from 0.5 to 1.4 between the total corpus and the corpus in English.

Table 6a: Characterisation of publications from France, top humanities categories, 2017-22*

Category	Ranking for number of publications		Share in English	Specialisation index		Impact index		Share of international co-publications	
	France	World		France Total	France English	France Total	France English	France OLE	France English
History	1	1	24.6 %	1.8	0.9	0.5	0.9	11.5 %	24.9 %
Language sciences	2	7	40.8 %	1.8	1.5	0.9	1.1	13.9 %	38.6 %
Philosophy	3	3	38.5 %	1.1	0.6	0.6	0.9	14.8 %	29.5 %
Literature	4	8	26.1 %	1.8	0.7	0.3	0.7	8.2 %	15.4 %
Social psychology	5	2	89.3 %	0.6	0.6	0.8	0.8	22.2 %	62.7 %
Anthropology	6	10	70.6 %	1.8	1.6	1.0	1.3	31.5 %	75.4 %
Literature in Romance languages	7		10.9 %	3.5	1.8	0.5	0.8	8.2 %	14.3 %
Archaeology	8		63.7 %	1.8	1.6	1.0	1.1	27.9 %	67.9 %
Study of religions	9	6	32.4 %	0.8	0.3	0.5	0.8	10.8 %	25.7 %
Medieval and Renaissance studies	10		10.3 %	4.2	0.9	0.2	0.6	5.3 %	18.6 %
Total Humanities			**41.7 %**	**1.2**	**0.7**	**0.6**	**1.0**	**12.9 %**	**48.6 %**

* Full year at 95%.
** These fields are among those with the most publications in France, but not at world level.
Source: OST database, Web of Science, OST calculations

For the three categories with a high proportion of publications in English, the differences between the total corpus and the English corpus are smaller (anthropology and archaeology) or even non-existent (social psychology). Furthermore, in all cases, publications written in English are much more often international co-publications than OLE publications (col. 8 and 9).

---

[23] The proportion of English is still over 75% for medical specialities in Germany and over 83% in France.

Table 6b presents the case of French publications in fields of social sciences. The proportion of publications in English is significantly higher, and changes in the indicators according to the corpus are less marked. The leading category in terms of number of publications is economics in the world, as in France. English accounts for 92% of French publications, which explains why the specialisation and impact indices are the same for both corpora. The proportion of international co-publications within the English corpus is 66%, which indicates that a large proportion of publications with only French authors are written in English. The Management and Business fields show similar features.

Table 6b: Characterisation of publications from France, top social sciences categories, 2017-22*

Category	Ranking for number of publications		Share in English	Specialisation index		Impact index		Share of international co-publications	
	France	World		France Total	France English	France Total	France English	France OLE	France English
Economy	1	1	91.9 %	1.1	1.1	0.9	0.9	19.8 %	66.0 %
Management	2	3	94.1 %	0.8	0.8	1.2	1.2	19.4 %	71.4 %
Commerce and org.	3	4	95.6 %	0.8	0.9	1.1	1.1	34.9 %	68.2 %
Education sciences	4	2	68.5 %	0.2	0.2	1.0	1.3	23.1 %	53.4 %
Human geography	5	10	51.4 %	1.2	0.7	0.4	0.7	20.6 %	48.4 %
Political science	6	5	66.0 %	0.6	0.5	0.6	0.8	21.4 %	52.8 %
Experimental psychology - SS**	7		91.6 %	1.4	1.4	0.9	1.0	21.7 %	58.9 %
Sociology	8	9	60.2 %	1.0	0.7	0.5	0.7	14.1 %	42.5 %
Psychiatry - SS	9	6	68.9 %	0.6	0.5	0.6	0.9	11.6 %	56.9 %
Law	10	7	70.0 %	0.5	0.5	0.8	0.9	36.1 %	49.8 %
Total social sciences			**81.4 %**	**0,7**	**0.6**	**0.9**	**1.0**	**20.5 %**	**62.8 %**

* Full year at 95%.
** This field is one of those with the most publications in France, but not at world level.
Source: OST database, Web of Science, OST calculations

On the other hand, two areas of the social sciences have features closer to those observed in the humanities: human geography and sociology, even though the proportion of publications in English is between 50% and 60%. France is moderately specialised, and its indices fall to 0.7 for the English corpus. Symmetrically, impact indices increase significantly, although they remain below the world average. The proportion of international co-publications is rather low compared with other social sciences categories.

Education sciences are the second most numerous category worldwide and the 4th most numerous for France, with a low specialisation index of 0.2. This index does not change in the English corpus, but the impact index rises sharply, as the share of international co-publications. Law is the 10th category with the most publications for France, and it is not specialised. The proportion of publications in English appears to be relatively high[24].

In medical research, Oncology and General and Internal medicine are the two fields with the most publications worldwide and in France (table 6c). In these fields, France appears to be less specialised in the English corpus, with a significant increase in its impact indices. France's international co-publications in these two fields are also much more intense in the English corpus. Three fields appear in the top ten for France and not for the world; France is logically specialised in these fields: Radiology, Haematology and Urology. France's specialisation index in the English corpus diminishes from 1.8 to 1.7 and its impact index rises from 1.2 to 1.4. The share of international co-publications is also much higher in the English corpus.

In this third major discipline, where the share of English in French publications is relatively lower, the specialisation and impact indices change less in the English corpus than in the social sciences and especially the humanities. On the other hand, the proportion of international co-publications can increase sharply between the OLE corpus and the English corpus. Of the three main fields, Oncology has

---

[24] The reviews of the numerous records relating to publications in law present in HAL-SSH are essentially in French (see appendix 4).

seen the biggest increase, rising from 7% to 61%. The impact index for French publications in English is 15% higher (1.5) than the total for French publications in the field (1.3).

Table 6c: Characterisation of publications from France, most numerous Medical Research categories, 2017-22*

Category	Ranking for number of publications		Share in English	Specialisation index		Impact index		Share of international co-publications	
	France	World		France Total	France English	France Total	France English	France OLE	France English
Oncology	1	1	88.5 %	1.0	0.9	1.3	1.5	6.9 %	60.7 %
General and internal medicine	2	2	82.5 %	0.8	0.7	1.1	1.3	12.4 %	60.6 %
Clinical neurology	3	4	93.8 %	1.1	1.2	1.2	1.2	12.3 %	58.8 %
Immunology	4	6	93.1 %	1.1	1.1	1.1	1.1	14.2 %	65.5 %
Surgery	5	7	91.0 %	1.1	1.1	1.1	1.2	7.7 %	41.5 %
Cardiovascular system	6	3	95.5 %	0.9	0.9	1.3	1.3	14.2 %	67.0 %
Radio, nuclear medicine & medical imaging**	7		93.1 %	1.3	1.3	1.0	1.1	7.9 %	53.2 %
Haematology	8		88.1 %	1.8	1.7	1.2	1.3	15.0 %	62.6 %
Endocrinology and metabolism	9	5	92.6 %	0.7	0.7	1.1	1.1	10.3 %	60.9 %
Urology & nephrology**	10		79.5 %	1.1	1.0	1.1	1.4	9.8 %	59.8 %
Total Medical research			**87.7 %**	**1,0**	**0.9**	**1.1**	**1.2**	**9.9 %**	**58.4 %**

* Full year at 95%.
** These fields are among those with the most publications in France, but not at world level.
Source: OST database, Web of Science, OST calculations

2.1.2 Comparisons with Germany, Spain and the UK

Appendix 5A presents the same information as tables 6a, b and c for Germany, Spain and the UK[25] . As Spain's share of publications in English is lower than France's, particularly in SSH, the changes in the indicators are similar and of greater magnitude. Logically, changes are strongest in fields where Spain is particularly specialised and where the proportion of publications in English is very low, such as literature in Romance languages or Medieval and Renaissance studies. As in France, these fields account for a modest proportion of SH publications, and the indicators for the discipline as a whole change more moderately.

The profile of UK publications is the opposite of that in France and Spain when observed in the English corpus. The first observation is, of course, that the proportion of publications in English is very high for the UK; it varies in the humanities between almost 99% in anthropology and almost 100% in social psychology. Insofar as, for certain categories, the share of publications from other countries in the corpus in English is falling, the UK's specialisation index is rising. Symmetrically, its impact indices tend to decrease. In History, for example, UK specialisation index rises from 2.2 to 4, while its impact index has fallen from 2.2 to 1.4. Impact indices in History for France and Spain increase in the English corpus, but remain well below 1.4. In anthropology, the drop in the UK impact index in the English corpus, to 1.1, means that it is below the indices for Spain (1.5) and France (1.3). In the social sciences, the UK shows some similar changes between the total corpus and the English corpus, but, as for the non-English-speaking countries studied, they are on a smaller scale. In medical research, almost 100% of UK publications are in English, and the switch to the English corpus does not alter the specialisation indicators or the impact indicators for the different categories.

Germany is in an intermediate position, as it has a fairly high proportion of publications in English in the social sciences and humanities. While the share of English is similar in total French and German

---

[25] As a complement, part B of appendix 5 shows the evolution of the share of English for the same scientific categories between 2010 and 2022, for France, Germany, Spain and Italy.

publications, it is significantly higher in German publications in the humanities (72%) and social sciences (90%)[26] . The difference varies, but is very significant for certain categories of humanities: Medieval studies (5.7 times higher share of English), History, Literature (more than twice in both cases). The difference is also noticeable in certain social sciences categories: Human geography (1.8 times), Sociology and Law (1.3 times in both cases). Thus, in several categories where its share of publications in English is relatively high, Germany shows the opposite trends to France in the English corpus - a slight increase in the specialisation index and a slight decrease in the impact index. This is the case, in the humanities, for History, Language sciences and Medieval and Renaissance Studies, and, in the social sciences, for Economics and Experimental Psychology-Social Sciences.

For Germany, the changes in the indicators between the total corpus and the English corpus are moderate and result in virtual stability at the aggregate level of the humanities and social sciences. In medical research, Germany, on the other hand, has an 83% share of publications in English, slightly lower than France (88%) or Spain (86%), which translates into significant changes in indicators, for example in Surgery or Urology. Overall, for the English corpus, France, Germany and the UK have the same impact index, 1.2.

2.2 France's position in selective corpora of publications

The analysis of the position of different countries or institutions is sometimes carried out on a very selective corpus of publications, as in the case of the index produced by the publisher Nature. This is calculated on the basis of around 150 journals in the physical and life sciences[27] . The corpus used here is much larger, since the decile of most-cited venues includes 2,710 journals and proceedings. Appendix 1 specifies that the average impact of journals is measured by a standard indicator, like that for individual publications[28].

2.2.1 Corpus of the decile of most cited journals

Table 7a shows that for some countries, the share of publications appearing in the decile of most-cited journals is significantly different from the share for all publications combined.

Four countries have a more than 40% higher share of publications in the selective corpus: Switzerland (+63%), the Netherlands (+50%), the United Kingdom (+48%) and the United States (+42%). A second group of six countries has a share of this selective corpus between 10% and 30% higher than their share of total publications: Australia (30% higher), Canada (20%), Germany (15%), China (14%), France (13%) and Spain (10%). The United States has a very high share of this corpus, making it the country with the most publications, ahead of China, which is the leading country in the total corpus (table 1, section 1.2.1).

Italy, South Korea and above all Japan have equal or lower world shares in the decile of most cited journals compared with the total corpus. This is even more clearly the case for emerging countries such as India and Brazil, whose share in the selective corpus is halved. The country with the smallest share in this corpus is Russia, with a 75% smaller share than in the total corpus.

Table 7a also shows that the variation in world shares in the selective corpus also depends on the discipline. For example, France's share rises sharply in mathematics (5.3%), compared with the total corpus (4.5%) and the English corpus (4.8%, table 3a). Conversely, France's share of the selective corpus in the humanities is significantly lower (1.6%) than in the total corpus (4.9%) and also lower than in the English corpus (2.2%, table 3a). Italy and Russia are also more present in mathematics in the selective corpus. China is significantly more present in chemistry. The United States is more present in Social Sciences, Computer Science and Mathematics, and less present in Applied Biology and Earth and Universe Sciences. Germany has few differences between disciplines, although its presence is relatively stronger in selective journals in physics and fundamental biology. Russia, which is not very present in the corpus, is relatively more present in the humanities.

---

[26] Larivière (2018) had already noted the difference between France and the humanities since the early 2000s.
[27] On the selection of journals and indicators, see
[28] The MNCS is calculated for journals and proceedings, see appendix 1. This standardised indicator is different from the Journal impact factor.

Table 7b shows the impact indices within the corpus of the most cited journals. Among the countries most represented in the corpus of most cited journals, the United Kingdom and the United States also have impact indices above the corpus average. The Netherlands, Australia, Germany and China have impact indices at the corpus average. France and Canada, which are well represented in this corpus, have an impact index for their publications that is below average (0.9). Spain, which is also relatively well represented in the corpus, has an impact index of 0.8. Italy, which is relatively less represented in the corpus, has an impact index close to the average (0.95). Brazil, India, Iran and Russia are all less present in this selective corpus and have impact indices below the corpus average.

A country's relative impact index in the selective corpus also varies from one discipline to another. In the case of France, for example, the impact index is lower than that of the world corpus, but it is slightly higher than the world total in medical research (table 7b). On the other hand, it is below the world average in the discipline in which France is most strongly represented in the corpus, mathematics (0.83). The United States in computer science has an almost opposite configuration: its share of publications in the selective corpus is slightly lower than its share for all disciplines, but its impact index is 20% higher than the average of all publications from this corpus.

Taking all disciplines together, France's position is better within this corpus of the most cited journals in terms of world share, as it ranks 8th (compared with 13th for the total corpus and 11th for the English corpus). On the other hand, its impact indicator within the corpus of most cited journals is less favourable: 11th compared with 10th for the total corpus and 9th for the English corpus. From this point of view, it should be noted that, as in the case of the English corpus, French publications in the humanities and social sciences within the selective corpus have better impact indices than in the total corpus.

A comparison of the position of different countries in tables 7a and 7b shows that while access to publication in highly cited, demanding and sometimes prestigious journals and conferences constitutes a recognition by the peers who guarantee the quality of these venues, it does not imply high impact indices within this corpus. Within these highly cited journals, there are still differences in impact between individual publications, even though the national indicators are closer together than in the total corpus (table 4).

