Sweden as a Science Nation

Current Status

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Contents

Sweden as a Science Nation – Current Status

Executive Summary

Sweden, the birthplace of the Nobel Prize, boasts a strong tradition of international collaboration, with over two-thirds of its research publications involving global partners. Sweden is home to innovative companies like Ericsson, Volvo, ABB, Sandvik, and Electrolux, alongside tech disruptors such as Spotify and Klarna – How does Sweden's globally connected position look in research in an increasingly competitive world?

- **How well is Swedish science performing?**
  Despite accounting for only 0.13% of the world's population, Sweden contributes 1.3% of global scholarly output, reflecting a research productivity nearly ten times its population share. This is supported by a robust investment in research and development, amounting to nearly 3.6% of GDP – one of the highest globally. Swedish research demonstrates high academic impact, with a Field Weighted Citation Impact (FWCI) 65% above the world average, outperforming the US, China, UK and the EU average. However, compared to its Nordic neighbours, Sweden has experienced slower growth and a more modest increase in academic impact in recent years.

- **What is the role of international collaboration?**
  Swedish research is highly international, with 66% of all scholarly output involving international collaboration. This is significantly higher than the world average (21%), the EU27 (43%) and the UK (58%). These internationally co-authored publications have nearly twice the world average academic impact (FWCI 1.95) and make a major contribution to the overall impact of Swedish research.

- **What is the role of academic-corporate collaboration?**
  Sweden demonstrates a high degree of collaboration between academia and industry, with 7.5% of scholarly output co-published with corporate partners. This rate is higher than the EU average and any G7 member country, underscoring the strength of Sweden's academic-industry ties. Additionally, 4.9% of Swedish scholarly output is cited in patents, highlighting the effectiveness of knowledge transfer.

- **How international are academic-corporate publications?**
  A notable 84% of Swedish academic-corporate co-publications involve international collaboration, primarily reflects partnerships with international corporate entities, underscoring the importance of global industry ties in enhancing research impact.

- **What is the impact on policy?**
  Swedish research extends its influence beyond academia, playing a significant role in shaping global policy. Since 2014, 12.8% of Swedish articles have been cited in policy documents – nearly double the EU average and significantly higher than G7 countries and China.

- **What is the impact on sustainable development?**
  Swedish research strongly supports the United Nations' Sustainable Development Goals (SDGs), outperforming the EU average across most SDG areas, particularly in Health, Gender, and Climate. In total, 38% of Swedish research is linked to at least one of the UN SDGs, surpassing both the global and EU averages of 33%. Swedish research on sustainability topics is particularly well cited, with an overall FWCI of 1.95.

- **How is Sweden doing on key strategic technologies?**
  Research related to key technologies, such as artificial intelligence, quantum technologies, semiconductors, and clean energy, demonstrates high scientific impact due to its citation levels and strong international and industry collaborations. Swedish research in AI and Quantum technologies is cited more than twice as often as the global average, while semiconductor technology and clean energy research are cited 60% and 78% above the global average, respectively. However, Sweden's relative activity (measured as the country's share of research in these fields compared to its overall research output) remains below the global average, which may be a cause for concern.

- **Which disciplines contribute the most to research impact?**
  In Sweden, Clinical and Health Sciences is the most impactful field and the largest field in terms of scholarly output. Social Sciences research is highly impactful in terms of citations, while Physical Sciences and Engineering are prominent in volume but have lower citation levels than other fields.

- **Which Swedish universities lead in academic impact?**
  All Swedish universities outperform the world average in academic impact. Karolinska Institutet is both the largest and the most impactful in terms of field-weighted citation impact (FWCI). Lund University ranks as the second most research-intensive institution, followed by Uppsala University.

Introduction

How well is Sweden performing in science, and how does its research activity support national competitiveness? While the question seems straightforward, evaluating Sweden's scientific standing requires a nuanced analysis from a kaleidoscope of perspectives. This report examines the volume and impact of Swedish research publications with comparators, looking at its influence on knowledge transfer, policy, contribution to key technologies and sustainability. The aim is to provide insights that inspire further discussion.

This report analyses Swedish research performance through the lens of scholarly communication as a primary output of research. **Chapter 1** assesses Sweden's position in the global scientific landscape. **Chapter 2** examines the role of international collaboration, crucial for any country to be at the frontline of science and innovation. **Chapter 3** explores academic-corporate collaboration, a key strength of Swedish research. **Chapter 4**, a key section in the report, investigates the impact of Swedish research on policy, sustainability and key technologies such as AI, Quantum, Semiconductors and Clean Energy. **Chapter 5** identifies the scientific disciplines and universities contributing the most to Sweden's success, and **Chapter 6** presents a summary of the findings.

As part of this report, we invited **Swedish academic and policy leaders to review its findings and share their reflections on Sweden's research landscape, its strengths, and future opportunities.** Their perspectives provide valuable context and expert commentary on the report's analysis. We thank them for their time and contributions, which can be found in **Chapter 7**.

The report concludes with **Chapter 8**, which provides key definitions, and **Chapter 9**, detailing the data sources used in the analysis.

This report is part of a series of research landscape reports released by Elsevier over the years, covering topics such as Artificial Intelligence, Net Zero, Biodiversity, Gender Gap in Science, and country or region-focused reports. The goal of these reports is to stimulate discussions and support evidence-based policymaking.

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1 How does Swedish science perform compared to other countries?

To answer the question of how Sweden is performing in the field of science, we begin by examining the publication output and citation levels of selected regions. For simplicity, we aggregate the Nordic countries: Denmark, Norway, Sweden, Finland, and Iceland. A more detailed analysis of Sweden's performance across specific topics will be presented later in this report.

Sweden invests heavily in research and development, with a gross investment of 3.57% of GDP in 2023, according to OECD (source Eurostat). In terms of output from research, the number of scholarly publications serves as a good measure of scientific activity or productivity. For a proxy of academic or scientific impact, we use the standard proxy of citations, here using the advanced normalized indicator of Field Weighted Citation Impact (FWCI). The FWCI is normalized to 1.0 for the world average, meaning an FWCI of 1.2 indicates that publications are cited 20% more frequently than the global average, while an FWCI of 3.0 signifies three times the average citations. A detailed definition can be found in Chapter 8.

Regarding scholarly productivity, Figure 1 illustrates the FWCI versus the relative share of scholarly output for selected countries and regions from 2019 to 2023. China and the European Union (as a block of 27 countries) account for 24% of global scholarly output, while the US holds approximately 20%. Notably, China surpassed the US in scholarly outputs in 2019, and India overtook the United Kingdom in 2021 (data not shown).

As depicted in Figure 1, the Nordics – with a population of 27 million – compares well in terms of both article share and citation impact, alongside similarly sized nations such as Australia (26 million) and Canada (40 million). In fact, the Nordics rank among the top performers in Field-Weighted Citation Impact (FWCI), well above the EU average and the US. (FWCI: Nordics 1.55; US 1.35; EU average 1.15).

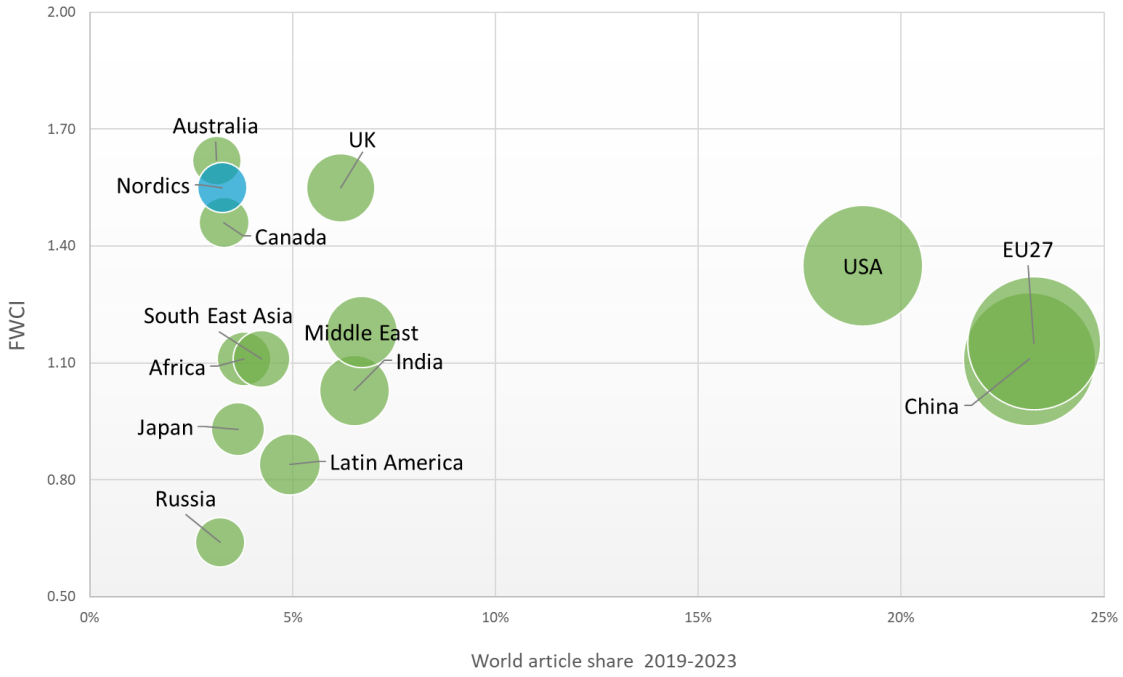


Figure 1: Field Weighted Citation Impact - FWCI vs. Relative share of scholarly output for different world regions and countries.

Taking a closer look at Sweden and its comparators, despite its relatively small population of 10.6 million, Sweden stands out as a research-intensive nation. As mentioned earlier, its gross R&D expenditure as a percentage of GDP is the highest in Europe. In terms of the volume of scholarly output, Sweden ranks 21st globally and 10th in Europe, positioned between Switzerland and Belgium.

For an Asian comparison, Sweden's scholarly output is similar to that of Indonesia, 80% higher than Singapore, and approximately half the size of South Korea's publication output. Not surprisingly, Swedish research enjoys a strong reputation and is cited more frequently than research from large European countries such as the UK, Germany, Italy, France and Spain. However, its citation impact is slightly lower than that of Denmark, Finland, the Netherlands and Switzerland.

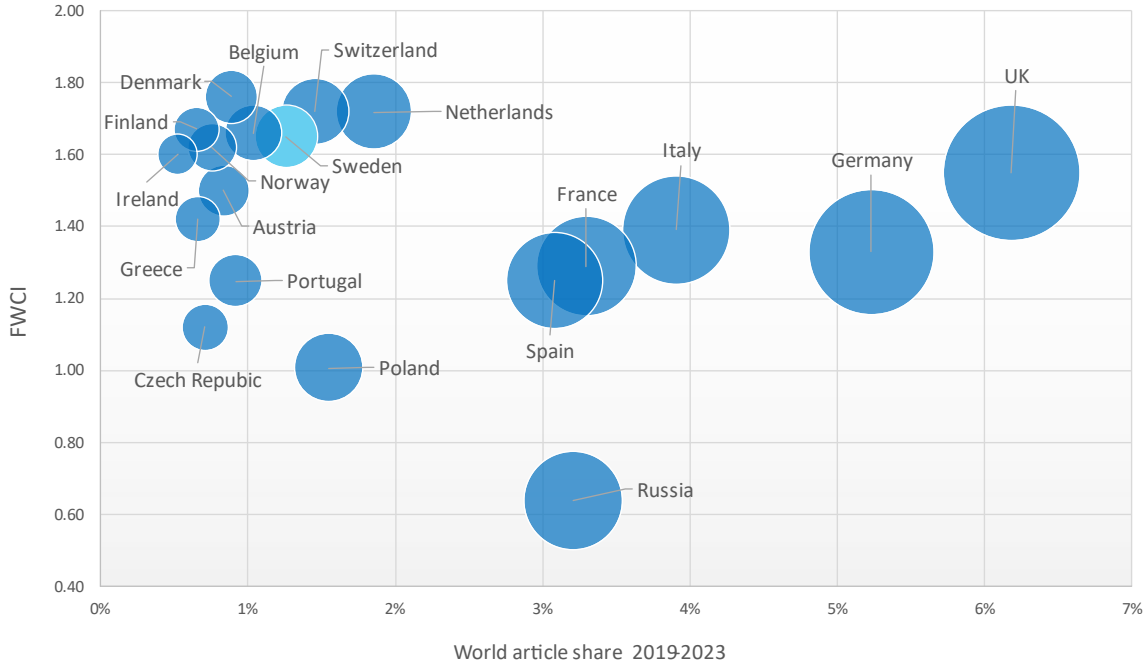


Figure 2: FWCI vs. Relative publication share of the 20 most prolific European countries.