Table 7a: Share of publications in the corpus of the decile of most cited journals*, top countries, 2017-22

Countries by alpha order.	Fond. Biology	Medical research	App. biology Ecology	Chemistry	Physics	Earth & Univ. sc.	Engineering	Computer Sc.	Maths	Humanities	Social sc	All disciplines	Total decile / total all pub.
AUS	2.3 %	3.1 %	4.3 %	1.9 %	1.8 %	3.4 %	2.5 %	2.9 %	1.3 %	4.3 %	5.0 %	**3.0 %**	**1.30**
BRA	0.8 %	1.3 %	3.7 %	0.7 %	0.5 %	1.8 %	1.3 %	1.0 %	1.5 %	0.4 %	0.9 %	**1.2 %**	**0.50**
CAN	2.9 %	3.8 %	2.9 %	1.6 %	1.6 %	3.3 %	2.9 %	3.1 %	2.2 %	4.3 %	3.5 %	**3.0 %**	**1.20**
CHE	1.8 %	1.5 %	1.2 %	0.9%	1.6%	1.2%	0.8 %	1.2%	1.4 %	1.2 %	1.1%	**1.3 %**	**1.63**
CHN	18.5 %	12.5 %	25.7 %	44.9 %	26.8 %	32.3 %	30.9 %	29.2 %	19.1 %	4.1 %	9.8 %	**23.7 %**	**1.14**
DEU	6.2 %	4.6 %	4.1 %	3.9 %	6.4 %	3.5 %	3.4 %	3.9 %	4.8 %	5.3 %	4.5 %	**4.5 %**	**1.15**
ESP	2.1 %	2.2 %	3.8 %	1.7 %	1.9 %	3.0 %	2.1 %	1.9 %	2.7 %	2.9 %	3.0 %	**2.3 %**	**1.10**
FRA	**3.4 %**	**3.4 %**	**3.0 %**	**1.9 %**	**3.1 %**	**2.8 %**	**2.2 %**	**2.3 %**	**5.3 %**	**1.6 %**	**1.9 %**	**2.7 %**	**1.13**
GBR	6.3 %	6.9 %	4.3 %	2.9 %	4.1 %	4.2 %	4.0 %	4.4 %	4.5 %	13.8 %	10.8 %	**5.9 %**	**1.48**
IND	1.8 %	1.2 %	3.2 %	5.1 %	4.6 %	2.8 %	6.2 %	3.5 %	2.2 %	0.5 %	1.3 %	**3.0 %**	**0.51**
IRN	0.4 %	0.5 %	1.3 %	1.4 %	0.4 %	1.2 %	2.8 %	0.8 %	1.3 %	0.3 %	0.4 %	**1.0 %**	**0.50**
ITA	2.1 %	3.5 %	2.5 %	1.3 %	2.2 %	2.9 %	2.8 %	2.3 %	3.8 %	1.6 %	2.5 %	**2.5 %**	**0.92**
JPN	3.0 %	2.8 %	1.6 %	2.8 %	4.4 %	1.9 %	1.9 %	2.1 %	2.4 %	0.8 %	0.8 %	**2.3 %**	**0.64**
KOR	2.0 %	2.5 %	1.5 %	4.3 %	5.4 %	1.7 %	2.9 %	2.7 %	1.7 %	0.9 %	1.3 %	**2.6 %**	**1.00**
NLD	1.9 %	3.0 %	1.5 %	0.7 %	1.1 %	1.4 %	1.1 %	1.0 %	1.0 %	3.0 %	2.9 %	**1.8 %**	**1.50**
POL	0.4 %	0.3 %	1.0 %	0.6 %	0.6 %	0.9 %	0.8 %	0.5 %	1.1 %	0.9 %	0.6 %	**0.6 %**	**0.43**
RUS	0.4 %	0.2 %	0.3 %	0.7 %	1.5 %	0.5 %	0.5 %	0.5 %	1.0 %	1.9 %	0.3 %	**0.5 %**	**0.23**
TUR	0.2 %	0.5 %	0.6 %	0.5 %	0.3 %	0.5 %	1.2 %	0.7 %	1.4 %	0.6 %	1.0 %	**0.6 %**	**0.38**
TWN	0.7 %	0.9 %	0.5 %	0.9 %	1.2 %	0.8 %	1.2 %	1.2 %	0.9 %	0.6 %	1.2 %	**1.0 %**	**0.91**
USA	32.6 %	33.8 %	15.0 %	12.4 %	20.0 %	16.2 %	13.5 %	22.9 %	24.4 %	35.9 %	29.3 %	**23.6 %**	**1.42**
World	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**1.0**

Table 7b. Impact index of publications in the decile of most cited journals*, top countries,

Countries by alpha order.	Fond. Biology	Medical research	App. biology Ecology	Chemistry	Physics	Earth & Univ. sc	Engineering	Computer Sc.	Maths	Humanities	Social Sc.	All disciplines
AUS	1.01	0.96	0.97	1.13	0.99	1.04	1.06	1.20	1.02	1.05	0.96	**1.02**
BRA	0.62	0.75	0.81	0.67	0.64	0.73	0.63	0.56	0.75	1.02	0.80	**0.70**
CAN	0.93	0.93	0.93	0.94	0.95	0.82	0.93	0.94	0.96	0.91	0.88	**0.93**
CHE	1.11	1.04	1.16	1.02	1.14	1.14	1.21	1.28	1.12	1.07	1.00	**1.11**
CHN	1.00	1.02	1.09	1.11	1.09	1.05	1.03	1.09	0.94	0.99	1.26	**1.04**
DEU	1.00	1.00	1.05	0.92	0.93	1.05	0.92	0.91	1.04	1.00	0.95	**0.98**
ESP	0.82	0.96	0.87	0.76	0.83	0.76	0.75	0.68	0.78	0.94	0.92	**0.84**
FRA	**0.84**	**1.05**	**0.91**	**0.73**	**0.81**	**0.90**	**0.84**	**0.75**	**0.83**	**0.94**	**0.89**	0.91
GBR	1.11	1.14	1.08	0.96	0.98	1.13	1.01	1.04	1.08	1.15	0.96	**1.08**
IND	0.59	0.83	0.95	0.90	0.91	1.17	1.06	0.73	0.99	0.87	1.23	**0.91**
IRN	0.59	0.88	1.05	0.88	0.63	1.08	0.94	0.75	1.02	0.75	0.87	**0.87**
ITA	0.84	1.00	0.93	0.83	0.86	0.98	0.95	0.72	0.97	0.88	1.03	**0.95**
JPN	0.84	0.78	0.90	0.82	0.92	0.76	0.96	0.64	0.78	0.69	0.76	**0.84**
KOR	0.81	0.77	0.94	0.83	0.85	0.89	0.91	0.84	0.83	0.79	0.82	**0.84**
NLD	0.99	0.95	1.05	0.84	1.03	1.20	0.89	0.85	1.31	1.20	1.03	**1.02**
POL	0.66	0.87	0.74	0.64	0.69	0.72	0.73	0.49	0.87	0.90	0.82	**0.72**
RUS	0.77	1.06	0.85	0.63	0.67	0.79	0.59	0.48	0.85	1.08	0.94	**0.77**
TUR	0.69	0.76	0.89	0.83	0.61	0.87	0.91	0.75	1.28	0.88	1.21	**0.89**
TWN	0.62	0.70	0.93	0.80	0.85	0.78	0.92	0.67	1.15	0.68	0.93	**0.80**
USA	1.11	1.06	1.09	1.06	1.15	1.03	1.18	1.21	1.12	0.97	1.00	**1.10**
World	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**

* Impact index calculated at the level of publications in the corpus of most cited journals (see appendix 1).

Source: OST database, Web of Science, OST calculations

2.2.2 Corpus of prestigious mathematics journals

A similar approach is applied to the corpus of five demanding and prestigious mathematics journals presented in table 8a. Nearly 95% of the contributions they publish are classified as fundamental mathematics. These journals have published 2,151 articles between 2010 and 2022, with the top ten countries accounting for 86% of this total (table 8b).

Table 8a: Presentation of the five mathematics journals analysed

Name, identifier	1st issue	Annual frequency, languages	Presentation
ACTA MATHEMATICA (0001-5962)	1882	4 English	Published by International Press on behalf of the Mittag-Leffler Institute (Royal Swedish Academy of Sciences)
ANNALS OF MATHEMATICS (0003-486X)	1884	6 English	Published jointly by the Department of Mathematics of Princeton University and the Institute for Advanced Studies
IHÉS MATHEMATICAL PUBLICATIONS (0073-8301)	1959	2 English, French	Edited by the Institut des Hautes Études Scientifiques in France; published by Springer
INVENTIONES MATHEMATICAE (0020-9910)	1966	12 English	Published by Springer
JOURNAL OF THE AMERICAN MATHEMATICAL SOCIETY (0894-0347)	1988	4 English	Published by the American Mathematical Society

Source: journal websites and OST database, Web of Science

The United States accounted for 41% of articles, 1.7 times more than its share of the decile of most-cited journals in the discipline (table 7a). France, with almost 14% of articles, has an even greater gap with its share of the most cited journals (2.6 times). This gap is still high, but smaller for the UK: 8.8% of the corpus of 5 journals, compared with 4.5% in the decile of the most cited journals. Canada and Switzerland are also better represented in this corpus. Conversely, China is much less represented: 3.2% compared with 19%. Israel, a small country highly specialised in mathematics, appears in table 8b, even though it is not one of the main countries publishing in the corpus of most-cited journals. On the other hand, Germany, Italy and Japan have equivalent weights in the two corpuses.

Table 8b: World share and impact index in the subset of 5 mathematics journals, top countries, 2010-22

	World share	Impact index within the subset
USA	41.2 %	1.1
FRA	**13.8 %**	**0.9**
GBR	8.8 %	1.2
DEU	6.2 %	1.0
CAN	3.6 %	0.9
CHN	3.2 %	1.2
SRI	2.9 %	0.9
CHE	2.7 %	1.1
JPN	2.2 %	0.9
ITA	1.7 %	1.4
World	**100 %**	**1.0**

Source: OST database, Web of Science, OST calculations

The United States, the United Kingdom and Switzerland have both higher weights than in larger corpora and impact indices greater than 1 within the corpus. France and Canada have high relative weights, but impact indices within the corpus that are 10% below average. Conversely, China has a relatively low

weight, but an impact index for its publications in the five journals that is 20% above the average for the corpus. This is also the case for Italy, which has the highest relative impact within the corpus (1.4).

The extreme case of these five mathematics journals thus confirms the more general conclusion about the corpus of the decile of most-cited journals: access to demanding journals and the relative impact of published articles are not necessarily correlated. Further analyses could seek to understand the cases of discordance, as in the case of France, China and Italy. In the case of France, these analyses could include an examination of the particular sensitivity to the scope of the humanities and social sciences corpus.

3. The position of France in European framework programmes

French performance as assessed by participation in EU research and innovation programmes has been a matter of concern, particularly since the 7th programme (Kallenbach et al. 2016). France's position can be summarised by the fact that its share of funding obtained is lower than the potential estimated by its share of the contribution to the EU budget. Between 2014 and 2022, the UK's participation in the framework programmes has fallen drastically as a result of Brexit[29] , which has increased the share of funding obtained by the other major beneficiaries. However, Figure 12 shows that not all countries have benefited equally. Germany closed the gap between its share of contributions to the budget and its share of funding obtained, as did Belgium. Italy has significantly reduced the gap, but its share of funding remains relatively low (at 54% of its contribution). France and Spain are in a comparable situation at the end of the period, with funding obtained representing just under 80% of their contribution to the budget.

Figure 12: Share of budget contributions and share of funding, main participating countries, 2014-22
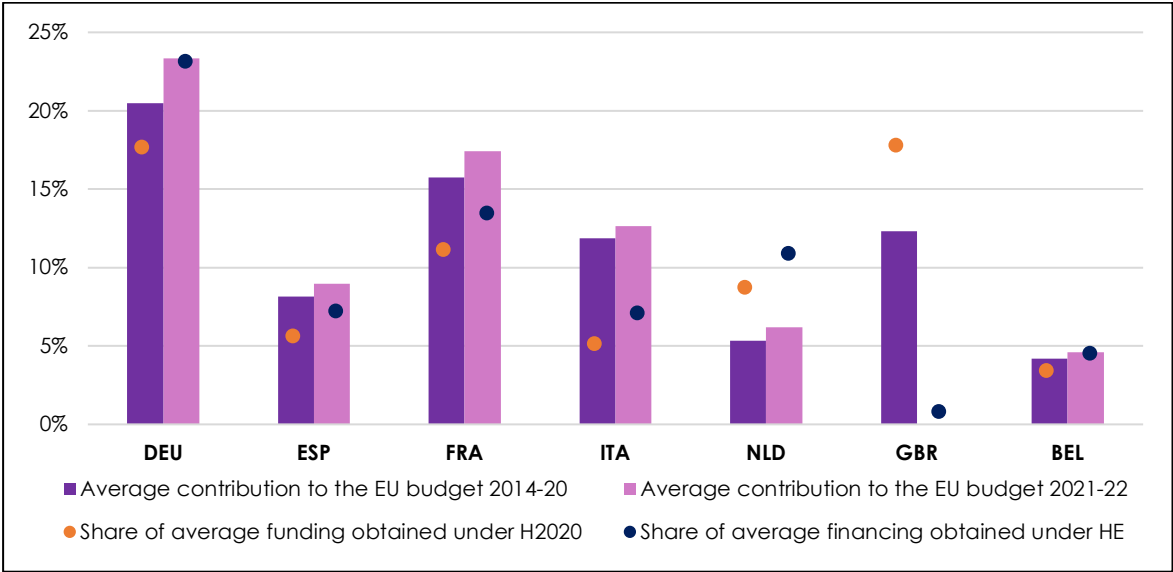
Source: e-Corda database (June 2024); European Commission Budget Directorate, OST calculations

The propensity to apply and success rates vary according to the pillars of the framework programmes and the research fields (Kallenbach et al. 2016; OST 2021). In order to address the disciplinary issue and remain within the scope of scientific publications, the analysis here focuses on France's position in the ERC.

---

[29] The UK has concluded an association agreement with Horizon Europe, allowing its participation despite its exit from the EU. Although the Brexit, effective since February 2020, has reduced its presence, its associate status could affect future positions within the framework programme.

3.1 French participation in ERC projects

Table 9 shows the evolution of the position of the main beneficiaries of ERC funding during the period 2014-23, distinguishing between the two framework programmes. The participation of both the United Kingdom and Switzerland has gradually disappeared as a result of the development of these two countries' relations with the EU. As a result, as with all FP funding, other countries have obtained a higher share of ERC funding. However, the increases varied, with a maximum increase of 33% for Austria, Denmark and Israel. Spain and Italy recorded an increase of 29% and Germany, the largest recipient, 28%. France, the second largest beneficiary, recorded an increase of only 8%; as a result, at the start of the Horizon Europe programme, it had only 16% more grants than the Netherlands.