Country	FWCI	Scholarly Output	Scholarly Output (growth %)	Open Access (all types*)	Authors	Authors (growth %)
EU27	1.15	4,575,767	8.0%	59%	3,284,768	13.7%
Nordics	1.55	641,993	11.1%	68%	340,953	12.6%
UK	1.55	1,219,017	6.1%	66%	709,379	8.5%
Germany	1.33	1,029,892	4.5%	57%	678,885	10.2%
Netherlands	1.72	365,845	10.0%	75%	209,276	14.3%
Sweden	1.65	248,038	8.0%	71%	120,175	8.0%
Belgium	1.66	204,240	11.9%	65%	110,522	15.6%

** By **Open Access** here it is meant all types: Gold, Hybrid Gold; Green and Bronze.*

Figure 3: Academic research published in selected European region between 2019 and 2023.

Over the past 5 years, Swedish research output has grown by 7.6%, on par with the EU27 average but at a lower rate than the overall Nordics average. As shown in Figure 3, the growth in Sweden's scholarly output has been accompanied by a corresponding rise in the population of authors.

In contrast, the UK and Germany – the most research-intensive countries in Europe – have not experienced the same level of growth. Figure 3 also highlights the Netherlands and Belgium, both of which have populations similar in size to Sweden's.

Examining the four Nordic countries (excluding Iceland), we observe that Sweden, Denmark, Norway and Finland have all experienced a steady growth in scholarly output since the early 2000s. The noticeable dip around 2020 may be linked to the pandemic, which impacted how researchers worked and published.

As illustrated in Figure 4, Sweden produced approximately 20,000 scholarly publications annually at the start of the millennium. By 2010, this number had increased to 30,000, reaching 40,000 by 2015, and surpassing 50,000 annually in recent years. However, as mentioned earlier, there are signs of a post-pandemic slowdown in publication growth since 2021, in line with global trends.

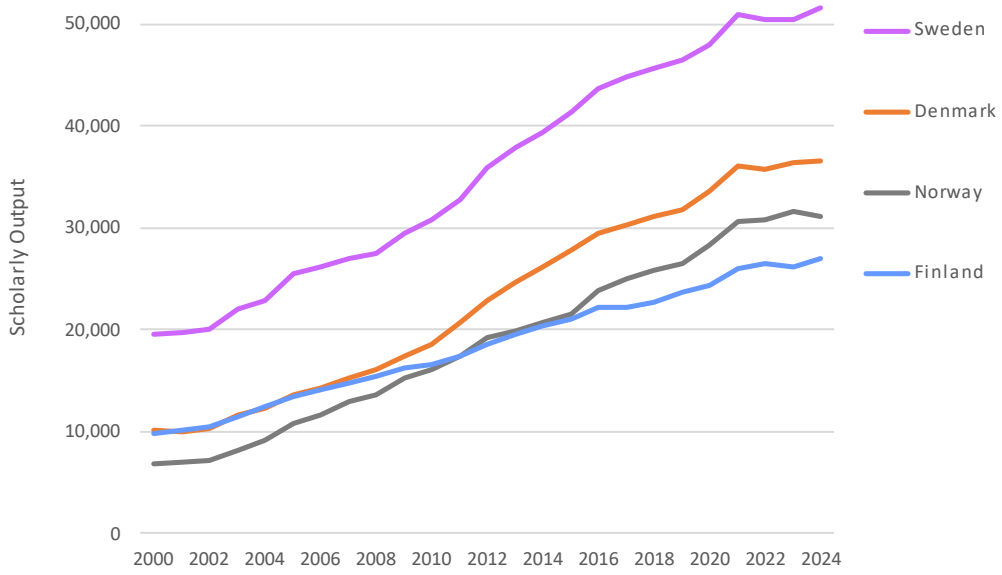


Figure 4: Trend of Scholarly Output in the Nordic Countries since the start of the millennium.

2 How does international collaboration contribute to overall performance?

International collaboration in science allows researchers to work with leading or complementary research environments, including top experts and cutting-edge infrastructures. It also facilitates the tackling of global challenges that may exceed the capabilities of individual countries. **Swedish international collaboration in science is very high**, with both the volume and quality of its research closely linked to the country's robust international networks within the scientific community.

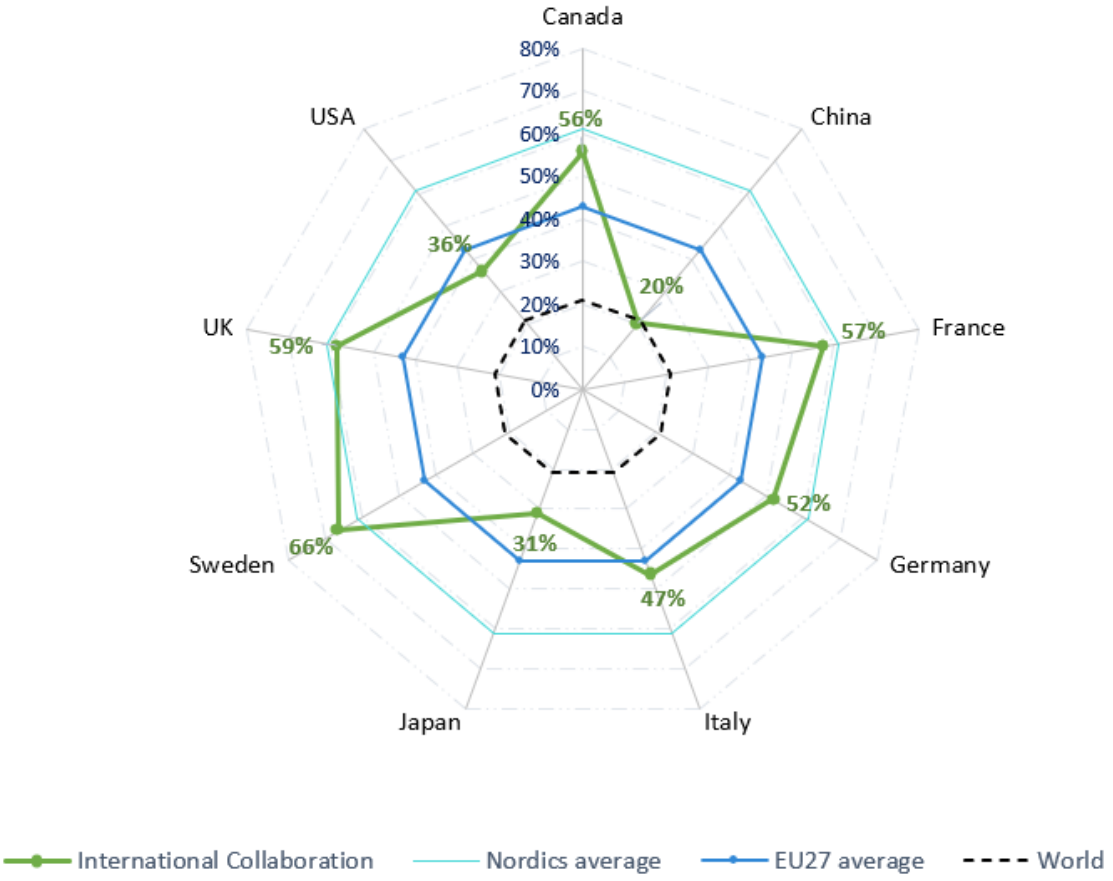


Figure 5: Internationalization of Scientific Research in selected countries. The world average is 21%.

To analyze international scientific collaboration, we focus on co-publications – research papers involving authors from multiple countries, as indicated by their affiliations. We use whole counting, meaning that if authors from Sweden and France co-publish a paper, it is counted as a publication for both Sweden and France. Figure 5 shows the share of international scholarly output as a percentage of research in Sweden, along with comparator countries, the global average, and the EU27 and Nordic region averages.

The global average for international co-publication is 21%, while the EU27 average is 43%. The Nordic countries, being smaller in size, show a higher average of 61%, and Sweden stands out even further with 66%. The UK and Australia come close but remain below 60%. To provide additional context, other global regions show the following international collaboration rates: Africa 45%, India 21%, Latin America 38%, the Middle East 43%, and Russia 21%. In Asia, Singapore – a frequent comparator to the Nordic countries in terms of size and academic impact – has an international co-authorship rate of 68%.

Given the high levels of international scientific collaboration involving Sweden, the question arises: how does internationalization in Sweden impact its overall performance?

Impact of research in Sweden:

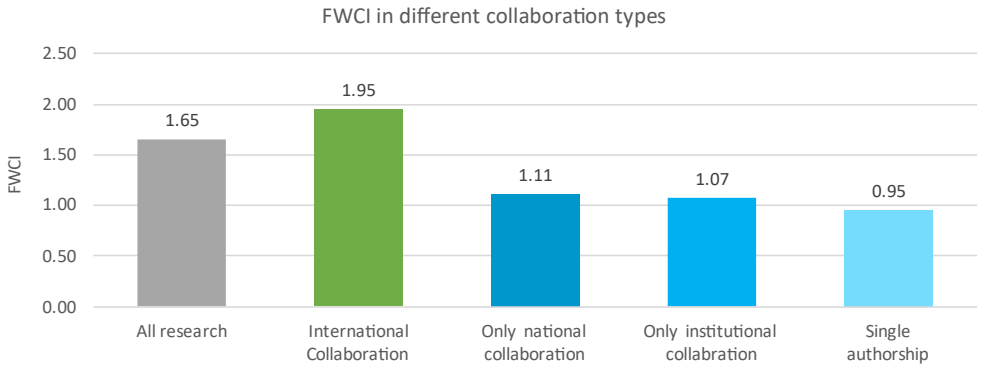


Figure 6: The research impact measured as FWCI for all research (1.65), for international research (1.95) and for only national research (1.11)

Figure 6 compares citation levels for Swedish research based on the type of collaboration: international, only national collaboration, only institutional collaboration and single authorship. The data clearly show that international collaborations result in significantly higher citation impact, as measured by the Field-Weighted Citation Impact (FWCI), compared to collaboration is within the national borders.

As mentioned in the introduction, this higher citation impact can be attributed to several factors. Research conducted through international collaboration may focus on topics of greater global relevance, thereby attracting a broader audience. Additionally, internationally co-authored papers tend to reach a wider network of researchers, increasing the likelihood of further studies building upon these findings, which in turn boosts citations.

International collaboration per subject area:

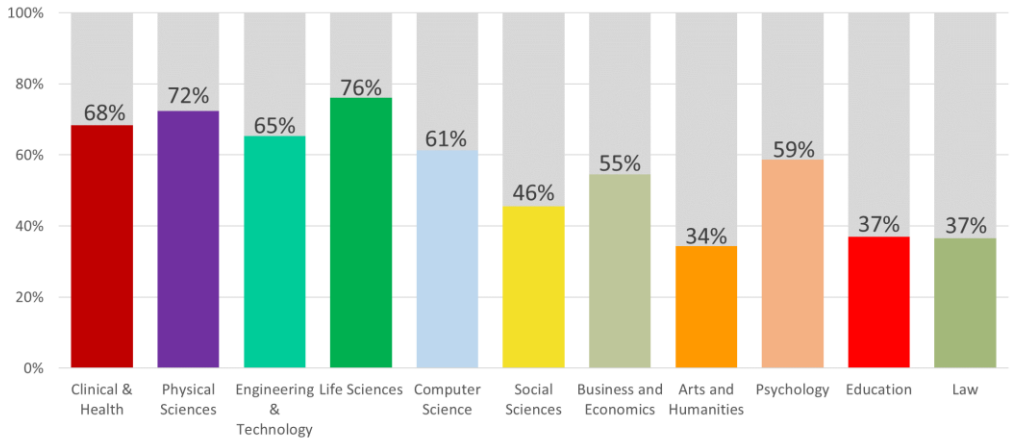


Figure 7: Share of international collaboration per subject area (Times Higher Education THE) expressed as a percentage.

Figure 7 illustrates the degree of internationalization in research across different subject areas in Sweden. Life Sciences show the highest percentage of international collaboration, followed by Physical Sciences and Clinical & Health. In contrast, Arts & Humanities and Law have the lowest shares of international collaboration. This variation is not surprising, as certain disciplines, such as law, often focus on national contexts, whereas others, like life sciences, address universal scientific challenges.

With which countries do Sweden engage the most?

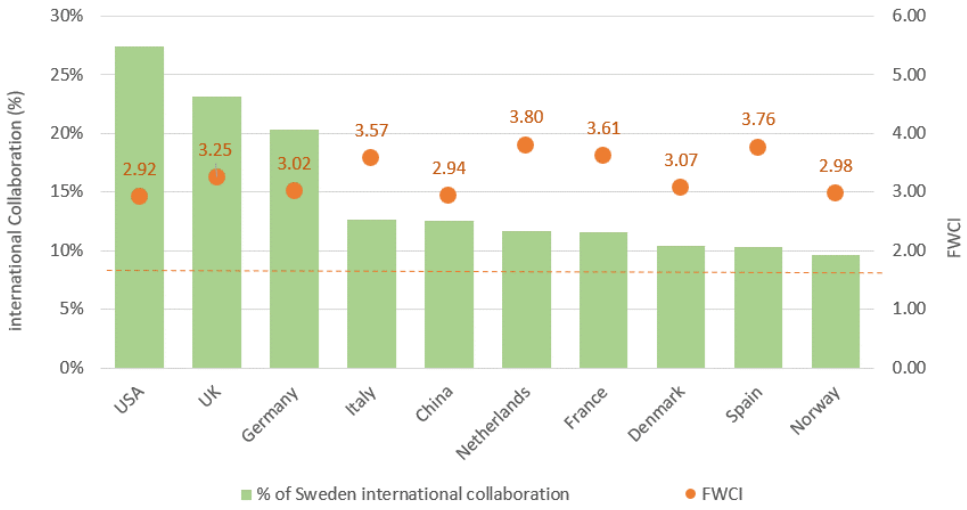


Figure 8: Most prolific countries collaborating with Sweden (shown as a percentage of Sweden's international publications) and citation impact measured as FWCI. The orange dotted line represents the average FWCI for all of Sweden's Scholarly Output (FWCI 1.65).

Figure 8 shows that more than a quarter of international collaborations involve the US. Collaboration with the UK is 23%, while with Germany is 20%. China accounts for 13% Sweden's international collaboration, while Denmark, Norway, and Spain each contribute 10%. The highest citation impact among Sweden's collaborations is observed with the Netherlands (FWCI 3.80) and Spain (FWCI 3.76).

It is noteworthy that Sweden's **most prolific international collaborations also tend to yield higher-than-average citation levels.** The overall average FWCI for Sweden's international publications is 1.95. However, collaborations with the US result in an impressive FWCI of 2.92, while partnerships with the UK reach an even higher FWCI of 3.25. For reference, Sweden's overall FWCI (including all research) is marked by the dotted line at 1.65. These figures highlight the significant contribution of international collaborations to the academic impact of Swedish science.

That said, Figure 8 should be interpreted with caution regarding any assumption about which partnerships are "best". A more in-depth analysis would be needed to assess the full impact of specific partnerships. It is increasingly so that international collaborations – particularly in fields like physics, where frequently large infrastructures are shared, or in global health – are multi-lateral rather than bilateral in nature. For example, among Sweden's 45,000 co-publications with the United States between 2019 and 2023, 15,000 also involved the United Kingdom.

Figure 9: Sweden's international co-publications and location of partners (measured by levels of Scholarly Output).

Most of Sweden's internationally collaborative research involves other European institutions. Within Europe, in terms of co-publications, the UK is the most prolific collaborator, followed by Germany and Italy. Collaboration is also strong with North America and the Asia-Pacific region. In North America, the US is Sweden's primary partner, while in the Asia-Pacific region, China emerges as the strongest collaborator, followed by Australia and Japan.

With the rise of Asia in terms of global scientific prominence – particularly China, but also other countries in the region – in line with the Swedish governmental trade, investment and global competitiveness strategy launched in 2024, **it remains an opportunity for Sweden to strengthen collaborations with Asian counterparts.**

3 The role of Academic-Corporate collaboration and impact on Patents

Academic-Corporate collaboration, as expressed in terms of co-publications and patent citations to publications, is significantly higher in Sweden than the EU average. It also surpasses the levels observed in any of the G7 countries, as well as China.

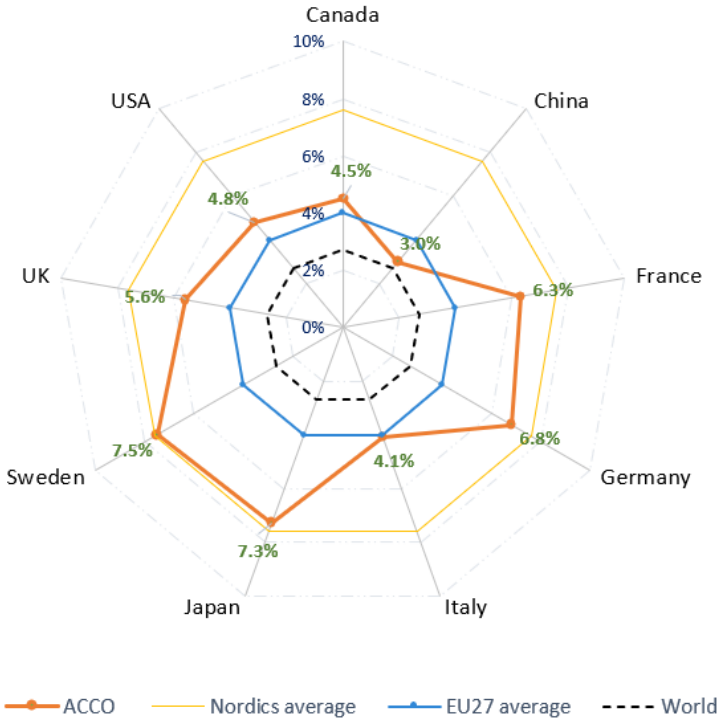


Figure 10: Academic-Corporate co-publication rates (ACCO) expressed as a percentage of total publication selected countries (G7 +China).

As proxies of academia-industry collaboration, we can use co-publications and citations in patents to publications. However, it is important to recognize that these are only partial indicators of broader academia-industry collaborations, as not all knowledge exchange between academia and industry results in published research. Despite this limitation, co-publications and patent citations remain valuable indicators for assessing such collaborations. From data covering the five-year period between 2019 and 2023, Sweden excels in academic-industry partnerships, with 7.5% of its research involving co-publications between universities and companies. This figure is significantly higher than the EU average and exceeds that of any G7 country. Additionally, **84% of Swedish academic-corporate co-publications are with international partners, further underscoring the key role of international collaboration in Swedish science.**

Collaboration between academia and industry combines a range of skills and resources to tackle modern challenges and generate innovative solutions. Research conducted across sectors also tends to receive more citations, resulting in greater impact. As shown in Figure 11, the field-weighted citation impact of academic-corporate co-published in Sweden is more than double that of research conducted solely within academia. It is worth noting that since many of these academic-corporate co-publications involve international corporate or academic partners, this also contributes to their higher citation impact.

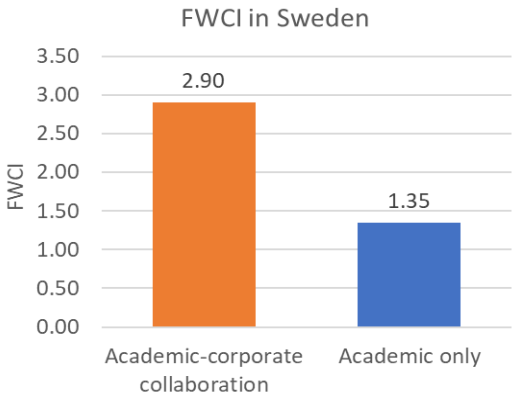
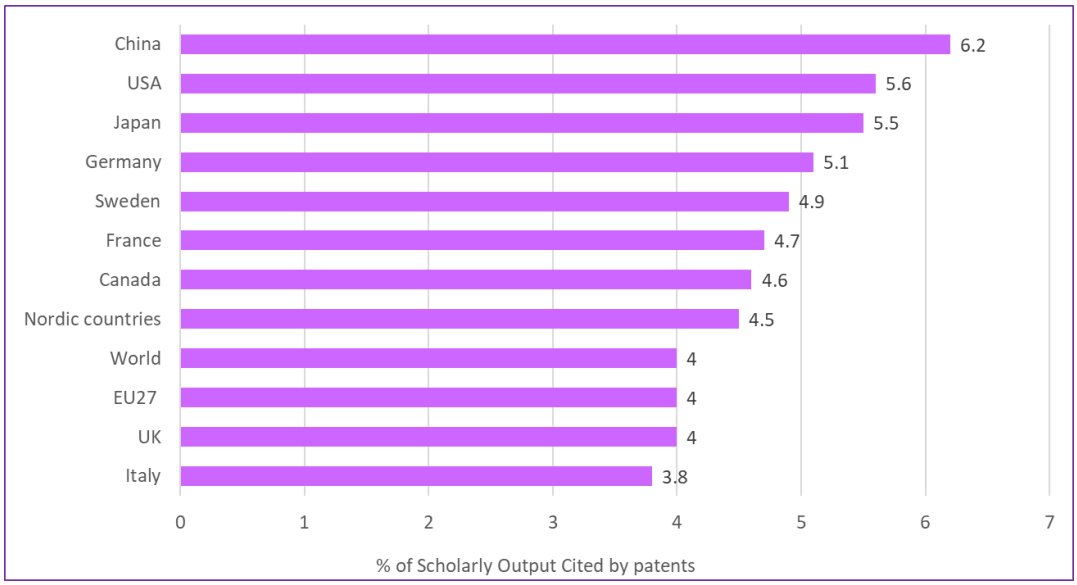


Figure 11: Comparison of citation levels between different types of publishing.