Table 9: Number and share of grants obtained, main beneficiary countries, 2014-23

Country	H2020		Horizon Europe		Change in share between the two programmes
	Number	Share	Number	Share	
DEU	1,401	18 %	763	23 %	+ 28 %
GBR	1,525	19 %	34	1 %	Exit
FRA	**914**	**12 %**	**455**	**13 %**	**+ 8 %**
NLD	766	10 %	393	12 %	+ 20 %
ESP	529	7 %	300	9 %	+ 29 %
ITA	513	7 %	310	9 %	+ 29 %
SRI	449	6 %	255	8 %	+ 33%
CHE	564	7 %	18	1 %	Exit
BEL	307	4 %	179	5 %	+ 25 %
SWE	293	4 %	160	5 %	+ 25 %
AUT	257	3 %	149	4 %	+ 33 %
DNK	197	3 %	127	4 %	+ 33 %
EU-27	5,471	70 %	3,045	90 %	-
Total countries	**7,835**	**100 %**	**3,380**	**100 %**	**-**

Source: e-Corda database (June 2024 for H2020 and Horizon Europe), OST calculations

Box 2. Types of ERC funding

The different types of grants awarded by the ERC each have their own eligibility criteria and funding levels. The figures below relate to the Horizon Europe Framework Programme.[30]

- *Starting* grants are awarded to researchers 2 to 7 years after their Ph. D. who show great promise. They are awarded to a principal investigator and are worth a maximum of €1.5 million for a maximum of 5 years. On average, 425 grants have been awarded over the last three years.

- *Consolidator* grants are awarded to researchers 7 to 12 years after their Ph. D whose scientific work is very promising. They are awarded to a principal investigator and are worth a maximum of €2 million for a maximum of 5 years. An average of 312 grants have been awarded over the last three years.

- *Advanced* grants are intended for established researchers. They are awarded to a principal investigator and are worth a maximum of €2.5 million for a maximum of 5 years. On average, 225 are awarded each year.

- *Synergy* grants for teams of 2 to 4 principal investigators bringing different skills and resources to tackle ambitious research questions. The maximum amount is €10 million for 6 years. Around 35 *Synergy* grants have been awarded in the last two years.

- *Proof of concept* grants enable successful applicants to explore the innovative potential of results from ongoing or recently completed ERC projects. Grants are worth €150,000 for a maximum of 18 months. On average, around 302 POC grants have been awarded over the last two years.

---

[30] For H2020, see OST-DEO (2023).

The distribution of fellowships by type varies moderately between countries, particularly for individual fellowships, which account for the vast majority of ERC funding (table 10). France is below the European average for *Starting grants,* and slightly above for *Consolidator* and *Advanced* grants.

Table 10: Number of ERC grants and distribution by type, main countries, 2014-23

Country	Starting	Consolidator	Advanced	Synergy	Proof of concept	Other	Number of grants
DEU	37.0 %	29.0 %	19.6 %	4.4 %	10.0 %	0.0 %	2,164
GBR	30.5 %	29.8 %	23.7 %	2.6 %	13.3 %	0.1 %	1,559
FRA	**34.3 %**	**29.0 %**	**19.6 %**	**4.5 %**	**12.6 %**	**0.1 %**	**1,369**
NLD	39.9 %	26.1 %	15.9 %	2.2 %	16.0 %	0.0 %	1,159
ESP	28.2 %	27.3 %	16.9 %	3.3 %	24.2 %	0.1 %	829
ITA	34.4 %	24.1 %	17.9 %	2.7 %	20.9 %	0.1 %	823
SRI	38.9 %	24.6 %	12.6 %	2.7 %	21.0 %	0.1 %	704
CHE	31.1 %	26.8 %	25.1 %	5.2 %	11.9 %	0.0 %	582
BEL	37.7 %	27.0 %	17.1 %	2.1 %	16.0 %	0.2 %	486
SWE	37.1 %	29.8 %	17.4 %	3.3 %	12.4 %	0.0 %	453
AUT	38.2 %	28.3 %	18.0 %	4.2 %	11.3 %	0.0 %	406
DNK	34.3 %	32.7 %	17.9 %	4.9 %	10.2 %	0.0 %	324
EU-27	36.4 %	28.5 %	17.9 %	1.9 %	15.2 %	0.0 %	8,516
Total countries	**36.1 %**	**28.6 %**	**18.3 %**	**1.5 %**	**15.4 %**	**0.0 %**	**11,215**

Source: e-Corda database (June 2024 for H2020 and Horizon Europe), OST calculations

France presents a particular profile in terms of the types of beneficiary institutions (table 11).

Table 11: Share of fundings obtained by type of beneficiary institution, 2014-23

Country	Educational establishments	Research organisations	Private entities (excluding higher education)	Other	Amount (€)
DEU	66.5 %	32.6 %	0.2 %	0.8 %	3,681,216,748
GBR	94.2 %	5.5 %	0.1 %	0.2 %	2,375,215,738
FRA	**24.7 %**	**75.0 %**	**0.2 %**	**0.1 %**	**2,232,807,459**
NLD	87.4 %	11.8 %	0.0 %	0.7 %	1,809,107,585
ESP	49.4 %	48.8 %	0.5 %	1.3 %	1,155,968,048
ITA	78.3 %	18.8 %	2.8 %	0.1 %	1,099,657,577
SRI	99.3 %	0.6 %	0.1 %	0.0 %	1,058,506,363
CHE	87.4 %	10.5 %	1.9 %	0.2 %	1,002,920,012
BEL	84.7 %	15.2 %	0.1 %	0.0 %	738,372,253
SWE	99.7 %	0.1 %	0.1 %	0.1 %	727,052,836
AUT	79.4 %	9.6 %	10.9 %	0.0 %	636,133,007
DNK	96.5 %	1.2 %	0.0 %	2.2 %	542,284,145
EU-27	67.3 %	31.1 %	0.9 %	0.7 %	14,062,031,119
Total countries	**74.1 %**	**24.5 %**	**0.8 %**	**0.6 %**	**19,034,880,719**

Source: e-Corda database (June 2024 for H2020 and Horizon Europe), OST calculations

The vast majority of European beneficiaries are higher education institutions - 67% in Germany to almost 100% in Sweden. The two exceptions are France, where organisations are the beneficiaries at 75%, and Spain, where they are on a par with higher education establishments at 49%.

3.2 Disciplinary profile and success rates of countries participating in the ERC

The disciplinary profile of ERC grants from different countries can be compared with that of their scientific publications in order to verify the degree of convergence. Table 12 makes this comparison, both for applications and for grants obtained, by country. In the case of France, the two profiles are similar and slightly accentuated at the ERC. French publications are slightly specialised in the physical sciences and engineering (10% above the world average), while applications and ERC grants are slightly more specialised (20% above the ERC total). In the life sciences, France's specialisation index is close to 1 in all three fields. Finally, in SHS, the specialisation index for publications is 20% below the world average, while ERC applications are below the average for the ERC total. This difference could be due to the fact that the applicant countries are essentially European and often have scientific profiles that are more specialised in SHS disciplines than France (OST 2021 and table 3b). The specialisation index for French grants is even lower, at 0.6, which suggests a lower success rate in this panel than in the other two. [31]

In both the ERC corpus and the publications corpus, Germany has a more balanced profile, with indices varying between 0.8 and 1.1 - compared with 0.6 to 1.2 for France. Furthermore, the differences between panels are the same for all three corpuses, with an index of less than 1 for SH in all three panels

Table 12. Specialisation of the main ERC beneficiary countries by research area, 2014-23

Country	Index* for ERC applications 2014-23 (H2020+HE)			Index* for ERC grants 2014-23 (H2020+HE)			Index for publications 2014-22		
	LS	PE	SH	LS	PE	SH	LS	PE	SH
DEU	1.1	1.1	0.8	1.1	1.0	0.8	1.0	1.0	0.9
GBR	0.9	1.0	1.2	0.8	0.9	1.4	1.1	0.7	1.8
FRA	**1.0**	**1.2**	**0.7**	**1.0**	**1.2**	**0.6**	**1.0**	**1.1**	**0.8**
NLD	1.0	0.7	1.5	0.9	0.8	1.5	1.3	0.6	1.5
ESP	1.1	1.1	0.9	0.9	1.0	1.1	1.0	0.8	1.9
ITA	0.8	1.1	1.0	0.6	1.1	1.4	1.2	0.9	0.9
SRI	1.2	1.0	0.8	1.4	1.0	0.5	1.1	0.8	1.6
CHE	1.1	1.06	0.8	1.2	1.2	0.5	1.2	0.9	1.0
BEL	1.0	0.9	1.2	1.0	0.9	1.3	1.1	0.8	1.4
SWE	1.4	0.9	0.7	1.4	0.9	0.8	1.1	0.8	1.3
AUT	0.9	1.0	1.1	1	1.0	1.1	1.0	1.0	1.0
DNK	1.1	0.9	1.0	1.0	0.9	1.2	1.3	0.7	1.1
Grand total	**29.1 %**	**43.5 %**	**27.3 %**	**31.0 %**	**45.0 %**	**23.9 %**	**42.4 %**	**44.5 %**	**13.1 %**

* The specialisation index is constructed in the same way as for publications. It relates the proportion of grants (applications) in an ERC field in a given country to this same ratio for the total number of projects (applications). Only individual grants are taken into account.
Source: e-Corda database (June 2024 for H2020 and Horizon Europe); WoS, OST calculations

More generally, the index of specialisation in humanities in the corpus of publications tends to be greater than or equal to the index in terms of ERC applications - for the two exceptions of Italy and Denmark, the difference is 10%. The consistency between the corpora applies both to countries whose publications are specialised in humanities, such as the Netherlands, and to countries whose publications are not specialised in the field, such as France and Germany. Spain, Sweden and Israel have indices of specialisation in humanities in their publications that are significantly higher than their indices of specialisation in ERC applications. In the case of Spain and Sweden, the index increases slightly for fellowships, which may suggest a self-selection process for applications that results in a high success rate. From this point of view, Italy presents a particular configuration: its publication specialisation index is 0.9, its index for ERC applications is very close, at 1, but its index for funded fellowships reaches 1.4, which suggests a high relative success rate in humanities (see tables 14a and b)

---

[31] This point is made clear in the comments on tables 13a and 13b.

For the main countries participating in the ERC, the proportion of publications in humanities (13%) is lower than the proportion of applications (27%) or grants obtained (24%); symmetrically, the proportion of LS is higher for publications. This may be due in part to the fact that a large proportion of life sciences publications are in the field of medical research, which is relatively under-represented in the ERC. The specialisation indices, which take into account the share of HS in the total of each corpus, make it possible to compare country profiles. The comparison of specialisation indices between corpuses must then take into account the fact that, depending on the country, researchers may be more or less encouraged to apply to the ERC in different disciplines. The national research system may also be more or less well-funded in certain disciplines, or offer different support systems depending on the institution and discipline. Analysing success rates provides additional information.

The success rate of countries has changed significantly in the context of the decline in participation in the ERC by the United Kingdom and Switzerland from the end of the 2010s. It should also be noted that between the H2020 and Horizon Europe programmes, the ERC budget increased while the amount of the various grants fell. The combination of these developments may explain the increase in the overall ERC success rate (Table 13).

Table 13. Success rates for ERC grants, main beneficiary countries, 2014-23

Country	2014-20		2021-23	
	Success rate	**Rank EU 27 and GBR**	**Success rate**	**Rank EU 27 and GBR**
DEU	16 %	3	18 %	1
GBR	14 %	5	16 %	4
FRA	**14 %**	**6**	**17 %**	**3**
NLD	17 %	1*	18 %	2
ESP	9 %	12	12 %	10
ITA	7 %	17	11 %	12
SRI	19 %	-	14 %	-
CHE	19 %	-	25 %	-
BEL	13 %	7	15 %	6
SWE	12 %	8	13 %	9
AUT	15 %	4	16 %	5
DNK	11 %	9	15 %	7
EU-27	12 %	-	14 %	-
Total countries	**13 %**	**-**	**14 %**	**-**

* In 1st place ex aequo with NL, LU.
Note: The success rate is calculated as the ratio of successful applications to all applications in the same "Proposals" database. Only individual grants are taken into account. *Proof of Concept* funding (no field specified) and *Synergy* funding (multidisciplinary) are excluded.
Source: e-Corda database (June 2024 for H2020 and Horizon Europe), OST calculations

Over the period as a whole, success rates also varied between panels for each country (tables 14a and b). Within the EU27, Germany and the Netherlands have the highest success rates, the former mainly in LS and the latter mainly in PE. Austria's success rate is driven by its performance in LS. Italy and Spain's success rates are favourably influenced by their good results in the SH panel. Conversely, France's success rate, which is higher overall, suffers from its performance in SH. The UK, Belgium and Sweden have success rates that vary relatively little between the panels.

Table 14a. ERC grants success rates by panel, main beneficiary countries, 2014-23

Country	LS	PE	SH	All panels
DEU	18.2 %	15.3 %	13.6 %	15.9 %
GBR	13.4 %	12.5 %	14.1 %	13.2 %
FRA	**13.8 %**	**14.3 %**	**10.9 %**	**13.5 %**
NLD	13.7 %	18.0 %	15.4 %	15.7 %
ESP	7.4 %	8.2 %	9.4 %	8.2 %
ITA	4.9 %	6.2 %	8.1 %	6.4 %
SRI	20.5 %	20.7 %	11.1 %	18.4 %
CHE	17.9 %	19.9 %	12.6 %	17.7 %
BEL	12.8 %	13.4 %	12.2 %	12.9 %
SWE	12.1 %	10.3 %	10.5 %	11.0 %
AUT	18.6 %	12.6 %	13.9 %	14.6 %
DNK	10.0 %	11.4 %	13.1 %	11.4 %
Total countries	**12.2 %**	**11.6 %**	**11.6 %**	**11.8 %**

Table 14b. Relative ERC grants success rates* by panel, main beneficiary countries, 2014-23

Country	LS/Total	PE/Total	HS/Total
DEU	1.15	0.96	0.86
GBR	1.01	0.94	1.06
FRA	**1.02**	**1.06**	**0.81**
NLD	0.87	1.14	0.98
ESP	0.90	0.99	1.15
ITA	0.77	0.96	1.26
SRI	1.11	1.13	0.60
CHE	1.01	1.12	0.71
BEL	1.00	1.04	0.95
SWE	1.09	0.93	0.95
AUT	1.27	0.87	0.95
DNK	0.87	1.00	1.16
Total countries	**1.03**	**0.99**	**0.98**

* Ratio of the success rate in a panel to the success rate for all panels in the country.
Source: e-Corda database (June 2024 for H2020 and Horizon Europe), OST calculations

Overall, France's position in the ERC by panel is consistent with its specialisation profile as measured by publications: France is specialised in various PE fields, particularly mathematics, physics and the sciences of the universe; conversely, it is not specialised in certain fields of the social sciences (OST 2021, table 6b above). The analysis is consistent with the hypothesis of self-selection by ERC researchers: they apply relatively less in fields in which they also publish relatively little compared to all researchers within the ERC perimeter. In the case of French researchers, this self-selection works in favour of PE fields and against SH fields.

Success rates by panel reinforce France's disciplinary profile at the ERC. Among the main beneficiaries in the EU 27, France is the country with the lowest relative share of grants in humanities, with a specialisation index of 0.6. Only Switzerland and Israel, both non-EU countries, have lower SH indices (0.5, table 12).

These results could be refined and completed, but they converge with the conclusions of earlier analyses which, based on qualitative analyses, pointed to a low level of international openness in certain SHS disciplines (Bouin 2015; Wieviorka and Moret 2017). This low level of openness may be reflected both in a relatively low presence in international journals indexed in the WoS and in a relatively low propensity to apply for ERC grants.

Conclusion and outlook

On a global scale, the share of scientific publications in English continued to grow in the early 2020s. The share of English is significantly higher in the large historical bibliometric databases than in the broader databases, but it is also increasing in the latter. France follows the global trend, but is one of the countries where the share of publications in a language other than English remains fairly high; at 5.3% in the main corpus studied, it is equivalent to that of Germany and, among European countries, only lower than that of Spain. In Poland, for example, the proportion of publications in a language other than English has fallen significantly since 2010, reaching 2% at the start of the 2020s.

The quantitative and qualitative dimensions of France's position vary in opposite directions when observed on the basis of different corpora of publications.

An analysis of the different corpuses reveals contrasting trends between the quantitative component of France's position, i.e. the number of publications, on the one hand, and various qualitative positioning indicators on the other. On the selective corpuses, the number of French publications is lower, but the indicators comparing France with other countries are rather better.

In 2017-22, within the English corpus, France's share is slightly lower than its share in the total corpus but, at 2.3%, it is higher than those of Spain and Russia, which places it 11th among the countries publishing the most, whereas it is 13th in the total corpus. France's position is even more favourable in the corpus of the decile of most-cited journals; with 2.7% of world publications, it ranks 8th. The analysis also showed that France has a remarkable position in the corpus of five prestigious mathematics journals; it is in 2nd position, behind the United States.

France's position in the selective corpus in terms of impact indicators is more complex to analyse. In the largest corpus, France's impact index is on a par with the world average, putting it in 10th place among the countries that publish the most. In the English corpus, where its share of publications is slightly lower, it has a higher impact index and is ranked 9th. This means that French publications in English have a greater relative impact within the English corpus than the impact of all French publications within the total corpus. The improvement in the performance of French publications in terms of impact within the English corpus is strongest for fields in the humanities and social sciences in which France has the most publications, such as history. Within the corpus of most-cited journals, France's share is higher than in the total number of publications, but its impact index is lower and places it in 11th place. Within the corpus of prestigious mathematics journals studied, France ranks 2ndth for the number of articles, but 7th for the impact index.

France's specific scientific profile persists, with variations depending on the corpus

France's scientific profile in relation to other research-intensive countries is confirmed, but partially modified in certain bodies of publications.

Mathematics is France's leading discipline of specialisation, both in the broad corpus and in the selective corpus analysed. France's clear specialisation in fundamental biology and physics is also maintained in the selective corpora. On the other hand, specialisation in earth sciences and the universe is lower in the corpus of the most cited journals. Finally, specialisation in the humanities disappears both in the English corpus and in the corpus of the most cited journals.

In France, indicators for disciplines in the humanities and, to a lesser extent, the social sciences are more sensitive to the scope of the corpus than in other countries. The analysis focused in particular on the comparison between France and Germany, which have the same share of OLE publications in the largest corpus. Overall, the trade-off between the coverage of French publications by the corpora studied and France's position appears to be closely linked to the SHS disciplines.

The disciplinary profile of France's ERC projects converges with that of its publications

France's scientific profile as measured by scientific publications is consistent with its profile of European Research Council (ERC) projects by major research area.

The disciplines in which France remains specialised in the selective bodies of publications belong to the ERC's Physical Sciences and Engineering panel, mathematics and physics in particular, and Earth and Universe sciences to a lesser extent. Yet it is in this panel that France performs best, in terms of applications, projects and success rates.

In the life sciences, France's performance is at the ERC average for applications, projects and success rates. This is also in line with France's positioning, as analysed on the basis of publications in the fields of fundamental biology and medical research.

France's position is weaker in the ERC panel corresponding to SHS. Here again, this profile corresponds to observations based on publications. France specialises in the humanities in the broadest corpus, but not in the social sciences - which account for a larger proportion of publications worldwide. Furthermore, France no longer specialises in the humanities in the selective corpus analysed. Similarly, the impact indices of French publications in the social sciences and humanities are often lower than those in other disciplines. These indicators are consistent with the relatively low number of applications in the SHS panel and a relatively low success rate.

Outlook

The contributions mentioned in the introduction to this report have shown that the impact indices of publications from non-English-speaking countries can suffer from the low audience of contributions published in languages other than English, resulting in a low citation potential. One solution for making international comparisons is to restrict the corpus considered to publications in English, or even to select scientific journals with an international circulation in order to create a more 'equitable' perimeter for the different institutions or countries. This is the approach adopted by the Leiden International University Rankings (appendix 7).

The report confirmed that this method produces better impact indices for countries with a higher share of OLE publications than the world average. But it emphasised that this is to the detriment of other dimensions of the international position of countries insofar as, in the English corpus, the number and world share of publications from these countries are lower. This is the case for France and even more so for Spain, but less so for Germany. France is better represented in the corpus of the most cited journals, but the impact index of its publications is lower than the average for the corpus and its world share is significantly lower in the SHS.

The report showed that a country's scientific position varies from one corpus to another depending on the characteristics under consideration. In addition to the corpora in the same database, the approach could be extended by using different publication databases. From this perspective, the development of the OpenAlex open database represents an opportunity insofar as it combines a much broader coverage of publications than the historical databases while allowing international comparisons. Explorations of the OpenAlex database and the bibliometric literature that reports on it, as well as analyses based on national repositories such as HAL, suggest that the mobilisation of this new data source should be based on two pillars. Firstly, improving the reliability of the metadata of indexed documents. This is currently underway, and will benefit from the combined efforts of the OpenAlex development team and user communities. Secondly, the value of the analyses will depend on the construction of a corpus of scientific publications suitable for international comparisons. In the context of the development of predatory journals, and even more generally of publications that do not follow a satisfactory peer review process, it is important that the corpora studied clarify the perimeter of what can be considered a scientific publication. This effort could draw on the experience of certain countries that have developed typologies of journals and international discussions. In addition, while this approach seems simpler for journal articles and conference proceedings, it could eventually be developed for books and book chapters

References

Aubert, F. d', 2008, Vers un partenariat renouvelé entre organismes de recherche, universités et écoles, Rapport à Mme la ministre de l'Enseignement supérieur et de la Recherche.

Archambault, E., Vignola-Gagne, E., Côté, G., Larivière, V., Gingras, V., 2006, Benchmarking scientific output in the social sciences and humanities: The limits of existing databases, *Scientometrics, Vol. 68, No. 3, 329-342*

Bouin, O. 2015. Study of French performance in SHS at the end of the first year of the Horizon 2020 programme. Paris, France: Athena Alliance,

Carayol, N., F. Maublanc, 2025, Can Money Buy Scientific Leadership? The Impact of Excellence Programs on German and French Universities, Research Policy, Vol.54, Issue 2: 105-155

Céspedes, L., Kozlowski, D., Pradier, C., Holmberg Sainte-Marie, M., Shokida, N-S., Benz, P., Poitras, C., Boudreau Ninkov, A., Ebrahimy, S., Ayeni, P., Filali, S., Li, B., Larivière, V., 2024, Evaluating the Linguistic Coverage of OpenAlex: An Assessment of Metadata Accuracy and Completeness, Arxiv-CS: https:

CWTS Leiden Ranking, 2024, Information on Indicators,

Gillet, P., et al, 2023, Mission sur l'écosystème de la recherche et de l'innovation, MESR, https://www.enseignementsup-recherche.gouv.fr/sites/default/files/2023-06/rapport---mission-sur-l-cosyst-me-de-la-recherche-et-de-l-innovation-28193.pdf

Hanson, M, Barreiro, P., Crosetto, P., Brockington, D., 2024, The strain on scientific publishing, *Quantitative Science Studies*, 5(4): 823-843., https://doi.org/10.1162/qss_a_00327

Horta, H., Shen, W., 2020, "Current and future challenges of the Chinese research system." *Journal of Higher Education Policy and Management* 42: 157 - 177.

IGF - IGAENR, 2014, *Implantation territoriale des organismes de recherche et perspectives de mutualisation entre organismes et universités*, May

Kallenbach, S., Toussain, R., Verhaeghe, D., Gabla, E., Margaria, C., Magnien, M. 2016. Evaluation of the French contribution to the European framework programme for research and innovation. Paris, France: IGAENR, IGF, CGIET

Lahatte, A., Sachwald, F., 2023, " les publications scientifiques en intelligence artificielle selon trois corpus, *L'Etat de l'Enseignement supérieur, de la Recherche et de l'Innovation en France* n°16, MESR

Lahatte, A., Laville, F., Sachwald F., 2024, La position scientifique de la France à travers deux corpus de publications, in *L'Etat de l'Enseignement supérieur, de la Recherche et de l'Innovation en France* n°17, SIES-MESR

Lahatte, A., de Turckheim, E., 2024, Impact of a reclassification of Web of Science articles on bibliometric indicators, Arxiv, https://arxiv.org/abs/2410.02701

Larivière, V., 2018, Le français, langue seconde ? De l'évolution des lieux et langues de publication des chercheurs au Québec, en France et en Allemagne. Recherches sociofigureiques, 59(3), 339-363. https://doi.

Larivière, V., Riddles, A., 2021, Langues de diffusion des connaissances : quelle place reste-t-il pour le français, Acfas Magazine,

Leeuwen, T.V., Visser, M., Moed, H., Nederhof, T., Raan, A.V., 2006. The Holy Grail of science policy: Exploring and combining bibliometric tools in search of scientific excellence. *Scientometrics* 57(2), p. 257-280.

Lepori, B, L. Bornmann, F. de Moya Anegón, 2023, Measuring university size: A comparison of academic personnel versus scientific talent pool data. *Quantitative Science Studies* ; 4 (4): 800-819. doi: https://doi.org/10.1162/qss_a_00273

Leydesdorff, L., Opthof, T. (2010). Normalization at the field level: Fractional counting of citations. Journal of Informetrics, 4(4), 644-646.

Leydesdorff, L., Park, H.W. 2016. Full and Fractional Counting in Bibliometric Networks. *arXiv,* http://arxiv.org/abs/1611.06943.

Leydesdorff, L., Radicchi, F., Bornmann, L., Castellano, C., Nooy, W. de 2013. Field-normalized impact factors (IFs): A comparison of rescaling and fractionally counted IFs. *Journal of the American Society for Information Science and Technology* 64(11), pp. 2299-2309.

Liu, W., 2017, The changing role of non-English papers in scholarly communication: Evidence form Web of Science's three journal citation indexes, *Learned Publishing*, 30:115-123

NSF, 2023, Publications Output: U.S. Trends and International Comparisons, NSB Science & Engineering Indicators 2024, National Science Foundation NSB-2023-33, https://ncses.nsf.gov/pubs/nsb202333/.

OECD, 2024, OECD Bibliometric indicators. 2024 edition highlights, OECD Directorate for Science, Technology and Innovation, https://issuu.com/oecd.publishing/docs/2024_bibliometrics_april_highlights

OST, 2018, France's scientific position in the world, 2000-2015, Hcéres,

OST, 2020, *Measurer le taux d'accès ouvert des publications scientifiques : le cas de la France*, Points OST, 2020.01, Hcéres, Paris

OST, 2021, *France's scientific position in the world and in Europe, 2005-2018*, Hcéres, Paris

OST, 2024, Structures de recherche et publications des universités en France, Le cas de l'Île-de-France, Hcéres, https://www.hceres.fr/sites/default/files/media/downloads/point-ost-2024.01_0.pdf

OST, 2024a, Diversification des sources de données pour les analyses bibliométriques. Focus sur les domaines des SHS, Hcéres,

OST-DEO, 2023, *CNRS Evaluation Report*, November, Hcéres

OST-DEO, 2023, Analyse des publications scientifiques d'Inria. Contribution à l'évaluation de l'Institut national de recherche en sciences et technologies du numérique, Hcéres, https://www.hceres.fr/sites/default/files/media/files/analyse-publications-scientifiques-inria-2023.pdf

Perianes-Rodriguez, A., Waltman, L., van Eck, N.J, 2016. Constructing bibliometric networks: A comparison between full and fractional counting. *Journal of Informetrics* 10(4), pp. 1178-1195.

Pölönen, J., Pylvänäinen, E., Aspara, J., Puuska, H-M., Rinne, R., 2021, Publication Forum 2010-2020: Self-evaluation report of the Finnish quality classification system of peer-reviewed publication channels, Federation of Finnish Learned Societies, https://julkaisufoorumi.fi/sites/default/files/2021-03/Publication%20Forum%20self-evaluation%20report%202021_0.

Pritychenko, B. 2016. Fractional authorship in nuclear physics. *Scientometrics* 106(1), pp. 461-468.

Simard, M-A., Basson, I., Hare, M., Larivière, V., Mongeon, P., 2024, The open access coverage of OpenAlex, Scopus and Web of Science, Arxiv,

Sivertsen, G., 2018. The Norwegian model in Norway, Journal of Data and Information Science, 3(4), 298-311. DOI: 10.2478/jdis-2018-0017

Stephen, D., Stahlschmidt, D., 2022, *Performance and Structures of the German Science System 2022.* German Centre for Higher Education Research and Science Studies (DZHW). Berlin

Tijssen, R., Visser, M., Van Leeuwen, T., 2006. Benchmarking international scientific excellence: Are highly cited research papers an appropriate frame of reference? *Scientometrics* 54(3), p. 381-397.