Beyond its scientific merit, research positively support knowledge transfer and innovation. One way to assess this is by examining the extent to which **Patents cite Scholarly Output.**



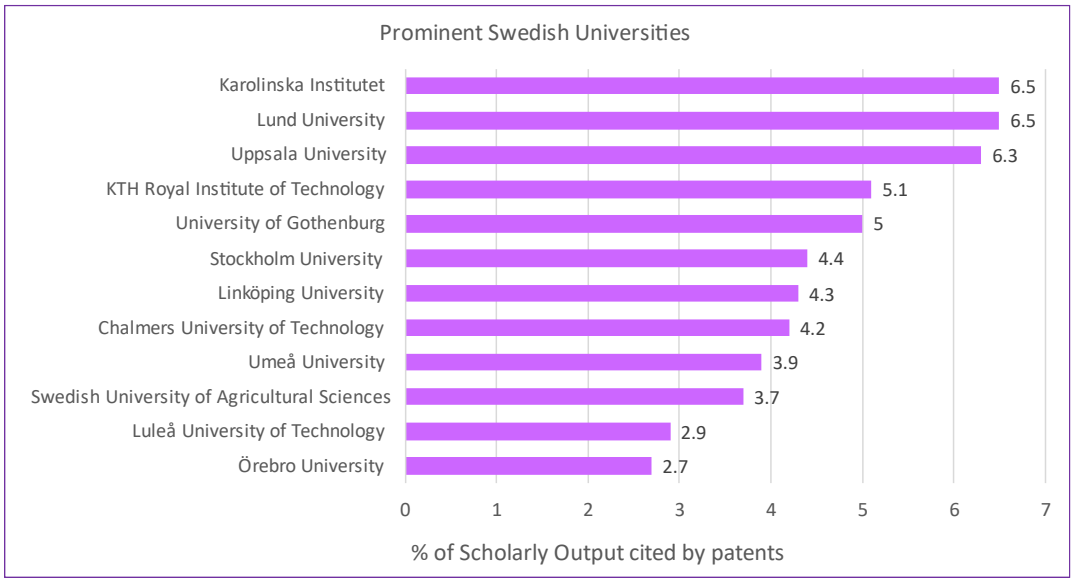


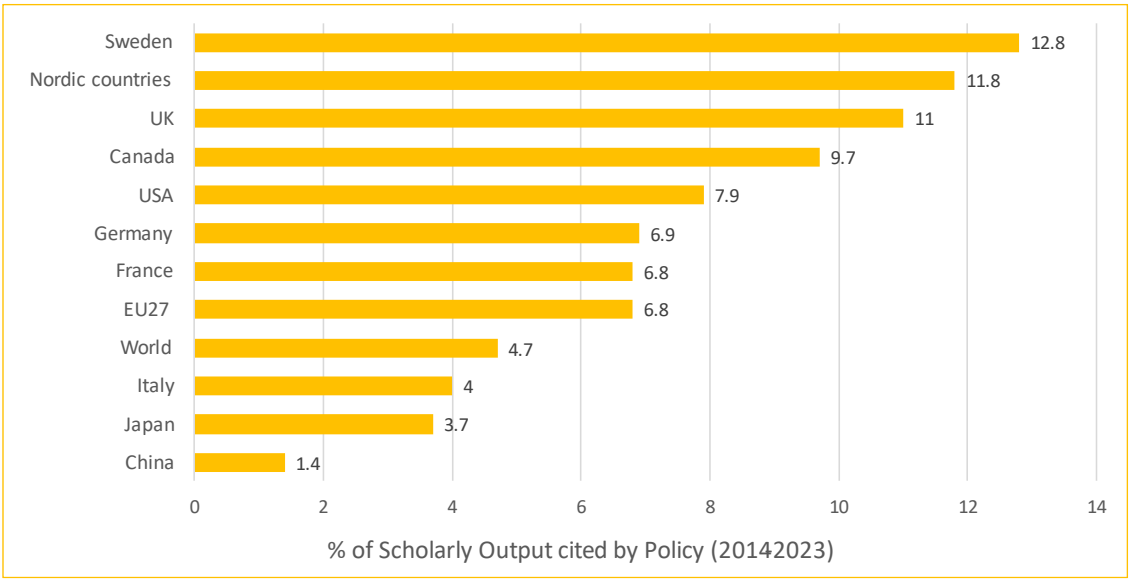
Figure 12 and 13: Scientific Articles Cited in Patents (as a Percentage of All Articles from the Country, Region, or Institution). Publications 2014-2023.

Swedish research is well cited by patents (4.9%), above the average levels for the Nordic region and the EU27. China has the highest percentage of research cited in patents, followed by the US, Japan and Germany.

Within Sweden, Karolinska Institutet, Lund University and Uppsala University have the highest shares of research cited in patents. A potential area for further analysis would be identifying the specific fields of research and entities that most frequently utilize Swedish scientific output in their patenting activities.

4 Impact of Science on Policy, Sustainability and Key Technologies

Beyond its scientific significance, Swedish research is making a tangible difference by influencing policy and contributing to real-world progress on global sustainability challenges.



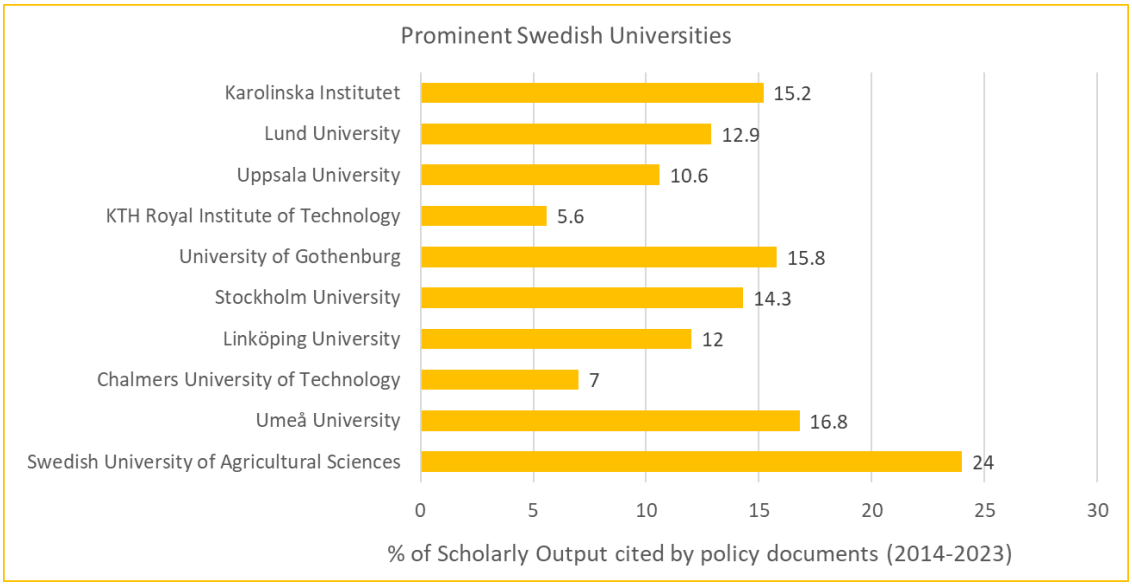


Figure 14 and 15: Scientific Articles Cited in Policy Documents (as a Percentage of All Articles from the Country, Region, or Institution). Publications 2014-2023.

To examine the impact of Swedish research on government policy worldwide, we can as a useful proxy analyse the percentage of scholarly output that is cited in policy documents. The results reveal that: **12.8% of Swedish articles published between 2014-2023 have been cited in policy documents so far – a figure almost twice the EU average, and higher than any countries or regions shown in the chart.** The Swedish University of Agricultural Sciences stands out, with 24% of its research cited in policy documents. Further analysis could explore which policy documents are citing Swedish research and in what contexts.

Sustainability

The **Sustainable Development Goals (SDGs)** are a set of global goals adopted by all United Nations member states in 2015. They represent a collective effort to achieve a better and more sustainable future for all by addressing critical issues facing our planet and its people. The SDGs address a wide range of interconnected issues, recognizing that solutions to one problem can contribute to solving others. They are designed to be a universal call to action for all countries, developed and developing alike, to work together in a global partnership. Figure 16 maps Swedish research to the SDGs and present the data normalized so that it can be compared with the average for the EU and in a global context. The mapping of scholarly output to SDGs (16 of 17 of SDGs) used is the widely accepted methodology developed by Elsevier for the Times Higher Education Impact rankings.

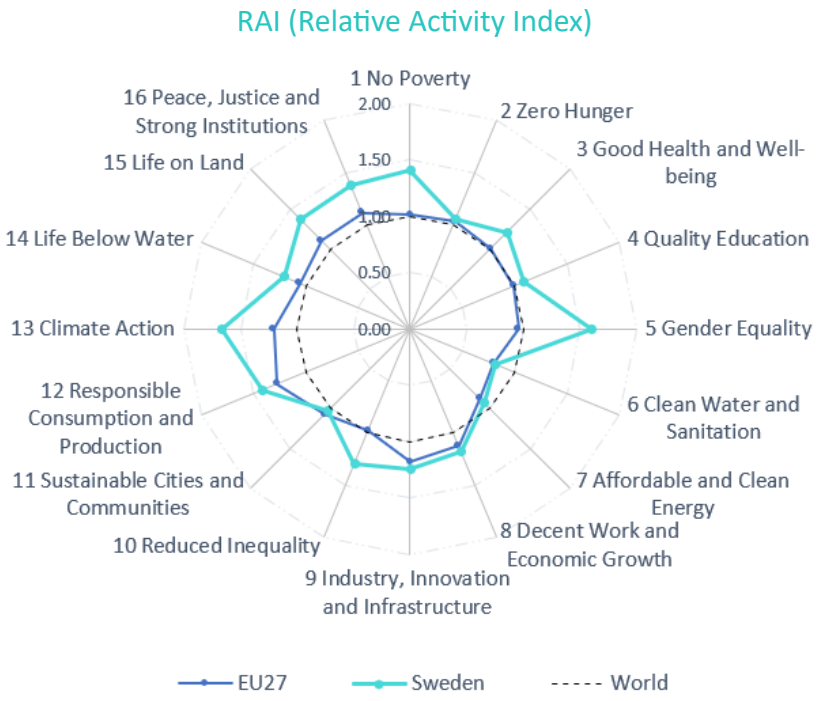


Figure 16: The light blue line shows Sweden's research relating to the 16 SDGs, compared to the World (Normalized to 1.0) and the EU27.

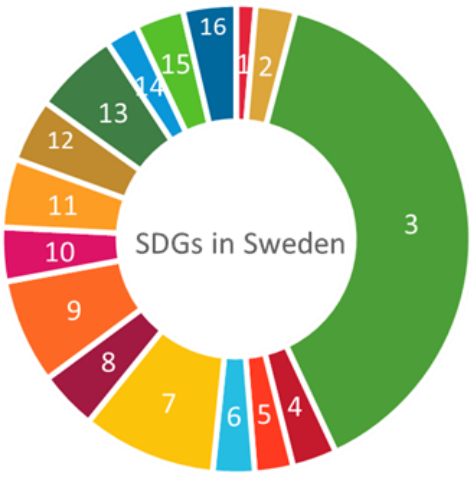


Figure 17: Shows the relative size of each SDG in Sweden.

Swedish research strongly contributes to the issues of sustainability we face today. Notably, 38% of Swedish research is related to at least one of the UN Sustainable Development Goals; this represents a higher share than both the global and EU (33%). Swedish research in sustainability-related topics is highly cited, with an overall FWCI 1.95.

As shown in Figure 16, **Sweden demonstrates higher research productivity (publishing more articles) in most SDGs compared to the EU average (normalized to 1.0) and, in fourteen out of the sixteen SDGs, compared to the world average.** Sweden is relatively more active than the EU average in all SDGs, particularly in Gender Equality (Goal 5) and Climate Action (Goal 13). However, Sweden (along with the EU) lags behind global levels in Clean Water and Sanitation (Goal 6) and Affordable and Clean Energy (Goal 7) – fields where China leads in research output.

Key Strategic Technologies

Globally, many countries –including Sweden– have identified several technologies of national strategic importance both in terms of boosting competitiveness as well as in terms of securing global supply chains. This section examines four key technologies highlighted in the Swedish Research Bill among strategic areas: **Artificial Intelligence**, **Quantum Technologies**, **Semiconductor Technologies**, and **Clean Energy**. While methodologies for defining research areas can vary, the definitions used in this analysis are available upon request.