Tollefson, J., 2018, China declared world's largest producer of scientific articles, Nature 553 (7689): 390, DOI: 10.1038/d41586-018-00927-4

Van Leeuwen, T., Moed, H., Tijssen, R., Visser, M., van Raan, A., 2001, Language biases in the coverage of the Science Citation Index and its consequences for international comparisons of national research performance, *Scientometrics*, Vol. 51, n°1 335-346

van Raan, T., van Leeuwen, T., Visser, M., 2011, Non-English papers decrease rankings. *Nature* **469**, 34. https://doi.org/10.1038/469034a

Waltman, L. 2016. A review of the literature on citation impact indicators. *Journal of Informetrics* 10(2), p. 365-391.

Wieviorka, M., Moret, J. 2017. *Les Sciences humaines et sociales françaises à l'échelle de l'Europe et du monde, : Rapport au secrétaire d'État à l'Enseignement supérieur et à la Recherche*. Les Editions de la MSH.

Zitt, M., Ramanana-Rahary, S., Bassecoulard, E., 2003, Correcting glasses help fair comparisons in international science landscape: Country indicators as a function of ISI database deliOLEtion, Scientometrics, Vol. 56, No. 2, 259-282

APPENDICES

Appendix 1. OST publications database, corpus and indicators

Database of scientific publications

The OST publications database is a version of the Web of Science (Clarivate Analytics) enriched with geofigureical and institutional data. The version of the OST database used in this report comes from the 2023 update campaign, which contains WoS data up to the 22nd week of data in 2023.

The Web of Science (WoS) is one of the main international databases used in bibliometrics, listing the most influential scientific journals and conference proceedings. It focuses on academic publications, particularly research articles. It covers more broadly well-internationalised disciplines and relatively less certain areas of the humanities, social sciences and engineering sciences. The coverage of the database has changed significantly over the last fifteen years, with new journals being added on a regular basis, following a selection process that includes criteria for editorial quality and the academic influence of the publication media. In addition, indexes have been added over time to provide better coverage of certain disciplines, countries or languages of publication.

The WoS indexes in the OST database are : SCI-Science *Citation Index Expanded*, SSCI-Social *Sciences Citation Index*, A&HCI-Arts & *Humanities Citation Index*, CPCI-Conference *Proceedings Citation Index* (S and SSH) and ESCI-Emerging *Sources Citation Index*. The latter has been integrated since 2023. It includes a higher proportion of media from SHS or non-English-speaking disciplines. Table A1.1 shows the weight of the ESCI index in the total corpus of the OST database; at world level, it exceeds 11% .[32]

Table A1.1: Average annual number of publications, top 20 countries, 2019-22

Country codes	Full counting		Fractional counting		Share of MDPI or Frontiers publications 2017-22
	Total corpus	ESCI share in the total corpus	Total corpus	ESCI share in the total corpus	
RUS	814,716	22.81 %	683,018.18	25.83 %	4.5 %
BRA	851,876	18.41 %	704,767.03	20.85 %	4.3 %
IND	1,459,428	19.02 %	1,281,704.95	20.45 %	1.7 %
TUR	563,255	18.70 %	488,673.70	20.35 %	1.0 %
IRN	593,777	17.58 %	514,907.52	19.06 %	1.6 %
ESP	1,078,490	13.59 %	775,200.58	16.84 %	12.9 %
POL	525,998	12.31 %	415,678.36	14.12 %	18.1 %
GBR	2,016,437	9.22 %	1,278,487.24	11.39 %	4.2 %
AUS	1,041,623	9.44 %	694,439.83	11.37 %	6.0 %
World	**29,420,328**	**11.25 %**	**29,420,328.00**	**11.25 %**	**7.0 %**
ITA	1,230,262	9.25 %	886,428.17	10.99 %	15.2 %
CAN	1,157,170	8.47 %	783,343.56	10.00 %	5.3 %
USA	6,708,104	8.06 %	5,334,241.20	8.91 %	4.3 %
KOR	941,730	7.35 %	787,167.17	8.07 %	12.8 %
JPN	1,392,664	7.08 %	1,152,833.76	7.69 %	5.6 %
FRA	1,247,234	6.20 %	817,663.64	7.21 %	6.6 %
CHE	495,372	5.60 %	263,185.37	6.94 %	7.1 %
DEU	1,840,573	5.93 %	1,248,527.34	6.89 %	8.2 %
NLD	647,578	5.81 %	389,246.58	6.82 %	6.9 %
TWN	459,170	4.13 %	378,129.57	4.19 %	7.2 %
CHN	5,859,363	2.99 %	5,198,654.53	2.97 %	8.7 %

Source: OST database (2024 update), Web of Science, OST calculations

Corpora of publications

---

[32] For an analysis of the impact of integrating the ESCI index on various indicators, see (Lahatte et al. 2024).

The report analyses world scientific publications during the period 2010-22, according to four different perimeters, ranging from a global corpus to selective perimeters of scientific journals. The first corpus is a broad corpus that includes all the publications in the OST database that are relevant for calculating the indicators. A second corpus includes the articles in the OST database published in English. It is determined on the basis of the metadata relating to the language in which the articles were written, available in the WoS.

The third corpus brings together articles from the decile of the most cited journals (2,710 journals). It is compiled by calculating the average impact of journals measured by MNCS for their publications between 2017 and 2021. The final corpus consists of all publications in five prestigious mathematics journals, identified by an expert in the field: *Inventiones mathematicae, Acta Mathematica, Journal of the American Mathematical Society, Publications mathématiques de l'IHES and Annals of Mathematics.* These five journals are included in the previous MNCS top of journals.

Data filtering

To calculate the indicators, standard filtering of bibliofigureic data is applied. Only original articles, including conference proceedings, and *reviews* are included in the corpus. Documents for which the country code, author-address links or disciplinary category are missing, as well as retracted publications, are not taken into account.

Disciplinary classification

The initial nomenclature corresponds to the WoS subject categories assigned to the journals and inherited by the publications. This nomenclature includes multiple assignments due to journals associated with several specialities and multidisciplinary journals. OST has decided to specify the discipline assigned to each publication so that the category of the publication corresponds to the majority category of its bibliofigureic references. This revision led to a revision of the initial disciplinary nomenclature, assigning a single speciality to each publication and eliminating the multidisciplinary categories[33] . Certain specialities that were too widely dispersed have been broken down into sub-specialities. In total, the disciplinary nomenclature of OST publications includes 242 non-overlapping specialities.

The OST database includes a classification of eleven scientific disciplines, such as fundamental biology, engineering sciences, computer science and humanities. A strict correspondence has also been established between the new OST categories and these eleven disciplines.

Methods for counting publications

Produced by researchers from different laboratories, a scientific publication may include several address lines corresponding to affiliations. Two counting logics can be adopted (Leydesdorff and Park 2016; Perianes-Rodriguez et al. 2016; Pritychenko 2016).

The full counting credits each of the affiliation institutions with one publication (1), regardless of the total number of affiliation addresses of the authors. This count refers to the logic of an entity's participation in the publication.

Insofar as the participation is set at 1 as many times as there are membership addresses, the full counting is not additive and therefore does not produce shares or percentages in the usual sense given to these indicators

The fractional counting reflects a logic of contribution to the scientific publication. A fraction of the publication is allocated to each signatory entity so as to have a unitary sum. The weight of an entity is proportional to its number of affiliation addresses in the total number of addresses mentioned in the publication.

Fractional counting is additive. This is why it is used to calculate shares of publications in geofigureical groupings. To compare countries or institutions, contributions to publications should be counted rather than mere participation.

---

[33] Presented by Lahatte and de Turckheim (2024).

In this report, apart from the co-publication indicators, which are displayed in full count, the other indicators are provided in fractional count.

Indicators on scientific publications

The indicator definitions are applied to the various bodies of publications studied in the report.

Scientific specialisation index

Scientific specialisation provides a measure of the concentration of a country's or an institution's publications in a given discipline. As the specialisation index is a double ratio, it can be presented in two ways.
- the ratio of the entity's world share in this discipline to its world share in all disciplines combined;
- the discipline's share of the entity's total publications, normalised by its share of world publications.

The higher a country's specialisation index is above 1, the more 'specialised' the country is in the discipline in question.

Co-publication indicators

A co-authored scientific publication is considered to be a co-publication. It includes at least two separate affiliation addresses, whereas a non-collaborative publication has only one signatory address. The number of co-publications for a given entity is the sum of the publications for which it is a co-author.

For an entity, the proportion of co-publications is given by the ratio between the number of co-publications and the total number of publications.

When the partnership involves one or more foreign addresses, it is referred to as an international co-publication. A co-publication involving only authors from two different countries is a bilateral international co-publication. The proportion of international co-publications is used to assess the extent to which an entity collaborates with players from different geofigureical areas. This indicator, expressed as a percentage, is defined as the number of international co-publications in relation to the total number of publications by the entity.

Impact indicators

Impact indicators are based on the references that scientific articles make to other publications. A distinction is traditionally made between average impact indicators and indicators relating to the most cited classes of publications.

Standardised impact by research area

Citation practices differ between fields of research and between disciplines. An impact indicator based on the number of citations received by an article must therefore be corrected for this disciplinary effect (Leydesdorff and Opthof 2010; Leydesdorff et al. 2013; Waltman 2016). It must also take into account the length of time between the date of publication and the citations. The older an article is, the more citations it will have received by the date of analysis. One method of correcting for this bias is to restrict the number of citations to a time window that is the same for all the publications in the study (a citation window of 2 years, for example). But this method has two disadvantages: it does not use all the information available at the date of the study for older articles, and it requires a very short window to be chosen in order to take recent articles into account.

The widely adopted solution is to calculate a normalised impact index to take account of the diversity of citation behaviour in scientific fields. The normalised citation score (MNCS) for each article is defined by the ratio between the citations received by the article and the world average. Normalisation is done for a given scientific field, type of document and year of publication. The impact index of a player in a field of research is then obtained as the average of its normalised scores.

Citation classes

Average indicators do not take into account the strong asymmetry that characterises the citations received by scientific publications. The distribution of scientific publications in global citation classes provides additional information. Citation classes classify scientific publications according to the intensity with which they are cited. They correspond to a breakdown of all publications into decreasing percentiles according to the number of citations received worldwide for a given citation window. The classes are constructed by field of research. The percentile of the most cited publications in the world, for example, corresponds to the 1% of publications receiving the most citations (Leeuwen et al. 2006; Tijssen et al. 2006).

The classes make it possible to position a player's entire production in global distribution and to visualise its performance at different levels of observation. The indicators of excellence, the top 1% and top, the most widely used in the literature, are derived from these classes. This report presents not only the top but also all seven of the following disjoint classes: the percentile of most cited publications, the next 4 percentiles (2 to 5), the next 5 (6 to 10), the next deciles (11 to 20), the next two deciles (21 to 40), the next two deciles (41 to 60) and the last 40 percentiles (61 to 100).

In theory, the share of publications in a percentile should be equal to 1% of the world total. In practice, however, this is not quite the case because of ties (publications with the same number of citations). Hence the calculation of activity indices, which make it possible to return to a simple global reference. The activity index of a country in a citation class is defined by the ratio between the share of the country's publications in this class and the share of the world's publications in the same class. An activity index greater than 1 in a class means that the country's share of the class is above the world average.

Appendix 2. Peer review and choice of scientific journals

The peer review process is a central feature of scientific publications that is under great pressure. Since the turn of the century, more countries have been investing in their research capacity, but the dynamic of publications seems to be outstripping both research capacity and peer review capacity. Some publishers of scientific journals have particularly contributed to the pressure exerted on the scientific publication system by reducing the time allowed for the peer review phase, or even by increasing the acceptance rate of contributions submitted to their journals. Some journals have thus been identified as "predatory" in that the publication fees they charge for publishing contributions in open access do not correspond to the work involved in validating and editing scientific publications.

A recent study uses a series of indicators to characterise the behaviour of scientific journal publishers (Hanson et al. 2024). Using publication databases and data collected from publishers or directly on the internet at publication level, the analysis compares the growth in the number of articles published between 2016 and 2022, the proportion of articles published in special issues, the time between submission and acceptance, the rejection rate and an indicator relating to citations. The corpus studied is rather conservative in that the journals selected are indexed by both the Web of Science and Scopus, which a priori at least ensures that a peer review process is implemented. However, within the corpus, it appears that two publishers, MDPI[34] and Frontiers Media[35] , present indicators that point to less demanding evaluation processes than the other publishers.

Table A2.1 shows the proportion of publications in the report's main corpus that appeared in journals published by these two publishers. It therefore only concerns the journals indexed by WoS among the hundreds of journals published by these two publishers. The publishers' websites consulted at the end of 2024 show 455 journals for MDPI and 230 for Frontiers Media, i.e. 685. For the period 2017-22, 272 journals from these publishers were found in the main corpus of the report, i.e. 39.7%. Note that HAL records include a greater number of MDPI or Frontiers journals: 416, or 60.7%. This difference may be due to the fact that there is no selection of publication media in HAL.

The table shows firstly that, even on the basis of a subset of their journals, these two publishers accounted for 7% of global publications for the period 2017-22. It then highlights the wide disparities between countries. India, Iran and Turkey have shares of less than 2%, even though their publications are dynamic. Other countries, with diverse scientific positions, also have shares of MDPI-Frontiers publications well below the world average: Sweden, Brazil, the United Kingdom, the United States and Russia. France has a share slightly below the world average (6.6%), as do Japan and the Netherlands. Germany's share is slightly above the world average (8.2%), close to that of China.

Conversely, some countries have a high proportion of their publications in MDPI-Frontiers journals: Poland, Italy, Spain and South Korea. However, the growth in publications from these countries is not solely due to appearances in these journals, since only Korea and Spain have seen their rank among the top publishers fall in the corpus without these journals. Note that this is also the case for Switzerland[36] , whose share of MDPI-Frontiers publications is at the world average. This can be explained by the low share of these publishers in the publications of Sweden, which has just fewer publications than Switzerland.

France is one of the countries with a slightly better ranking in terms of number of publications in the non-MDPI-Frontiers corpus in 2017-22: it has moved up from 13th to 12th. Brazil and Canada, which have lower shares of MDPI-Frontiers publications, moved up two places (table A2.1).

---

[34] Multidisciplinary Digital Publishing Institute, https://www.mdpi.com/ .
[35] Frontiers Media, https://www.frontiersin.org/ .
[36] MDPI and Frontiers are publishers based in Switzerland.