Summary Observation on Four Technology Areas

Artificial Intelligence

Swedish research on Artificial Intelligence (AI), despite relatively modest in volume, demonstrates a high impact. While the United States has historically led AI research and remains a market leader with numerous applications from companies like OpenAI, Meta, and Google, China has surpassed it in research volume for over a decade and continues to drive innovation e.g., with companies like DeepSeek, Alibaba and Tencent. India has also emerged as a major player, now ranking third globally in research output after China and the USA. Asia dominates AI research globally, while Europe lags behind. Within Europe, Sweden ranks among the most prolific countries per capita. Swedish AI research exhibits high citation rates, indicating high quality and global relevance. The country boasts strong industry-academia collaborations, with 11.7% of AI research involving industry partners, significantly exceeding the EU average. KTH is the leading Swedish institution in AI research, publishing twice as many articles as Chalmers. Sweden actively collaborates internationally, with 65.4% of its AI research involving foreign partners, comparable to the UK and slightly lower than France. The USA is Sweden's most frequent international collaborator (notably Harvard and Stanford University) followed by China and the UK. Additionally, 8.4% of Sweden's AI research is cited in patents, exceeding both the Nordic (7.9%) and EU27 (7.0%) averages, underlining its importance for innovation.

Quantum Technologies

In the emerging field of Quantum Technologies (quantum computing/simulation, quantum communication and quantum sensing/metrology), Sweden ranks 27th globally, with a relative activity (RAI) below the global, EU, and Nordic averages. China, again in terms of scholarly output dominates the field, followed by the EU and the USA. Germany and Japan exhibit the highest relative activity. **Despite modest research volume, i.e. around 450 quantum-related papers between 2019 and 2023, Swedish research shows a strong field-weighted citation impact (FWCI 2.30),** indicating international recognition for quality. Sweden is also highly collaborative, with 77.4% of its quantum research involving international partnerships—higher than any G7 country. Industry collaboration is robust, involving global players such as IBM and domestic industry like Ericsson (quantum communication), further solidifying Sweden's role in innovation in this key technology. Patents cite 10.1% of Swedish quantum research, comparable to France (10.2%), slightly below the Nordic (10.5%), and above the EU27 (9.5%) averages, highlighting its relevance to knowledge transfer and technological applications.

Semiconductors

The global semiconductor research landscape has undergone a dramatic shift over the past decade. In 2012, Europe produced twice the research output of China, and the USA also outpaced China. Since 2023, China dominates in terms of scholarly output, publishing twice as much as Europe and three times as much as the USA. In terms of relative activity (RAI), Taiwan, the undoubted industry leader in advanced semiconductor fabrication technologies (think TSMC) leads globally, followed by South Korea, India, China, and Japan. **Sweden ranks 10th in Europe and contributes 4.5% of the European Economic Area's semiconductor research, accounting for less than 1% of global output.** Sweden's relative activity (RAI 0.77) exceeds the Nordic average but aligns with the EU average. While semiconductor research in Sweden is less active than perhaps expected, it is highly cited (FWCI 1.53), indicating significant quality and impact. Collaborative efforts with industry (10.6%) and a strong partnership, notably historically with Ericsson and ABB, highlight Sweden's capacity to drive innovation in this critical field. Power semiconductors, notably Silicon Carbide SiC technologies has also been a strong area in Sweden. Sweden's semiconductor research is also impactful in patents, with 10.3% of publications cited—ranking above the Nordic average (9.6%) and EU27 (9.7%), reflecting an effective knowledge transfer system.

Clean Energy

In examining SDG 7 (Affordable and Clean Energy), a distinct global trend emerges. China dominates research output in this area, with the EU and the USA struggling to keep pace. **Within Europe, while Germany and the UK produce the largest number of publications, Sweden stands out in relative activity (RAI) and ranks among the leaders in citation impact.** Sweden's academic-corporate collaborations in sustainable energy research are particularly notable, with 10% of its publications involving industry partners—significantly higher than its overall academic-corporate collaboration average of 7.5%. Patent citations for Sweden's clean energy research (6.6%) exceed Nordic (5.9%) and EU27 (5.2%) averages, highlighting its contribution to innovation.

Artificial Intelligence

AI Publications

Sweden ranks 28th globally in AI research output and exhibits a lower relative activity (RAI) than global, EU, and Nordic averages. Despite this modest contribution in volume, Sweden's AI research is recognized for its quality, as indicated by an FWCI of 2.33. This high citation impact underscores the global visibility and relevance of Swedish AI research. Globally, the AI landscape is dominated by China and the USA, while India has emerged as a prolific and highly active contributor (RAI 2.02), showcasing an impressive trajectory in AI research growth.

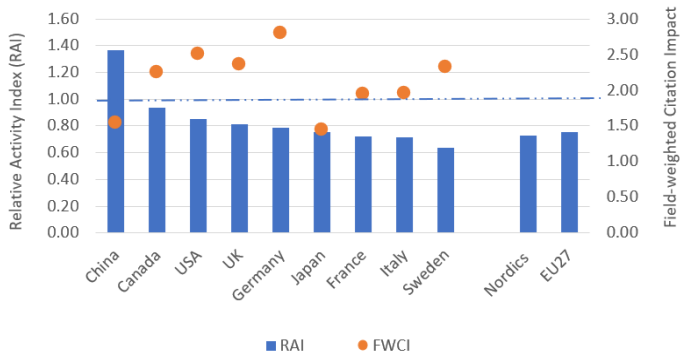


Figure 18: Sweden AI research volume and activity: comparison with G7+China. Publications 2019-2023.

Academic-Corporate Collaborations

Sweden leads among comparators in academic-corporate co-publications in AI, with 11.7% of AI research publications involving joint efforts between academia and industry. This is significantly higher than the EU average of 4%, and outpaces collaboration levels in all G7 countries and China. Notable corporate collaborators include Ericsson, AstraZeneca, ABB Group, Volvo Car Corporation, Microsoft and Alphabet, among others.

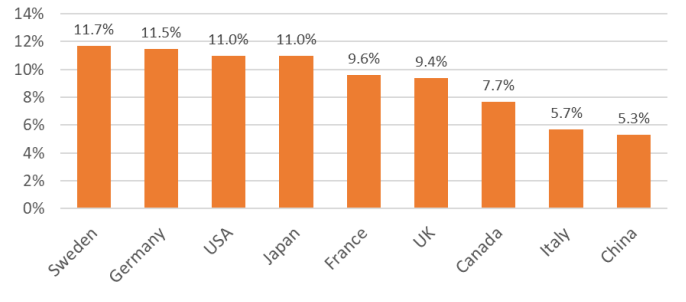


Figure 19: Sweden AI academic-corporate collaboration: comparison with G7+China. Publications 2019-2023.

Patent Citations

The United States leads in AI research cited by patents, with 11.6% of its output receiving patent citations, followed by China at 9.9%. Sweden, at 8.4%, is ahead of the Nordic average (7.9%) and the EU27 (7.0%).

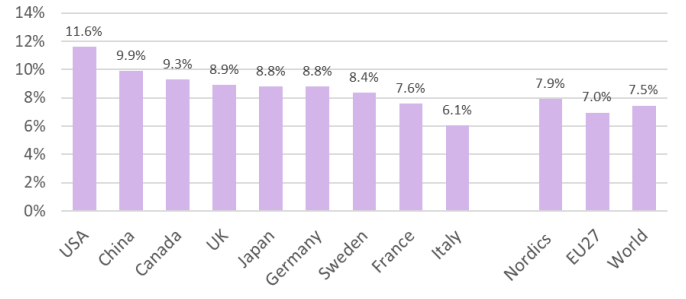


Figure 20: Sweden AI patent citations: comparison with G7+China. *Publications 2014-2023.*

International Collaboration

Sweden's research is highly international, with 66% of all Swedish research involving at least one foreign partner. In AI, the trend is similar, with 65.4% of research being internationally collaborative – comparable to the UK and slightly lower than France. The USA is the most prolific partner of Sweden in AI research, followed by China and the UK.

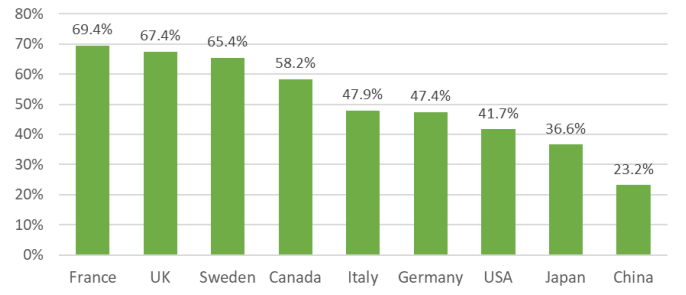


Figure 21: Sweden AI international collaboration: comparison with G7+China. Publications 2019-2023.

Quantum Technologies

Quantum Technologies publications

Between 2019 and 2023, Sweden produced 450 publications directly related to Quantum Technologies. Although this places Sweden 27th globally, the impact of these publications is significant, as evidenced by a citation impact (FWCI 2.30) that surpasses most countries and far exceeds Sweden's overall research average. This underscores the strong reputation of Swedish research in this niche area.

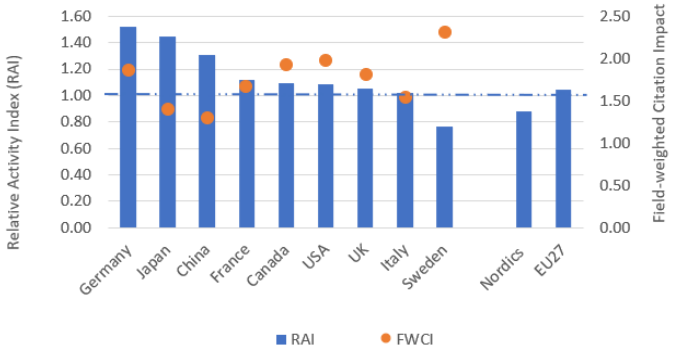


Figure 22: Sweden quantum technology research volume and activity: comparison with G7+China. Publications 2019-2023.

Academic-Corporate Collaborations

Sweden's collaborative strength extends into Quantum Technologies, with 11.3% of publications involving partnerships between academia and industry. IBM emerges as a key corporate collaborator, alongside Ericsson, highlighting Sweden's ability to integrate global expertise into its research ecosystem. International collaborations further amplify the impact of Swedish contributions in this field

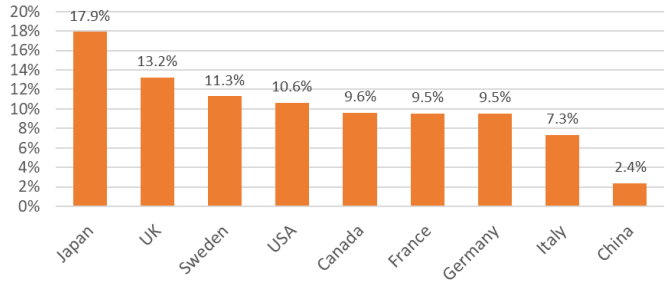


Figure 23: Sweden quantum technology collaboration: comparison with G7+China. Publications 2019-2023.

Patent Citations

Citations in patents are dominated by research from the United States and Canada. However, Swedish publications hold their ground, with 10.1% of quantum research cited in patents – slightly below the Nordic average (10.5%), and above the EU27 average (9.5%). This demonstrates Sweden's strong contribution to knowledge transfer.

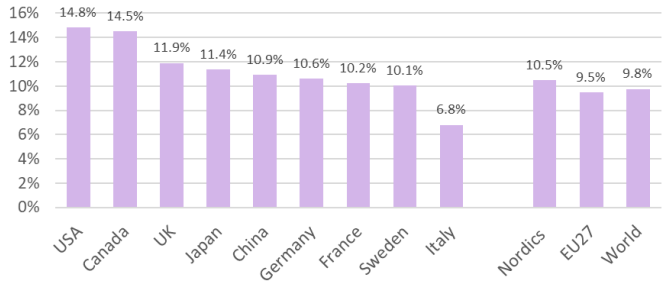


Figure 24: Sweden quantum technology patent citations: comparison with G7+China. Publications 2014-2023.

International Collaboration

Sweden's research is highly international, with 66% of all Swedish research involving at least one foreign partner. In Quantum Technologies, Sweden is even more internationally collaborative, with 77.4% of research involving foreign partners – higher than any G7 country. Germany is Sweden's most significant partner in Quantum Technologies research, followed by the USA and China.

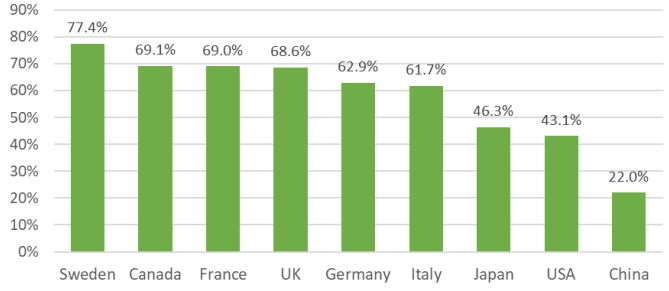


Figure 25: Sweden quantum technologies international collaboration: comparison with G7+China. Publications 2019-2023.

Semiconductor Technologies

Semiconductor publications

Sweden's semiconductor research output remains modest, accounting for 4.5% of European publications and less than 1% of global output between 2019 and 2023. However, the quality of Swedish research is notable, with a citation impact (FWCI 1.53) above the global average. While Sweden's Relative Activity Index (0.77) trails the EU average (0.79), it aligns closely with other Nordic nations.

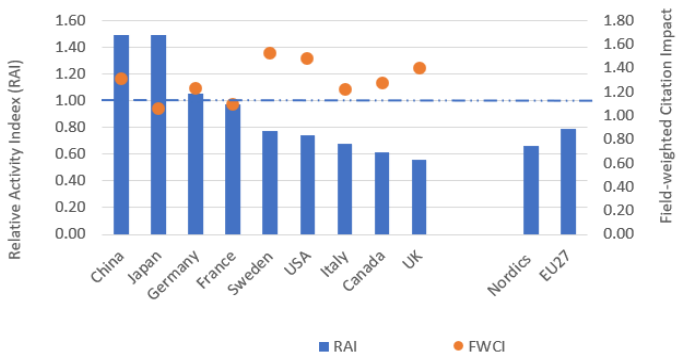


Figure 26: Sweden and comparators semiconductors research volume and activity: comparison with G7+China. Publications 2019-2023.

Academic-Corporate Collaborations

As with AI and Quantum Technologies, Sweden excels in academic-corporate collaboration in semiconductors, with 10.6% of publications co-authored by academic and industry partners. Ericsson is Sweden's most prominent corporate collaborator in this space, further emphasizing the strategic alignment between research and industrial applications. Other key collaborator includes ABB Group and IRnova, among others.

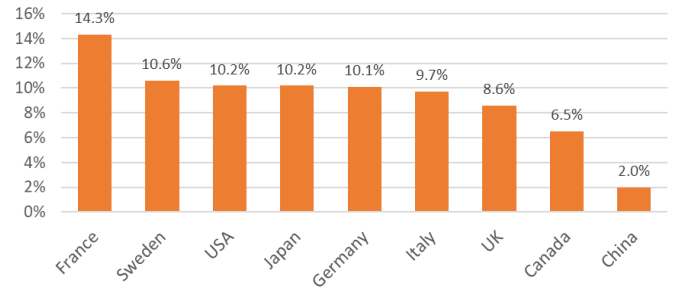


Figure 27: Sweden and comparator semiconductors academic-corporate collaboration: comparison with G7+China. Publications 2019-2023.

Patent Citations

Key technology research generally performs better in terms of patent citations compared to overall research, and this holds true for Sweden as well. Semiconductor research, in particular, stands out for being highly cited in patents, reflecting a well working knowledge transfer system.

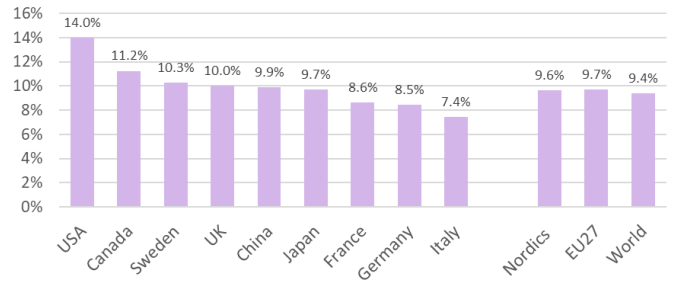


Figure 28: Sweden and comparators semiconductors patent citations: comparison with G7+China. Publications 2014-2023.

International Collaboration

Sweden's research is highly international, with 66% of all research involving at least one foreign partner. In Semiconductor Technologies, this collaboration is even more pronounced, with 77.3% of research involving foreign partners—higher than any G7 country. China is Sweden's most significant partner in Semiconductor research, followed by Germany and the United States.

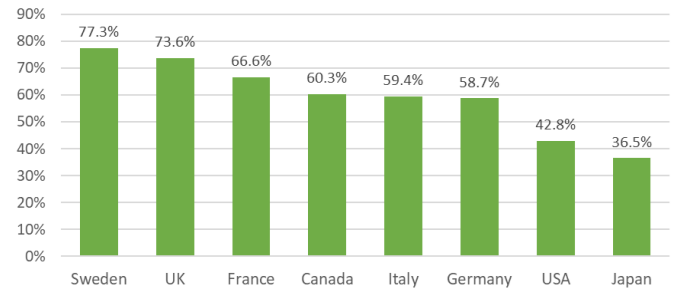


Figure 29: Sweden and comparators semiconductors international collaboration: comparison with G7+China. Publications 2019-2023.

Clean Energy

Clean Energy publications

Sweden's contribution to Clean Energy research is modest in volume but impactful, with an FWCI of 1.78. Its RAI is 0.94—below the Nordic average (1.11) but above the EU average (0.88). Globally, China is the most prolific contributor, dominating both in volume and relative activity, while all G7 nations fall below an RAI of 1.00. Beyond the G7, India is emerging as a major player, ranking highly in both research output and relative activity (1.51). Within the Nordic region, Denmark leads in relative activity (1.25), followed by Norway (1.20) and Finland (0.95).

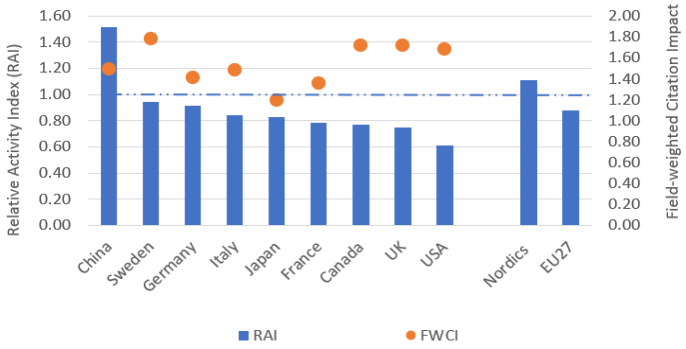


Figure 30: Sweden clean energy research volume and activity: comparison with G7+China. Publications 2019-2023.

Academic-Corporate Collaborations

Sweden's Clean Energy research demonstrates strong academia-industry collaboration (7.6% on average vs 4% EU average), with 10% of publications involving corporate partners—higher than any G7 country or China. Of Sweden's 450 papers, 66 were co-authored with both academic and corporate institutions, with IBM and Ericsson as the most prominent collaborators. In the global space the most active corporates are IBM, Nippon Telegraph & Telephone, Microsoft and Alphabet.

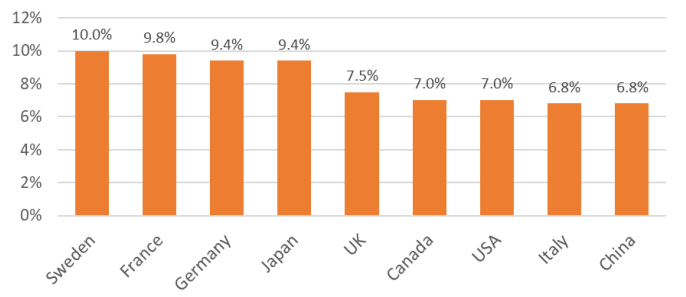


Figure 31: Sweden clean energy academic-corporate collaboration: comparison with G7+China. Publications 2019-2023.

Patent Citations

The United States (9.6%) and China (9.1%) lead in patent citations for Clean Energy research. Sweden's research, with 6.6% of publications cited in patents, ranks as the highest in Europe among G7 members.

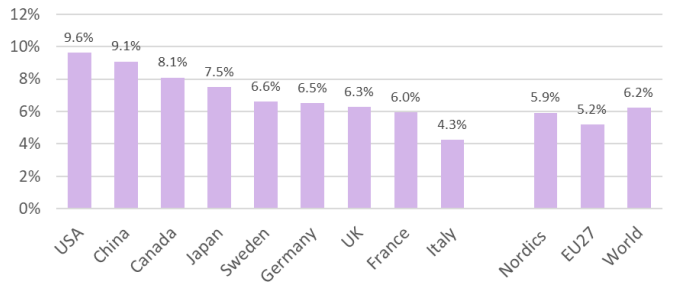


Figure 32: Sweden clean energy patent citations: comparison with G7+China. Publications 2014-2023.

International Collaboration

Sweden's research is highly international, with 66% of all research conducted in collaboration with at least one foreign partner. In Clean Energy, this figure is even higher, with 68% of Swedish publications involving international partners. Only the UK has a higher level of international collaboration in Clean Energy research. Sweden's most prolific partner in this field is China, followed by Germany and the USA.

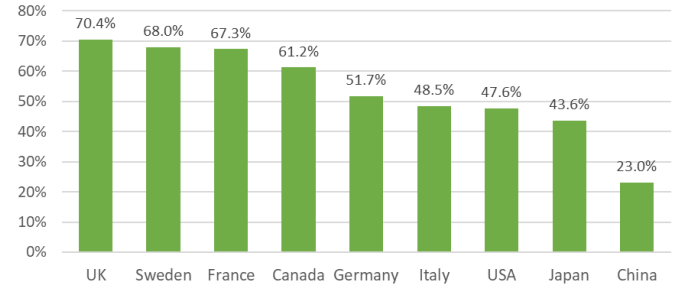


Figure 33: Sweden clean energy international collaboration: comparison with G7+China. Publications 2019-2023.

5 Which disciplines and universities contribute the most to Swedish success?

By examining the size and citation levels of different disciplines within Swedish research, we are able to gain deeper insights into the Sweden's scientific strengths. Clinical & Health is not only the largest discipline but also the highest cited. Social Sciences are second in term of citation levels.