Table A2.1. Number of publications and share in MDPI or Frontiers Media journals indexed in WoS, top countries, 2017-22

Total corpus rank (excluding MDPI-Frontiers if different)	Country	Average number publications per year	Average number excluding MDPI-Frontiers	Share in MDPI or Frontiers journals indexed in WoS
1	CHN	535,404.8	488,824.5	8.7 %
2	USA	435,434.6	408,002.2	4.3 %
3	IND	124,231.2	122,119.3	1.7 %
4	GBR	105,139.2	98,620.6	4.2 %
5	DEU	102,163.7	93,786.3	8.2 %
6	JPN	91,984.1	86,833.0	5.6 %
7	ITA	76,745.6	65,080.3	15.2 %
8 (11)	KOR	67,760.3	59,087.0	12.8 %
9 (8)	RUS	66,500.7	63,508.2	4.5 %
10 (14)	ESP	65,169.3	56,762.5	12.9 %
11 (9)	CAN	64,519.2	61,099.7	5.3 %
12 (10)	BRA	63,400.3	60,674.1	4.3 %
13 (12)	**FRA**	**62,801.6**	**58,656.7**	**6.6 %**
14 (13)	AUS	59,750.2	57,061.4	6.0 %
15	IRN	50,237.0	49,433.2	1.6 %
16	TUR	44,397.8	43,953.8	1.0 %
17	POL	36,992.5	30,296.8	18.1 %
18	NLD	31,773.2	29,580.8	6.9 %
19	TWN	27,894.2	25,885.8	7.2 %
20 (21)	CHE	21,942.6	20,384.6	7.1 %
21 (20)	SWE	21,630.3	20,786.8	3.9 %
	World	**2,628,103.7**	**2,444,136.4**	**7.0 %**

Reading. Countries whose rank is improving outside the MDPI-Frontiers are shown in green, those whose rank is deteriorating are shown in red. In brackets, the rank on the corpus excluding MDPI-Frontier.

Source: OST database, Web of Science, OST calculations; main body of the report, fractional count (the world total is a whole number, but the figures in the table are annual averages).

Appendix 3. Method for analysing data from the OpenAlex database

OpenAlex is a database of free-access document records[37] , built using scripts available as open source. OpenAlex brings together in a single database information from various sources, in particular the previous Microsoft Academic Figure database, their authors and institutions, their provenance and their disciplinary fields (https://docs.openalex.org/). It also ingests information contained in online repositories, both internationally (Arxiv, Zenodo) and nationally (e.g. HAL for France).

The OpenAlex data used for this report was extracted using the online API (https://api.openalex.org/) on 29/11/2024.

Construction of the corpus of publications analysed

OpenAlex offers very broad coverage (≃ 124 M documents for 2010-2022), with documents of varying nature and variable metadata quality. For example, 50% of documents have information on the geofigureical origin of the authors and 15% have no defined disciplinary or thematic field. This information tends to be more complete for recent documents.

Journal articles, selected for analysis in this report, represent 68.2% of all documents. However, a cross-analysis of documents present in the WoS and identified by their DOI (≃ 32%) reveals an over-inclusion of this type of document in OpenAlex, with a false positive rate (classified as journal articles by mistake compared to the WoS) of 21% compared to a false negative rate of only 2%.

The language of publication: detection and precision

The language of publication is identified in OpenAlex by applying a language detection algorithm (https://github.com/Mimino666/langdetect) to document summaries and, failing that, to their titles. This method can generate errors when this information is not written in the same language as the full text of the document or when metadata is collected in several languages.

In the analysis sample, the rate of articles for which the language is not provided is around 1.5% (2% in 2010 to for the year 2022). This figure is comparable to that mentioned in a recent study carried out on articles from the period 2000-2020 (Cespedes et al. 2024), which estimates it at 2%. On the other hand, the rate of missing data is higher for books/monofigures (6%) and book chapters (16%).

With regard to the accuracy of the detection method, Cespedes et al (2024) estimate, based on a representative sample of articles checked by experts, that nearly 15% of documents, all languages combined, are 'false positives': the language identified is not the one observed during the check. Due to the mechanisms mentioned above, English is involved in 89% of cases of erroneous classification, whether to (69%) or from this language.

Within the corpus compiled for this report, and taking the WoS as the reference for information on the language of publication, the joint sample of OpenAlex and WoS includes 0.7% of articles in English that are incorrectly classified and more than 63% of articles in other languages that are classified in English.

---

[37] It has been developed by the not-for-profit company OurResearch.

Appendix 4. Using the HAL repository to analyse French publications

The HAL dataset was retrieved in December 2024 using the API. The dataset was restricted to publication records associated with at least one institutional address located in France and published between 2017 and 2022.

Constitution and description of the corpus

The deposit in HAL is not subjected to selection criteria and the various fields are filled in by the depositors. As a result, the database includes articles from journals with heterogeneous editorial processes[38] . In order to identify scientific journals by validating the implementation of a peer review process (PR), the analysis combined a series of filters to identify the indexing of the journal in at least one of the following databases: DOAJ, Bona Fide, WoS (including ESCI), Scopus, Ulrich ("refereed"). These indexes have varying levels of coverage, depending on their purpose and their editorial requirements. Journal articles appearing in at least one of the indexes are considered as *articles with a validated peer review (PR)*.

The issue of duplicate submissions in HAL has been addressed by deduplicating documents that share a common DOI. All document types were cleaned, with the exception of Books and Book Chapters. The decision was made to retain them in their entirety, given the observation that different chapters of a book frequently share the same DOI, which may be that of the book. If duplicate submissions have different types, the priority order for retaining data is as follows: Journal_article_PR > Proceedings_paper > Journal_article__w/o_PR > Conf_comm_w/o_proceedings > Other productions. The duplicate removal has also been applied to documents sharing the same title and other metadata. However, this approach does not completely eliminate duplicates.[39]

The reprocessing of the data resulted in a corpus of 1,205,263 documents. Metadata such as document type and language have not been checked. The corpus comprises 53% articles, 10% book chapters and 3% books (Table A4.1). If we restrict the corpus to these three categories (excluding the 34% of other records), they account for 81%, 15% and 4% respectively.

Table A4.1 Records in HAL by type, production years 2017-22

Type of records	Number of records	Share of records	Share in French
Total	**1,205,263**	**100 %**	**39 %**
Articles	**644,095**	**53 %**	**25 %**
Journal articles	569,261	47 %	25 %
of which validated peer review process (PR)*	*458,957*	*38 %*	*11 %*
Conference proceedings	74,834	6 %	23 %
Book chapters	**115,125**	**10 %**	**64 %**
Books	**31,923**	**3 %**	**72 %**
Other types of records	**414,120**	**34 %**	**52 %**
of which communications at conferences without proceedings	*186,837*	*16 %*	*41 %*

* Combination of filters: journal indexed in at least one of the following databases: DOAJ, Bona Fide, WoS (including ESCI), Scopus, Ulrich ("refereed").

An analysis of the language of the[40] records shows that 39% of the documents are written in French. This proportion varies according to the type of document; it is lower for articles (25%), particularly EP journal articles (11%), and higher for book chapters and books (64% and 72%).

---

[38] For example, the "reading committee", "international audience" or "promotion" fields may be filled in differently for the same publication medium (YES by some applicants and NO by others)

[39] This processing is difficult to carry out due to the lack of standardization in the relevant metadata (e.g. title of document and publication medium, names of authors).

[40] The language of the document corresponds to the metadata available in HAL without any verification.

The SSH perimeter corresponds to publications whose primary discipline falls within the field of Social sciences and Humanities (HAL-SSH). This corpus includes 491,433 records, i.e. 41% of the total. The records include 39% articles, 20% chapters and 6% books (Table A4.2). If we restrict the corpus to these three categories (excluding the 36% of other records), they have shares of 61%, 31% and 9% respectively.

The proportion of journal articles whose peer review process has been validated is lower in the SSH corpus (17% of records) than in the total corpus (38% of records). Documents in French, on the other hand, are significantly more frequent in the HAL-SSH corpus: 71% of records, with little variation between types. As in the total corpus, EP journal articles are less often in French (51%).

Table A4.2 Records in HAL-SSH by type, production years 2017-22

Type of records	Number of records	Share of records	Share in French
Total	**491,433**	**100 %**	**71 %**
Articles	**190,584**	**39 %**	**70 %**
Journal articles	177,924	36 %	70 %
of which validated peer review process (PR)*	82,102	17 %	51 %
Conference proceedings	12,660	3 %	73 %
Book chapters	**96,645**	**20 %**	**72 %**
Books	**27,395**	**6 %**	**77 %**
Other types of records	**176,809**	**36 %**	**71 %**
of which communications at conferences without proceedings	86,949	18 %	65 %

* Combination of filters: journal indexed in at least one of the following databases: DOAJ, Bona Fide, WoS (including ESCI), Scopus, Ulrich ("refereed").

Comparison of publications in HAL and the WoS-OST database

A comparison between HAL and the WoS-OST database is carried out by matching publications based on their DOI, with the sample restricted to EP journal articles and conference proceedings[41] . Two methods of validating peer review are presented: combining the bibliographic indexes described above (1) or relying exclusively on indexing by Ulrich with the "refereed" method (2). Table A4.3 presents the results for all disciplines on the one hand and for publications indexed in SSH on the other.

Table A4.3 Comparison between HAL and OST-WoS for articles*, 2017-2022

1. Validation of peer review: combination of indexes				
Present in :	**All disciplines**		**SSH**	
	HAL	**WoS-OST**	**HAL**	**WoS-OST**
HAL only	92,990	-	40,703	-
WoS-OST only	-	216,012	-	29,365
Intersection of the two databases	360,299	360,299	18,201	18,201
Total	453,289	576,311	58,904	47,566
2. Validation of peer review: Ulrich "refereed				
Present in :	**All disciplines**		**SSH**	
	HAL	**WoS-OST**	**HAL**	**WoS-OST**
HAL only	73,611	-	30,709	-
WoS-OST only	-	303,332	-	34,335
Intersection of the two databases	272,979	272,979	13,231	13,231
Total	346,590	576,311	43,940	47,566

* PR journal articles and conference proceedings (see tables A4.1 and 2.

---

[41] Records contain a DOI for 94% of articles and proceedings in the OST database, and 85% of EP articles and proceedings in HAL.

For the total perimeter, nearly 80% of the articles indexed in HAL (453,289) are also present in WoS (intersection), whereas this is the case for only 53% of the articles indexed in WoS-OST (576,311). The share of intersection between the databases decreases considerably within the SSH perimeter, with only 31% of HAL-SSH articles shared with WoS-OST (34% of articles from the WoS-OST point of view). The two databases are thus much more dissimilar in the fields of the SSH.

In the case where the peer review of a journal is validated by the Ulrich "refereed" index alone, the number of HAL articles decreases by around 25% for both corpora.

Table A4.4 presents a complementary analysis by calculating the share of EP journals and the share of associated articles. Of the total corpus, 58% of the journals present in HAL have a validated peer review (38% for the Ulrich "refereed" index alone), which corresponds to 81% of the articles (respectively 60%). This proportion is lower in the HAL-SSH corpus, in which 45% of journals and 46% of articles are associated with a peer review (reduced to 31% and 34% respectively for the Ulrich index alone).

Table A4.4 Share of peer-reviewed HAL journals and associated articles, 2017-2022

	All disciplines		SSH	
	Share of EP journals	Share of EP journal articles	Share of EP journals	Share of EP journal articles
Index cumulation	57.7 %	80.8 %	44.8 %	46.4 %
Ulrich "referred	37.5 %	60.3 %	31.2 %	34.4 %

List of journals with the most SSH publications in HAL and the WoS-OST database

Tables A4.5 and A4.6 provide the lists of journals and conference proceedings with the highest number of articles published between 2017 and 2022 in HAL-SSH and the WoS-OST database for SSH disciplines. These two lists only include around 50 journals each, but they contribute to qualitatively complete the comparison between the two data sources.

These lists share some common journals, such as *Revue d'histoire littéraire de la France, Revue française des sciences de l'information et de la communication, Revue française de gestion* and *Revue française de science politique*. The complete lists, beyond those included in the tables, contain other common journals, such as *Plos One, Journal of Archaeological science: reports, or Revue de droit rural*. The complete list of journals for each source can be provided upon request from OST.

Some journals are found in both sources, but with different numbers of articles, mainly because the deposit in HAL is voluntary. For example, *Research Policy* has 92 hits in the OST database and 51 in HAL. Conversely, some journals have fewer articles in the OST database for the period, such as *Cybergéo* and *Sociologie du travail*. This could be due to the fact that the attribution to the SSH disciplines is based on the bibliographic references of the articles in the OST database (see appendix 1), whereas it corresponds to the information provided by the submitter in HAL.

The journals with the highest number of articles in HAL are often publications in law for which the peer review process has not been validated by the approach explained above. It is possible that some of them are professional journals. *The Conversation France* and La vie des idées are also among the journals with the highest number of article records indexed in HAL-SSH.

Table A4.5 Journals in the HAL-SSH corpus with the highest number of records for 2017-22

Journals in descending order of number of articles* 2017-22	Publisher	Peer review		Number of records
		Ulrich	Cumu-lation	
Recueil Dalloz	Dalloz	N	N	2,043
Revue trimestrielle de droit civil	Dalloz	N	N	1,521
Actualité juridique droit administratif	Dalloz	N	N	1,281
Rev. trim. de droit commercial et de droit éco.	Dalloz	N	N	1,165
Revue trimestrielle de droit européen	Dalloz	N	N	1,056
Droit social	Dalloz	N	N	976
Gazette du palais	Gazette du palais, lextenso	N	N	912
Dalloz actualité	Dalloz	N	N	845
Revue des sociétés	Dalloz	N	N	829
La semaine juridique. Ed. générale	Lexisnexis	N	N	828
Rev. de droit immobilier. Urbanisme - const.	Dalloz	N	N	769
La semaine juridique. Ad. et coll. ter.	Lexisnexis	N	N	756
La semaine juridique. Entreprise et aff.	Lexisnexis	N	N	737
Rev. de sc. criminelle et de droit pénal comp.	Dalloz	N	N	695
Actualité juridique pénal	Dalloz	N	N	682
Actualité juridique famille	Dalloz	N	N	647
Revue de droit du travail	Dalloz	N	N	636
Revue de droit sanitaire et social	Dalloz	N	N	574
The conversation France	The conversation media group	N	N	571
La semaine juridique. Social	Lexisnexis	N	N	560
Rev. française de droit administratif	Dalloz	N	N	545
Actualité juridique contrats d'affaires : concurrence, distribution	Dalloz	N	N	538
Les petites affiches	Journaux judiciaires associés	N	N	536
Actualité juridique coll. territoriales	Dalloz	N	N	536
Droit de la PI et du numérique	Dalloz	N	N	503
Actualité juridique droit immobilier	Dalloz	N	N	465
Juristourisme	Dalloz	N	N	460
Droit de la famille	Lexisnexis	N	N	453
Rev. critique de droit international privé	Dalloz	N	N	439
La semaine juridique. Notariale et immobilière	Lexisnexis	N	N	426
Bulletin joly travail	Lextens	N	N	351
Lectures	Centre Max Weber	N	N	323
J. de droit de la santé et de l'ass. maladie	Inst. droit et santé (univ. Paris Cité)	N	N	318
Revue des droits de la concurrence	Inst. de droit de la concurrence	N	N	300
Revue de l'Union européenne	Dalloz	N	N	297
Propriétés intellectuelles	Transactive	N	N	294
Rev. française des sc. de l'info. et de la com.	Soc. fr. des sc. de l'info. et de la com.	N	Y	286
Revue française de gestion	Lavoisier	Y	Y	285
La vie des idées	La vie des idées	N	N	279
Revue française de science politique	Presses de Sciences Po	Y	Y	278
Rev. d'histoire littéraire de la France	Presses universitaires de France	Y	Y	274
Rev droit & santé : rev. jur. des ent. de santé	Les études hospitalières	Y	Y	274

* The number of documents indexed in HAL may be greater than the number of articles for journals that include several types of documents, such as editorials or letters.

Table A4.6 Journals with indexed articles in SSH, total WoS-OST corpus, 2017-22

Journal title in descending order of number of articles	WoS ESCI Index	Number of items
Journal of Business Research	N	435
Plos One	N	331
Frontiers in psychology	N	315
Technological forecasting and social change	N	303
Sustainability	N	280
In situ heritage review	Y	273
Applied Economics	N	268
Lecture notes in Computer science	N	244
Journal of archaeological science reports	N	234
E spania rev. électronique d'études hispaniques médiévales	Y	228
Journal of Business Ethics	N	226
Revue économique	Y	223
Revue d'histoire littéraire de la France	N	210
Finance research letters	N	197
Annales médico-psychologiques	N	195
Economics bulletin	Y	192
Economic modelling	N	190
Annals of operations research	N	187
Energy economics	N	180
SHS web of conferences	N	175
Romanticism	N	167
Annales de Bretagne et des pays de l'ouest	N	162
Journal of economic behavior & organization	N	162
Revue d'économie politique	N	160
Revue du nord	N	159
Revue d'économie régionale et urbaine	Y	152
Développement durable & territoires	Y	147
Journal of cleaner production	N	147
Politix	N	139
Annales historiques de la révolution française	N	139
Ecological economics	N	137
Energy policy	N	132
Scientific Reports	N	130
Guerres mondiales et conflits contemporains	N	127
Dix septième siècle	N	127
Encephale rev. de psychiatrie clinique bio. et thérapeutique	N	125
Miranda	Y	125
Recherche et applications en marketing english edition	Y	124
European economic review	N	121
Mouvement social	N	121
Revue d'anthropologie des connaissances	Y	121
Etudes germaniques	N	120
Langue française	N	119
Revue d'histoire moderne et contemporaine	N	119
Journal of retailing and consumer services	N	118
Industrial marketing management	N	118
Internat. journal of environmental research and public health	N	118
Revue historique	N	116
Littérature	N	114
Information géographique	Y	114
Langages	N	113
Management	Y	111
Economics letters	N	111
Research in international business and finance	N	110
Nouvelle revue du travail	Y	110
Babel littératures plurielles	Y	109

Appendix 5. Publications in SHS and medical research by language in various European countries

This appendix is in two parts. The first (A) completes part 2.1 of the report with indicators by fine categories within the three disciplines for Germany, Spain and the United Kingdom. The second (B) provides, for the same SHS categories, the evolution of the share of English in publications in Germany, Spain and Italy.

A. Characterisation of publications in the 10 most numerous categories for France

1. Germany

Table A5.1a. Characterisation of publications from Germany, top humanities categories for France, 2017-22°

Category	Rank for number of publications		Share in English	Specialisation index		Impact index		Share of international copublications	
	France	World		DEU Total	DEU EN	DEU Total	DEU EN	DEU OLE	DEU EN
History	1	1	56.7 %	0.8	0.9	1.3	1.2	9.1 %	22.8 %
Language sciences	2	7	63.4 %	1.4	1.9	1.6	1.3	13.6 %	36.2 %
Philosophy	3	3	69.2 %	1.3	1.4	1.2	1.2	11.7 %	22.1 %
Literature	4	8	59.1 %	0.8	0.7	1.0	1.1	6.8 %	18.4 %
Social psychology	5	2	93.8 %	1.5	1.6	1.1	1.1	13.7 %	53.4 %
Anthropology	6	10	94.6 %	1.3	1.4	1.3	1.2	41.3 %	65.5 %
Literature in Romance languages**	7		14.7 %	0.5	0.3	1.2	1.1	9.9 %	14.7 %
Archaeology**	8		78.2 %	0.9	1.0	1.1	1.1	29.2 %	70.9 %
Study of religions	9	6	54.7 %	1.3	0.9	0.8	1.0	8.0 %	21.0 %
Medieval and Renaissance studies**	10		58.9 %	0.8	0.9	0.9	0.9	7.8 %	19.5 %
Total Humanities			**71.6 %**	**1.1**	**1.1**	**1.1**	**1.2**	**10.8 %**	**41.5 %**

Table A5.1b. Characterisation of publications from Germany, top social science categories for France, 2017-22°

Category	Rank for number of publications		Share in English	Specialisation index		Impact index		Share of international copublications	
	France	World		DEU Total	DEU EN	DEU Total	DEU EN	DEU OLE	DEU EN
Economy	1	1	98.1 %	1.1	1.2	0.9	0.9	23.3 %	60.7%
Management	2	3	96.1 %	1.0	1.1	1.3	1.3	13.6 %	47.7 %
Commerce and org.	3	4	97.3 %	0.8	0.8	1.4	1.4	8.7 %	51.4 %
Education sciences	4	2	82.3 %	0.6	0.5	1.5	1.6	10.6 %	38.4 %
Human geography	5	10	90.5 %	0.9	1.0	1.0	1.0	23.1 %	42.9 %
Political science	6	5	88.4 %	1.6	1.6	1.2	1.2	13.5 %	43.7 %
Experimental psychology - SS**	7		97.7 %	2.3	2.5	1.0	1.0	23.5 %	45.9 %
Sociology	8	9	79.0 %	1.3	1.3	1.1	1.2	9.3 %	36.8 %
Psychiatry - SS	9	6	74.4 %	1.2	1.0	1.0	1.2	16.1 %	53.6 %
Law	10	7	89.2 %	0.7	0.8	1.3	1.1	33.2 %	35.9 %
Total social sciences			**89.8 %**	**0,9**	**0.9**	**1.2**	**1.2**	**13.9 %**	**50.0 %**

Table A5.1c. Characterisation of publications from Germany, top medical research categories for France, 2017-22°

Category	Rank for number of publications		Share in English	Specialisation index		Impact index		Share of international copublications	
	France	World		DEU Total	DEU EN	DEU Total	DEU EN	DEU OLE	DEU EN
Oncology	1	1	89.4 %	0.9	0.8	1.0	1.1	6.1 %	60.4 %
General and internal medicine	2	2	76.2 %	0.7	0.6	1.0	1.2	11.5 %	59.2 %
Clinical neurology	3	4	86.6 %	1.3	1.2	1.1	1.2	11.9 %	58.9 %
Immunology	4	6	95.7 %	1.3	1.3	1.1	1.2	19.7 %	64.7 %
Surgery	5	7	74.7 %	1.1	0.9	1.0	1.2	9.2 %	43.5 %
Cardiovascular system	6	3	89.5 %	1.4	1.4	1.2	1.2	9.9 %	59.2 %
Radio, nuclear medicine & medical imaging**	7		93.3 %	1.7	1.7	1.2	1.2	11.4 %	55.2 %
Haematology	8		92.2 %	1.3	1.2	1.4	1.4	9.8 %	67.2 %
Endocrinology and metabolism	9	5	83.4 %	0.8	0.7	1.1	1.3	9.4 %	64.4 %
Urology & nephrology**	10		78.4 %	0.9	0.8	1.1	1.4	11.3 %	64.6 %
Total Medical research			**83.1 %**	**1.0**	**0.9**	**1.1**	**1.2**	**10.2 %**	**59.1 %**

Full year at 95%.
* These fields are among those with the most publications in France, but not at world level.
Source: OST database, Web of Science, OST calculations

2. Spain

Table A5.2a. Characterisation of publications from Spain, top humanities categories for France, 2017-22°

Category	Rank for number of publications		Share in English	Specialisation index		Impact index		Share of international copublications	
	France	World		ESP Total	ESP EN	ESP Total	ESP EN	ESP OLE	ESP EN
History	1	1	16.6 %	3.0	1.1	0.6	0.9	6.3 %	13.7 %
Language sciences	2	7	34.5 %	4.1	3.3	0.8	1.0	6.6 %	18.3 %
Philosophy	3	3	26.3 %	2.3	1.0	0.4	0.9	4.7 %	18.9 %
Literature	4	8	42.6 %	1.6	1.1	0.8	1.0	6.4 %	9.7 %
Social psychology	5	2	76.8 %	1.4	1.3	0.7	0.8	18.5 %	47.2 %
Anthropology	6	10	75.8 %	2.1	2.1	1.3	1.5	23.1 %	66.0 %
Literature in Romance languages**	7		9.3 %	8.9	4.2	1.2	1.6	3.1 %	7.1 %
Archaeology**	8		49.7 %	3.5	2.6	0.8	1.2	12.8 %	50.5 %
Study of religions	9	6	38.5 %	0.8	0.5	0.9	1.3	10.5 %	17.6 %
Medieval and Renaissance studies**	10		14.7 %	6.8	2.2	0.9	1.6	3.3 %	5.9 %
Total Humanities			**38.0 %**	**2.6**	**1.5**	**0.7**	**0.9**	**7.5 %**	**31.3 %**

Table A5.2b. Characterisation of publications from Spain, top social science categories for France, 2017-22°

Category	Rank for number of publications		Share in English	Specialisation index		Impact index		Share of international copublications	
	France	World		ESP Total	ESP EN	ESP Total	ESP EN	ESP OLE	ESP EN
Economy	1	1	88.1 %	1.2	1.3	0.7	0.8	18.3 %	49.1 %
Management	2	3	90.2 %	1.2	1.3	0.9	1.0	28.4 %	50.6 %
Commerce and org.	3	4	83.4 %	1.9	1.9	0.9	1.0	16.5 %	40.6 %
Education sciences	4	2	56.8 %	2.9	2.2	0.9	1.1	14.0 %	24.2 %
Human geography	5	10	49.1 %	1.8	1.2	0.7	1.1	11.4 %	38.2 %
Political science	6	5	50.2 %	1.4	0.9	0.5	0.8	13.4 %	43.1 %
Experimental psychology - SS**	7		87.9 %	1.3	1.4	0.8	0.9	11.4 %	51.9 %
Sociology	8	9	52.0 %	1.4	0.9	0.5	0.7	11.2 %	33.5 %
Psychiatry - SS	9	6	79.7 %	1.3	1.3	0.8	1.0	13.6 %	45.5 %
Law	10	7	13.7 %	3.4	0.7	0.2	0.6	7.2 %	25.2 %
Total Social sciences			**64.1 %**	**1.7**	**1.4**	**0.8**	**1.0**	**13.6 %**	**39.8 %**

Table A5.2c. Characterisation of publications from Spain, top medical research categories for France, 2017-22°

Category	Rank for number of publications		Share in English	Specialization index		Impact index		Share of international copublications	
	France	World		ESP Total	ESP EN	ESP Total	ESP EN	ESP OLE	ESP EN
Oncology	1	1	94.0 %	0.7	0.7	1.1	1.1	8.0 %	60.6 %
General and internal medicine	2	2	78.0 %	1.0	0.9	0.9	1.1	12.3 %	52.6 %
Clinical neurology	3	4	84. 7%	1.0	1.0	1.0	1.1	8.5 %	57.5 %
Immunology	4	6	98.5 %	0.8	0.9	0.9	0.9	21.7 %	56.6 %
Surgery	5	7	78.3 %	0.8	0.7	0.9	1.1	7.5 %	42.6 %
Cardiovascular system	6	3	85.4 %	1.0	1.0	1.0	1.1	10.1 %	59.1 %
Radio, nuclear medicine & medical imaging**	7		84.1 %	0.5	0.5	0.8	0.9	7.7 %	58.9 %
Haematology	8		94.7 %	1.0	1.1	1.0	1.1	10.1 %	59.9 %
Endocrinology and metabolism	9	5	90.6 %	1.0	1.0	1.0	1.1	10.2 %	50.0 %
Urology & nephrology**	10		72.6 %	0.9	0.8	0.9	1.1	10.9 %	52.8 %
Total Medical research			**86.0 %**	**1.0**	**1.0**	**1.0**	**1.1**	**12.1 %**	**54.1 %**

Full year at 95%.
* These fields are among those with the most publications in France, but not at world level.
Source: OST database, Web of Science, OST calculations

3. United Kingdom

Table A5.3a. Characterisation of UK publications, top humanities categories for France, 2017-22 °

Category	Rank for number of publications		Share in English	Specialisation index		Impact index		Share of international copublications	
	France	World		GBR Total	GBR EN	GBR Total	GBR EN	GBR OLE	GBR EN
History	1	1	96.9 %	2.2	4.0	2.2	1.4	34.3 %	9.8 %
Language sciences	2	7	95.2 %	0.8	1.4	2.3	1.4	39.1 %	32.3 %
Philosophy	3	3	98.2 %	2.1	2.9	1.9	1.4	17.4 %	16.3 %
Literature	4	8	98.4 %	2.7	3.6	1.4	1.1	32.8 %	7.0 %
Social psychology	5	2	99.9 %	1.6	1.7	1.2	1.1	100.0 %	60.5 %
Anthropology	6	10	98.8 %	2.5	2.8	1.2	1.1	66.7 %	50.0 %
Literature in Romance languages**	7		77.9 %	1.1	3.7	2.0	1.3	7.4 %	8.0 %
Archaeology**	8		98.6 %	2.3	2.9	1.5	1.2	73.5 %	50.2 %
Study of religions	9	6	99.0 %	2.2	2.7	1.5	1.3	25.6 %	12.3 %
Medieval and Renaissance studies**	10		95.5 %	2.7	4.7	1.6	1.2	9.7 %	5.4 %
Total Humanities			**98.1 %**	**2.0**	**2.5**	**1.6**	**1.3**	**37.0 %**	**30.2 %**