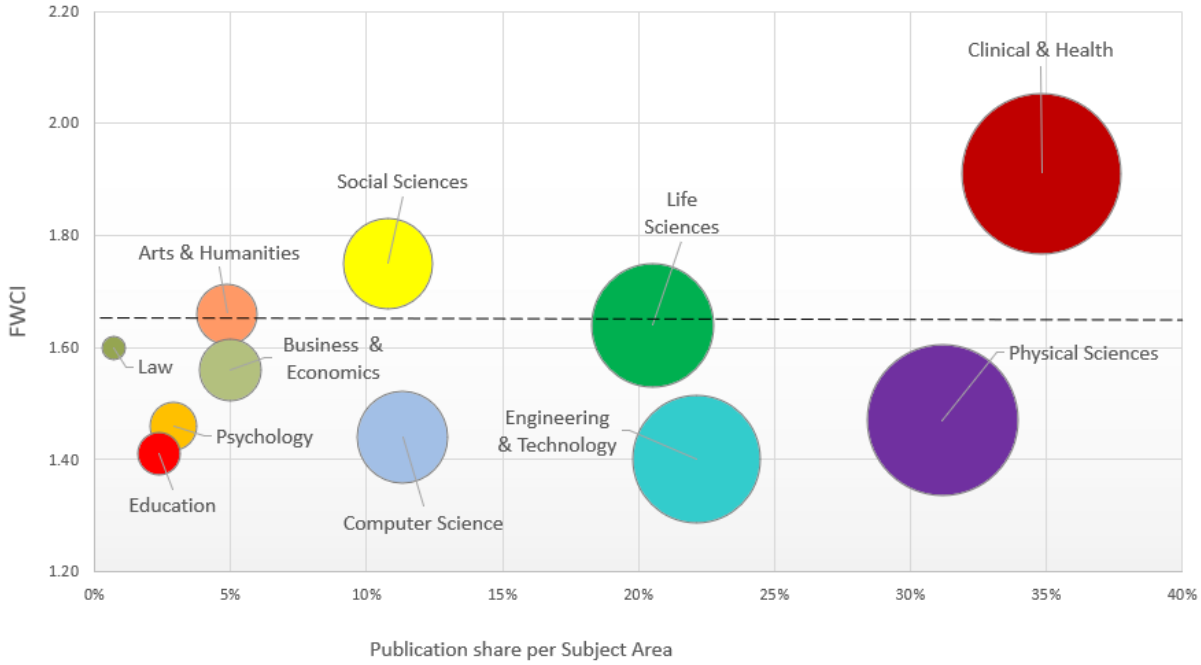


Figure 34: Relative contribution per discipline to Swedish Science, in term of volume, share of country total output and FWCI (Times Higher Education subject areas).

The overall research impact, measured as Field-Weighted Citation Impact (FWCI) for Swedish research published in the five-year period 2019-2023, stands at 1.65 (represented by the horizontal dotted line in the above chart). A FWCI of 1.65 means Swedish research received 65% more citations than the global benchmark.

Looking at individual fields of study, **Clinical and Health is both the most impactful (FWCI 1.91) and the largest,** emphasizes the significant contribution of medical research to Sweden's overall scientific performance. Physical Sciences is the second largest discipline, with an FWCI of 1.47 – which is still high comparing to most fields, but below the overall average in Sweden.

In contrast, across the EU, the highest volume of research is in Physical Sciences (with an average of FWCI 1.12), while Clinical and Health ranks second (with an average of FWCI 1.22).

Most prolific universities in Sweden

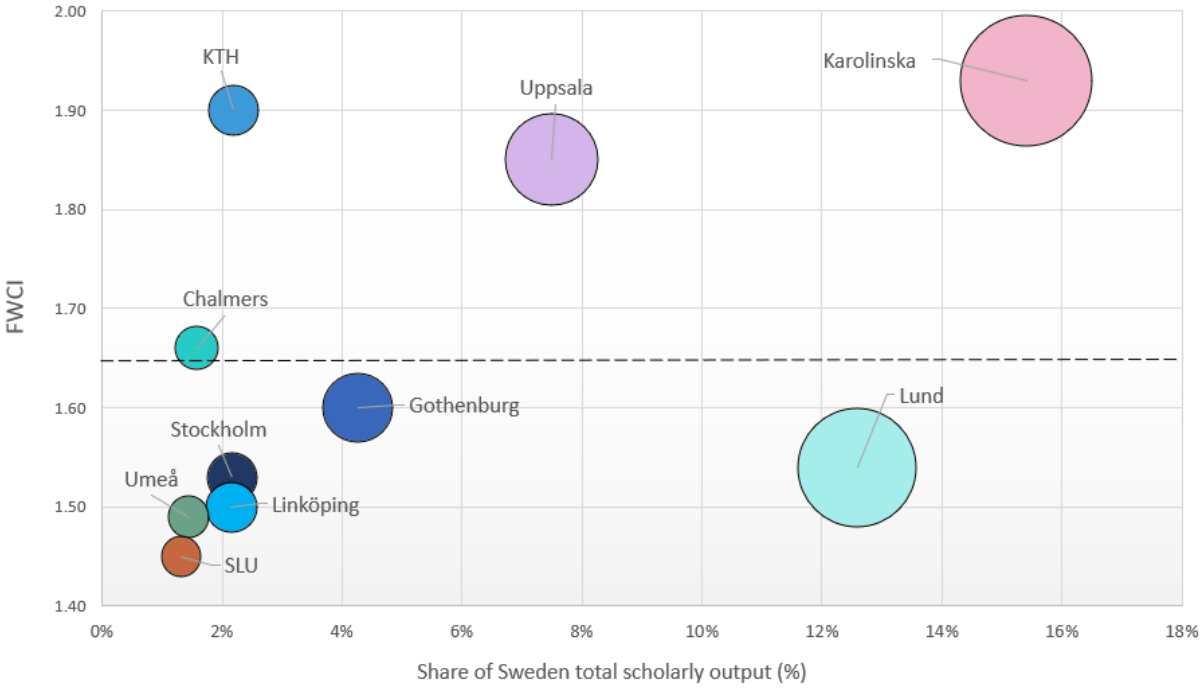


Figure 35: Most prolific Swedish universities, output (as a % of country total) and the scientific impact (in FWCI). The size of the bubble represents volume of research at the universities.

Among Swedish universities, Karolinska leads in productivity, boasting almost 40,000 research articles published between 2019 and 2023. Lund University follows, with just over 31,000 publications during the same period. Uppsala ranks third, with approximately 18,600 publications, while Gothenburg is fourth, with over 10,000 publications. KTH, Stockholm University and Linköping are all similar in research output with over 5,000 publications each between 2013 and 2023. Chalmers follows closely, with just under 4,000 publications.Umeå University has contributed 3,500 papers, while the Swedish University of Agricultural Sciences has published 3,300.

Karolinska is also the highest-impact institution, achieving a Field-Weighted Citation Impact (FWCI) of 1.93 and it's closely followed by the small but impactful KTH (FWCI 1.90). Uppsala University ranks third in citations (FWCI 1.85) and is followed by Chalmers (FWCI 1.66) and Gothenburg (FWCI 1.60). Lund (FWCI 1.54) and Stockholm have similar citation impact (FWCI 1.53), while Linköping (FWCI 1.50), Umeå (FWCI 1.49), and the Swedish University of Agricultural Sciences (FWCI 1.45) complete the list.

For reference, the dotted line is a reminder of Sweden's average (FWCI 1.65). The EU average is FWCI 1.15 well below each of the universities shown above.

Top **Academic Collaborators** of the three most research-intensive universities in Sweden

with Karolinska		Co-authored publications	FWCI
SWE	Uppsala	7,268	1.73
SWE	Stockholm	4,710	1.81
SWE	KTH	3,405	1.86
SWE	Gothenburg	3,010	1.92
SWE	Lund	2,994	1.77
SWE	Linköping	2,154	1.87
FIN	Helsinki	2,098	2.19
DKN	Copenhagen	2,066	2.93
SWE	Umeå	1,876	1.63
USA	Harvard	1,818	4.24

with Lund		Co-authored publications	FWCI
SWE	Karolinska	3,240	2.93
DKN	Copenhagen	3,073	3.35
SWE	Uppsala	2,744	3.03
SWE	Gothenburg	2,499	2.95
BRA	São Paulo	1,819	3.10
USA	Pennsylvania	1,747	3.29
USA	Columbia	1,728	2.92
USA	Michigan, Ann Arbor	1,655	3.05
NOR	Oslo	1,602	4.08
SWE	Stockholm	1,571	3.56

with Uppsala		Co-authored publications	FWCI
SWE	Karolinska	7,535	2.22
SWE	Stockholm	4,830	2.31
SWE	KTH	4,459	2.10
SWE	Lund	2,744	3.03
SWE	Gothenburg	1,878	3.09
GBR	Oxford	1,821	4.39
DKN	Copenhagen	1,779	4.65
USA	Harvard	1,691	5.44
SWE	Umeå	1,441	2.88
NOR	Oslo	1,332	4.00

Figure 36: The above tables show the most prolific academic collaborators of the 3 most research-intensive Swedish universities (2019-2023 publications).

Top **Corporate Collaborators** of the three most research-intensive universities in Sweden

with Karolinska		Co-authored publications	FWCI
GBR	AstraZeneca	446	3.68
DKN	Novo Nordisk	164	3.54
CHE	MOH Holdings Pte Ltd.	151	6.7
USA	GlaxoSmithKline	142	13.1
USA	Johnson & Johnson	142	8.31
GBR	Pfizer	136	9.76
USA	Novartis	120	10.63
KOR	Samsung	115	11.43
FIN	Fimlab Laboratories	106	6.63
USA	Merck	106	11.34

with Lund		Co-authored publications	FWCI
CHN	China National Nuclear Corp	237	1.98
DKN	Novo Nordisk	166	4.09
GBR	AstraZeneca	104	369
KOR	Samsung	66	7.94
SGP	MOH Holdings Pte Ltd.	64	10.58
SWE	Ericsson AB	59	1.18
USA	AbbVie	57	4.91
USA	Eli Lilly	55	23.69
USA	Genentech	55	6.98
ISL	deCODE Genetics	54	5.13

with Uppsala		Co-authored publications	FWCI
GBR	AstraZeneca	318	3.89
DKN	Novo Nordisk	97	5.3
USA	GlaxoSmithKline	84	12.75
SWE	Antaros Medical	83	1.16
GBR	Pfizer	66	4.81
USA	Genentech	65	7.43
KOR	Samsung	62	7.66
USA	AbbVie	61	6.85
USA	Leidos Inc	57	5.75
ITA	EURAC Research	56	4.39

Figure 37: The above tables show the most prolific corporate collaborators of the 3 most research-intensive Swedish universities (2019-2023 publications).

Analysing the 10 most prolific collaborations of Sweden's top three universities (Figure 36), several important points stand out:

- The three universities collaborate extensively with one another, with each ranking as a major collaborator for the other two.
- Most of Karolinska and Uppsala's top academic collaborators are within the national border, while Lund has a more international network, with six international and four national partners in its top ten. Notably, one of Lund's top partners is from the Global South (University of São Paulo, Brazil).

As discussed in Chapter 3, 7.6% of research in Sweden involves academic-corporate collaboration, with 84% of these collaborations being international. This is reflected in the corporate partnerships of Karolinska, Lund, and Uppsala (Figure 37), where we can see only Ericsson with Lund, and Antaros Medical with Uppsala. Karolinska's top corporate collaborators are all international (as defined by corporate headquarters). Lund again stands out for its diversity, with corporate collaborations spanning multiple regions, including Asia.

6 Conclusions

Despite its relatively small population of approximately 10.6 million (ranking 90th globally), Sweden achieves outsized global influence in science. Swedish research is highly international, widely cited, and characterized by robust academia-industry collaboration. With a focus on health, sustainability, and emerging technologies, Sweden consistently demonstrates leadership in impactful research areas and is frequently referenced in policy documents.

Over the past two decades, the global research landscape has undergone profound changes. China has seen a remarkable rise, with its share of global scholarly output increasing from 4% to an impressive 26% in 2023. Similarly, developing nations – particularly India – have made substantial contributions, with India overtaking the United Kingdom in terms of scholarly output. Meanwhile, the dominance of the US and Europe has decreased, with the US share falling from 28% to 18% and the EU27 share from 26% to 23%.

Despite these global shifts, Swedish research output has grown by 7.8% over the past five years. While this growth is modest compared to some emerging players, it exceeds that of the UK (6.2%), Germany (4.5%), and France (-0.7%) during the same period.