Table A5.3b. Characterisation of UK publications, top social science categories for France, 2017-22°

Category	Rank for number of publications		Share in English	Specialization index		Impact index		Share of international copublications	
	France	World		GBR Total	GBR EN	GBR Total	GBR EN	GBR OLE	GBR EN
Economy	1	1	99.7 %	1.4	1.4	1.2	1.1	76.7 %	68.0 %
Management	2	3	99.9 %	1.7	1.7	1.3	1.3	80.0 %	63.4 %
Commerce and org.	3	4	99.9 %	1.3	1.3	1.4	1.3	100.0 %	67.5 %
Education sciences	4	2	99.6 %	1.3	1.5	1.4	1.2	85.3 %	33.9 %
Human geography	5	10	99.5 %	3.8	4.2	1.4	1.2	66.7 %	32.2 %
Political science	6	5	99.2 %	2.8	3.0	1.2	1.0	63.9 %	37.8 %
Experimental psychology - SS**	7		99.9 %	2.3	2.3	1.2	1.2	77.8 %	60.0 %
Sociology	8	9	99.1 %	2.6	2.9	1.3	1.1	61.0 %	30.0 %
Psychiatry - SS	9	6	99.8 %	2.4	2.4	1.1	1.0	81.8 %	47.7 %
Law	10	7	99.2 %	2.5	3.2	1.3	1.0	68.4 %	25.0 %
Total social sciences			**99.6 %**	**1.8**	**1.9**	**1.3**	**1.2**	**73.4 %**	**48.9 %**

Table A5.3c. Characterisation of UK publications, top medical research categories for France, 2017-22°

Category	Rank for number of publications		Share in English	Specialization index		Impact index		Share of international copublications	
	France	World		GBR Total	GBR AN	GBR Total	GBR AN	GBR OLE	GBR AN
Oncology	1	1	99.9 %	0.7	0.7	1.2	1.2	86.7 %	69.6 %
General and internal medicine	2	2	99.8 %	1.8	1.8	1.4	1.3	91.9 %	59.5 %
Clinical neurology	3	4	99.8 %	1.2	1.2	1.4	1.4	96.0 %	67.7 %
Immunology	4	6	99.9 %	0.9	0.9	1.3	1.3	100.0 %	74.1 %
Surgery	5	7	99.9 %	1.2	1.2	1.2	1.2	75.0 %	44.7 %
Cardiovascular system	6	3	99.8 %	1.1	1.1	1.4	1.3	93.8 %	72.6 %
Radio, nuclear medicine & medical imaging**	7		100.0 %	1.0	1.0	1.2	1.2	100.0 %	59.9 %
Haematology	8		99.9 %	0.9	0.9	1.4	1.3	100.0 %	71.8 %
Endocrinology and metabolism	9	5	99.9 %	1.0	1.0	1.4	1.3	100.0 %	67.0 %
Urology & nephrology**	10		99.8 %	1.0	1.0	1.2	1.2	87.5 %	58.8 %
Total Medical research			**99.9 %**	**1.1**	**1.1**	**1.3**	**1.3**	**92.4 %**	**63.5 %**

Full year at 95%.
* These fields are among those with the most publications in France, but not at world level.
Source: OST database, Web of Science, OST calculations

B. Trends in the share of English in SSH publications in various European countries

1. France

Table B5.1a. Trend in the share of English in French publications, top humanities categories, 2010-22

Humanities categories	2010	2022	2022/2010
History	15.7%	28.9%	1.8
Language sciences	48.9%	49.6%	1.0
Philosophy	31.7%	47.3%	1.5
Literature	26.7%	26.5%	1.0
Social psychology	73.0%	92.4%	1.3
Anthropology	43.4%	79.7%	1.8
Literature in Romance languages	3.0%	22.7%	7.5
Archaeology	28.3%	71.7%	2.5
Study of religions	22.4%	45.1%	2.0
Medieval and Renaissance studies	14.3%	10.4%	0.7

Table B5.1b. Trend in the share of English in French publications, top social sciences categories, 2010-22

Social sciences categories	2010	2022	2022/2010
Economy	82.2%	94.7%	1.2
Management	92.1%	95.2%	1.0
Commerce and org.	96.7%	96.8%	1.0
Education sciences	63.6%	79.3%	1.2
Human geography	22.6%	68.9%	3.1
Political science	58.8%	77.0%	1.3
Experimental psychology - SS	87.0%	95.3%	1.1
Sociology	45.5%	72.7%	1.6
Psychiatry - SS	41.5%	83.5%	2.0
Law	51.9%	82.8%	1.6

2. Germany

Table B5.2a. Trend in the share of English in German publications, first humanities categories, 2010-22

Humanities categories	2010	2022	2022/2010
History	47.7%	61.8%	1.3
Language sciences	67.9%	71.4%	1.1
Philosophy	45.1%	80.1%	1.8
Literature	55.3%	56.5%	1.0
Social psychology	85.5%	95.5%	1.1
Anthropology	81.1%	97.0%	1.2
Literature in Romance languages	-	42.1%	-
Archaeology	26.8%	83.9%	3.1
Study of religions	46.2%	65.9%	1.4
Medieval and Renaissance studies	57.1%	61.2%	1.1

Table B5.2b. Trend in the share of English in German publications, top social sciences categories, 2010-22

Social sciences categories	2010	2022	2022/2010
Economy	95.1%	98.9%	1.0
Management	92.0%	97.1%	1.1
Commerce and org.	97.2%	98.5%	1.0
Education sciences	68.5%	85.7%	1.3
Human geography	70.1%	96.3%	1.4
Political science	59.5%	92.8%	1.6
Experimental psychology - SS	92.2%	98.5%	1.1
Sociology	48.8%	87.9%	1.8
Psychiatry - SS	50.4%	78.7%	1.6
Law	89.5%	94.7%	1.1

3. Spain

Table B5.3a. Trend in the share of English in Spanish publications, top humanities categories, 2010-22

Humanities categories	2010	2022	2022/2010
History	9.4%	34.4%	3.7
Language sciences	28.5%	54.6%	1.9
Philosophy	9.9%	46.0%	4.7
Literature	43.8%	49.8%	1.1
Social psychology	47.4%	90.1%	1.9
Anthropology	57.2%	82.6%	1.4
Literature in Romance languages	0.5%	30.9%	59.7
Archaeology	26.7%	66.8%	2.5
Study of religions	20.0%	63.7%	3.2
Medieval and Renaissance studies	13.8%	26.2%	1.9

Table B5.3b. Trend in the share of English in Spanish publications, top social sciences categories, 2010-22

Social sciences categories	2010	2022	2022/2010
Economy	81.1%	93.9%	1.2
Management	76.1%	93.4%	1.2
Commerce and org.	68.9%	89.3%	1.3
Education sciences	51.9%	67.4%	1.3
Human geography	19.5%	72.4%	3.7
Political science	26.2%	71.7%	2.7
Experimental psychology - SS	82.1%	91.3%	1.1
Sociology	31.2%	69.9%	2.2
Psychiatry - SS	61.7%	90.0%	1.5
Law	10.3%	24.1%	2.3

4. Italy

Table B5.4a. Trend in the share of English in Italian publications, first humanities categories, 2010-22

Humanities categories	2010	2022	2022/2010
History	31.0%	41.0%	1.3
Language sciences	51.9%	35.2%	0.7
Philosophy	45.6%	56.8%	1.2
Literature	60.2%	41.2%	0.7
Social psychology	85.2%	97.9%	1.1
Anthropology	87.9%	85.7%	1.0
Literature in Romance languages	3.7%	4.6%	1.2
Archaeology	52.7%	82.7%	1.6
Study of religions	57.2%	66.9%	1.2
Medieval and Renaissance studies	19.0%	27.9%	1.5

Table B5.4b. Trend in the share of English in Italian publications, top social sciences categories, 2010-22

Social sciences categories	2010	2022	2022/2010
Economy	96.5%	99.1%	1.0
Management	98.9%	99.8%	1.0
Commerce and org.	98.1%	99.5%	1.0
Education sciences	95.4%	91.8%	1.0
Human geography	81.4%	88.9%	1.1
Political science	83.8%	88.0%	1.1
Experimental psychology - SS	95.6%	93.8%	1.0
Sociology	96.5%	93.1%	1.0
Psychiatry - SS	75.6%	97.5%	1.3
Law	85.1%	62.6%	0.7

Appendix 6. Data and indicators on European projects

The e-Corda base

The study is based on data from the e-Corda database processed by OST through the integration of information from the 'H2020' programme, which covers the period 2014-2020, and from the new 'Horizon Europe' programme, which runs from 2021 to 2027. The data comes from the last delivery of the database in June 2024. H2020 and Horizon Europe are European programmes to support research and innovation. The former has been allocated a budget of €79 billion (including Euratom) by the European Union, and the latter a budget of €95.5 billion. These programmes are organised into major pillars such as scientific excellence, European industrial competitiveness and innovative Europe. These programmes are implemented through the funding of mainly collaborative European research projects via calls for projects. This funding can involve both public and private players.

The database is structured into two main families of data tables. On the one hand, we have data on funded projects and participants "the Grants database" and on the other hand, data on applicants and projects submitted as part of calls for projects "the Proposals database". Grants are awarded in the year in which the corresponding call for proposals closes. We are using the extraction from the database dated June 2024.

The analysis is based on the June 2024 version of the database and covers both the H2020 and Horizon Europe programmes. The calculations only take into account beneficiaries - "beneficiary" refers to the legal entity that enters into a grant agreement or convention with the European Union (EU), represented by the European Commission or any other EU funding agency. The allocation of a project to a beneficiary is based on the most recent information available. If an entity withdraws from a project or is replaced by a new beneficiary, the allocation of the project to the entity will be suspended.

Projects are considered as belonging to the closing year of the corresponding call for proposals. Cancelled projects and "blocked" participants (such as those who are bankrupt) are not included in the evaluation. Participants who have left a project are also excluded.

The ERC perimeter includes the countries of the EU-27 (EU-28 for H2020), which are automatically eligible for funding, as well as countries associated under the Framework Programme.

Countries associated with H2020 and Horizon Europe (HE)

			United Kingdom (except EIC)*
Albania	**Iceland**	**Northern Macedonia**	
Armenia	**Israel**	**Moldova**	**Serbia**
Bosnia-Herzegovina	Turkey	**Montenegro**	**Switzerland**
Canada (pillar 2 HE)	Kosovo	**Norway**	**Tunisia**
Faroe Islands	Ukraine	New ZeOLEnd (pillar 2 HE)	

* The United Kingdom has been associated since 1 January 2024. It was eligible for Horizon 2020 funding, but as a result of Brexit its status has changed on Horizon Europe,
Note. In bold, countries associated with H2020 and Horizon Europe. The others are only associated with Horizon Europe.

Indicators on ERC applications and grants

Number of applications

The number of applications from a country corresponds to the number of projects involving at least one applicant from this country as a beneficiary in the Proposals database during the period studied.

Number of grants

The number of grants from a country corresponds to the number of winning projects (as a beneficiary) that obtained a grant in the Grants database over the period studied. This indicator can be broken down by type of grant or ERC field.

Share of applications and grants by country

For a country (i), the share of applications/fellowships in an ERC subpanel (P_x) is defined by the number of applications/fellowships (y) in that country in relation to the number of applications/fellowships for all countries within the ERC perimeter (Y) in the same subpanel (x):

$$P_{ix} = \frac{y_{ix}}{Y_x}$$

Success rate

The success rate (S) of a country (i) in a sub-panel is calculated by dividing the number of successful applications (B) at the end of the selection process (on the main list, retained on the main list) by the total number of applications (C) in the same panel on the same "Proposals" basis.

$$S_{ix} = \frac{B_{ix}}{C_{ix}}$$

Under the H2020 or Horizon Europe programmes, the status of a project may change during the proposal evaluation process. For example, a project may go from "main" to "rejected" or from "reserve" (waiting list) to "main" (retained on the main list). These adjustments are generally linked to factors such as the availability of funds or the withdrawal of selected projects, for example when the required conditions are not met or a consortium withdraws its proposal.

Appendix 7. France's position in the Shanghai and Leiden rankings

Table A7. 1. Number of institutions in the Shanghai 2024 ranking, selected countries

Country of institutions	Total number of institutions classified	Number ranked in the Top 20 (share of national total)	Number ranked in the Top 100 (share of national total)
China	225	0 (0 %)	14 (6.2%)
United States	183	16 (8.7 %)	38 (20.8%)
United Kingdom	62	3 (4.8 %)	8 (12.9%)
Germany	51	0 (0 %)	4 (7.8%)
Italy	42	0 (0 %)	0 (0%)
Spain	36	0 (0 %)	0 (0%)
Australia	31	0 (0 %)	5 (12.5%)
Japan	30	0 (0 %)	2 (6. %)
Canada	27	0 (0 %)	3 (11.1%)
France	**25**	**1 (4.0 %)**	**4 (16.0%)**
Netherlands	13	0 (0 %)	2 (15.4%)
Switzerland	9	0 (0 %)	5 (55.6%)
Israel	7	0 (0 %)	3 (42.9%)
Denmark	6	0 (0 %)	2 (33.3%)
World*	**1,000**	**20**	**90**

* Inclusion criteria: Nobel Prize winners or Fields Medals among alumni or faculty, or researchers among the Highly Cited (Clarivate Analytics) or articles published in *Nature* or *Science*, or a sufficient number of publications indexed by the Web of Science (not specified).

Source: https://www.shanghairanking.com/rankings/arwu/2024, OST processing

Table A7. 2: Number of institutions in the Leiden 2024 ranking, selected countries

Country of institutions	1. Total number of institutions classified	2. Number whose share publications in the Top 10% is at least equal to 10%.	3. Col. 1/ Col 2.
China	273	144	53%
United States	206	129	63%
United Kingdom	63	62	98%
Japan	59	0	0%
Germany	57	40	70%
Italy	49	38	78%
Spain	47	6	13%
Australia	35	30	86%
Canada	32	18	56%
France	**32**	**15**	**47%**
Netherlands	13	13	100%
Switzerland	8	8	100%
Israel	7	3	43%
World-	**1,506**	**605**	**40%**

* Inclusion criteria: the institution must have at least 800 international scientific publications for the period 2018-21. They are defined on the basis of the Web of Science database, must be in English, must not have been retracted and must come from media with sufficient international circulation (*core journal, approximately one sixth of WoS publications are excluded in order to comply with the filters, see* CWTS Leiden Ranking (2024)

Source: https://www.leidenranking.com/information/general and link to data, OST processing

Acknowledgements