Sweden's academic success stems from two primary factors: international partnerships and cross-sector collaborations – particularly between academia and industry – which amplify its global reach and enhances its research impact far beyond its borders.

The influence of Swedish research further extends beyond the scientific community, making an impact on policymaking both nationally and internationally. **Swedish research is cited in policy documents across Europe and beyond at a rate higher than the average**, reflecting its policy relevance.

Additionally, Swedish research plays a significant role in key technology areas such as Artificial Intelligence (AI) and Quantum Technologies, as well as in research supporting the United Nations Sustainable Development Goals (SDGs). Although Sweden's activity in these areas remains relatively modest compared on a global scale, its contributions are nonetheless influential, as evidenced by high citation rates and impactful collaborations.

Building on Sweden's strong foundation in research excellence, three recommendations can help ensure that the country continues to thrive as a global research leader, adapting to the evolving dynamics of the international scientific landscape and addressing emerging challenges.

Deepening international collaboration should remain a key priority. Sweden's research impact is closely tied to its high level of international partnerships, with 66% of its scholarly output involving global collaborations – significantly above the EU27 and world averages. To sustain and enhance this advantage, Sweden should actively foster multilateral collaborations, notably in areas of strategic importance, such as sustainability, artificial intelligence, and clean energy. Responsible internationalization will be critical in this context, particularly given the heightened importance of research security in today's geopolitical climate.

Building on Sweden's strong foundation of academia-industry collaboration, further enhancing these partnerships will be essential to maintaining innovation leadership and economic competitiveness. With 7.6% of its scholarly output co-published with industry – outperforming any G7 nation – Sweden has established itself as a model for effective cross-sector collaboration. To sustain this success, continued efforts may focus on strategic technology areas such as those studied here: AI, quantum technologies, semiconductors, and clean energy, where global competitiveness requires ongoing investment and innovation.

Investing in strategic technologies and sustainability research will be critical for Sweden to retain its global leadership in impactful science. While Sweden has demonstrated strong academic performance across all technology areas analysed, its activity levels in these fields are relatively modest compared to global efforts. Roadmaps that align the efforts of academia, industry, and government will be essential for ensuring sustained growth and competitiveness, particularly in light of recent EU priorities, as outlined in the Draghi report. Furthermore, Sweden's strength in sustainability-related research offers an opportunity to integrate these efforts with industrial strategies and policymaking, creating a holistic approach that supports both societal and economic goals.

7 Academic Leaders' Perspectives

In this section, Swedish academic and policy leaders share their reflections on the findings presented in this report. We sincerely thank all contributors for sharing their valuable perspectives.

Andreas Göthenberg
Executive Director, STINT

In the current geopolitically polarized and complex landscape, it is essential to remember the significant value of responsible international academic cooperation. Not only does it enhance citation impact, but it can also contribute to economic development. International networks can also be leveraged for both soft power and diplomatic gains. Responsible international academic cooperation is required to tackle the global challenges we face. This report illustrates how internationalization impacts the overall performance of Swedish research and confirms that citation impact increases significantly when researchers in Sweden engage in international collaboration. I fully agree with the report that this is because international cooperation typically addresses topics of greater global interest and reaches a wider audience. According to the report, Sweden is performing well. However, I would also advocate for a higher degree of international research collaboration in the humanities and social sciences, as their importance is increasingly relevant in the volatile, uncertain, complex, and ambiguous world in which we live.

Katarina Bjelke
Director General, Swedish Research Council

The Elsevier Status report on "Sweden as a Science Nation" provides an overview of Sweden´s research performance, based on data from the Elsevier tools Scopus, SciVal and Overton. The report highlights the importance and quality of Swedish research in an international perspective, considering that Sweden is a relatively small country. Notably, Sweden's scholarly output is of high quality in several different research fields and has overall a high number of international research collaborations, as judged by the number of co-publications with authors from other countries.

Being the largest research funding agency in Sweden, besides funding research projects, the Swedish Research Council strives to continuously contribute to the development of conditions for research. The council´s development strategy for the coming years include:

- *Development of processes for research infrastructures. We need to find better ways to meet long-term national aspects of research infrastructure with a strategic national and international holistic perspective that is necessary for well-balanced priorities.*
- *Development of processes for systematic collaboration with HEIs as well as other research organizations, including industry and health care organizations. In connection with the government's new research policy bill, we have identified a need to coordinate necessary changes in the research system in order to strengthen the quality of Swedish research. This requires close cooperation with universities in particular, but also with other actors in the research system. In order for the cooperation to be conducted strategically and in a focused manner, a systematic working method will be developed.*
- *Development of strategies for international cooperation. We recognize the importance of international cooperation, something that is probably symptomatic of smaller countries in general. This applies in particular to collaborations within the EU, which is also something the government has underlined in its latest research policy position, but also beyond EU. At the same time, research is being conducted in a new geopolitical situation where security issues are becoming increasingly important. Therefore, working towards a responsible internationalization will be central in our work.*

A common denominator of all these areas is the long-term view required, which highlights the need for indicators and comparative data as a basis for analysis and for following progress and monitoring a changing environment. The Swedish Research Council publish biannually 'The Swedish Research Barometer' as well as evaluations and analyses on various topics related to the research system. We also welcome analysis of our system from external observers, like this report.

Hans Adolfsson

Vice-Chancellor, Stockholm University

Chair of the Association of Swedish Higher Education Institutions

Sweden as a science nation is an interesting report giving insights into the strengths of Swedish research in an international perspective. In comparison to other countries and regions, Swedish researchers tend to be more involved in international cooperations leading to more impactful publications. It is an important take home message that international engagement and cooperation lead to higher research quality and scholarly impact. With the geopolitical development over the last years, responsible global engagement will be of utmost importance for Sweden as a science nation to uphold this position. In addition, the report highlights how impactful cooperation between academia and industry is for Swedish research output. Furthermore, in contradiction to what is often believed, research findings from Swedish universities are frequently cited in worldwide policymaking. Overall, the report gives a good insight into where Swedish science is standing today and what should be considered when making strategical choices for future developments.

Emil Görnerup

Head of Research and Innovation Policy, Confederation of Swedish Enterprise

An excellent report that highlights the critical importance of internationalization and industry collaboration in science. It is clear the nations attracting and collaborating the very best will be more successful. Not only when it comes to scientific impact but also in future prosperity and competitiveness. From a European perspective, Sweden sits at the very top. This is a clear sign of strength.
Even though Sweden punches above its weight in scientific impact, the report also exposes a clear challenge when it comes to prioritization. Swedish AI and quantum technology research demonstrates a high impact, but the research volume is too modest. This exposes a possible threat to the critical mass of Swedish science in key strategic areas. Research has also become an important part of national security. Whether we like it or not, this places new challenges on internationalization.

Mats Benner

Professor of Science Policy, Lund University

Sweden is a country which clearly punches above its weight in the domain of science and innovation with salient features such as the Nobel Prize and a dazzling number of tech companies – but how good is it really? The report gives an excellent overview of Sweden's achievements but also some of the challenges it faces as a knowledge nation in an increasingly competitive world. Among its achievements are the rich and dense networks between academic institutions and companies (second to none in the world) and thoroughly internationalized universities as measured in cross-national R&D collaboration. Among its challenges are the need for more dedicated and concerted efforts in new technologies (such as quantum technology, clean energy and AI) where Sweden contributes less than would be expected. Overall, this is an eminent and highly useful analysis of a research system in good shape that cannot rest on its laurels.

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8 Definitions

This report is primarily based on Scopus data. Scopus is a large abstract and citation database launched in 2004 by Elsevier. It's one of the most prominent tools for researchers to find relevant academic publications, track citations, and analyse research trends. It covers 36,377 titles from 11,678 publishers. For more information see www.scopus.com.

Scholarly Output

Scholarly Output describes the products of scholarly activity, such as journal articles, books, book chapters, conference papers, and other forms of research dissemination. Throughout the report, when looking at collaborations, we use whole counting, meaning that collaborating entities on a scholarly publication all get a full count in terms of contribution.

Citation

A citation is a formal reference to earlier work made in document, frequently to other scholarly papers, but also to policy documents or patents. A citation is used to credit the originator of an idea or finding and is typically used to indicate that the earlier work supports the claims of the work citing it. The number of citations received by a paper from subsequently published papers and/or policy documents as well as patents, can be used as a proxy of the quality, importance, societal impact or economic translational value of the reported research.

FWCI (Field-Weighted Citation Impact)

Field-weighted citation impact (FWCI) is an indicator of mean citation impact and compares the actual number of citations received by a paper with the expected number of citations for papers of the same document type (article, review, or conference proceeding), publication year, and subject area. When the paper is classified in two or more subject areas, the harmonic mean of the actual and expected citation rates is used. The indicator is therefore always defined with reference to a global baseline of 1.0 and intrinsically accounts for differences in citation accrual over time, differences in citation rates for different document types (e.g., reviews typically attract more citations than research articles), as well as subject specific differences in citation frequencies overall and over time and document types. It is one of the most sophisticated indicators in the modern bibliometric toolkit.

Subject Area Classification

The subject area classification used in this report is based on the Journal Classification (ASJC) used in Scopus database, further condensed using the classification by Times Higher Education for their subject rankings. Scopus uses a hierarchical structure with 27 main subject areas. Times Higher Education THE agglomerate these 27 areas into 11 broader subject areas which makes comparison more manageable. Each publication can be linked to multiple ASJCs and this means that when you look at the breakdown by subject area a publication will be counted twice if it appears in a Scopus Source mapped to two categories, as SciVal doesn't use fractionalization. Therefore, for most entities in SciVal, if you add up the percentage values in the pie or donut charts, they will equal more than 100%. The percentages represent the relative publication share per subject area.

International Collaboration

International collaboration in this report is indicated by papers with at least two different countries listed in the authorship byline.

Academic-Corporate Collaboration

Academic -Corporate collaboration in this report is indicated by papers with at least one author from an academic institution and one author from a corporate institution listed in the authorship byline

RAI (Relative Activity Index)

Relative Activity Index is defined as the share of an entity's publications in a subject relative to the global share of publications in the same subject. A value of 1.0 indicates that an entity's research activity in a field corresponds exactly with the global activity in that field; higher than 1.0 implies a greater emphasis while lower than 1.0 suggests a lesser focus.

9 Data sources

Scopus

Scopus is a comprehensive, source-neutral abstract and citation database curated by independent subject matter experts who are recognized leaders in their fields. 91+ million items include data from 7,000+ publishers, 94,000+ affiliation profiles and 17+ million authors. Scopus puts powerful discovery and analytics tools in the hands of researchers, librarians, research managers and funders to promote ideas, people and institutions Delivering a comprehensive overview of the world's research output in the fields of science, technology, medicine, social sciences, and arts and humanities, our state-of-the-art search tools and filters help uncover relevant information, monitor research trends, track newly published research and identify subject experts. Worldwide, Scopus is used by more than 3,000 academic, government and corporate institutions and is the main data source that supports the Elsevier Research Intelligence portfolio.

SciVal

SciVal is a web-based analytics solution with unparalleled flexibility that provides access to the research performance of over 20,000 academic, industry and government research institutions and their associated researchers, output and metrics. SciVal allows users to visualize research performance, benchmark relative to peers, develop strategic partnerships, identify and analyse emerging research trends, and create uniquely tailored reports.

Overton

Overton is the world's largest searchable index of policy documents, guidelines, think-tank publications and working papers. Its database consists of more than 1.65 million policy documents, with data collected from 182 countries and over a thousand sources worldwide. These policy documents include white papers from international multilateral organizations, as well as guidelines from city councils, parliamentary transcripts and other classes of the so-called "gray literature." Around half of these documents make citations to academic or scholarly publications. More than 2 million distinct journal-based publications are cited by at least one policy document in the database.

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