Swedish Foundation for Strategic Research

ADC

30 March 2026

SSF Strategic Research Index (SRI)

Methodology Report

P.O. Box 70483, SE-107 26 Stockholm, Sweden Visiting address: Kungsbron 1, G7
Phone: +46 8 505 816 00 E-mail: info@strategiska.se www.strategiska.se

Table of Content

1 Introduction

The Swedish Foundation for Strategic Research (SSF) is an independent organisation with the objective to fund research within technology, medicine, and natural science with the aim of strengthening Sweden's long-term competitiveness. The research must be at the forefront internationally and relevant for meeting the challenges of industry and society. This is what SSF means by "strategic research".

This report describes the methodology behind the Strategic Research Index (SRI) that has been initiated by SSF. The purpose is to focus attention on the value of strategic research for Sweden and to help Swedish Higher Education Institutions (HEI) and researchers to identify areas of strength and of development potential related to strategic research. The SRI has been developed by ADC (Amsterdam Data Collective) in close collaboration with SSF.

The SRI is a completely data-driven analysis of how HEIs conduct strategic research*, i.e.*, being both of excellent international scientific quality while also being beneficial to Swedish society. The method is to only use relevant indicators where objective data are publicly available. SSF has therefore selected ten indicators distributed across five categories: Science, Mobility, Attractiveness, Internationalisation, and Utilisation.

The SRI does not contain any qualitative analysis of research content, except that only HEIs that conduct significant research in Science, Technology, Engineering and Medicine are included. Both one-faculty and multi-faculty HEIs are included in their entireties*, i.e.*, the analysis of a HEI always covers all the HEI's faculties' data.

Available SRI resources include an easy-to-use web-based tool to list and histogram various HEI performance data. Some examples of screenshots from this web-tool are included below. The SRI web-tool can be accessed from: www.strategiska.se/sri

SSF can also provide researchers and analysts with access to the full SRI dataset (in Excel-format) for in-depth analysis. Please contact SSF by email under the subject "SRI dataset access" to: info@strategiska.se.

The next two pages show some example screenshots from the SRI web-tool to illustrate the SRI indicators, categories and HEI performance.

Overview

Export as PDF | How to use | About the SRI

SSF Strategic Research Index

The SRI is a tool to support Higher Education Institutions (HEIs) and researchers to identify areas of strength and of development potential related to strategic research.

SSF Strategic Research Index (SRI), 2024

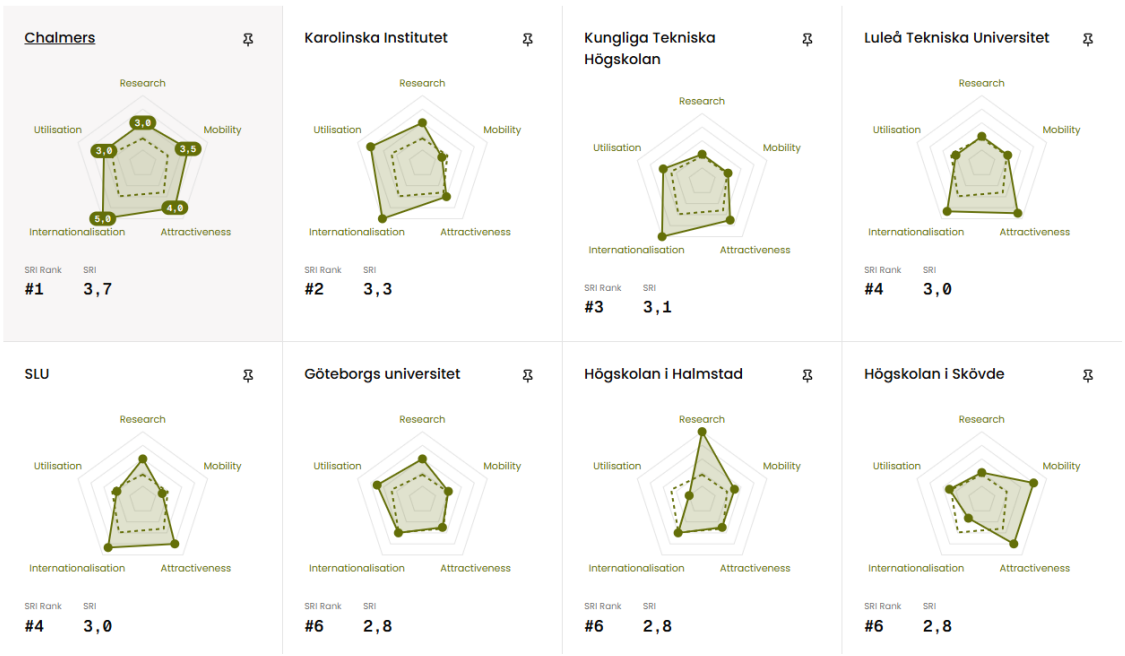
List View | Grid View | Filter HEIs | 2024 | Sort by SRI Rank | Categories | Reset

SRI Rank	Higher Education Institution	Research	Mobility	Attractiveness	Internationalisation	Utilisation	SRI
#1	Chalmers	3,0	3,5	4,0	5,0	3,0	3,7
#2	Karolinska Institutet						3,3
#3	Kungliga Tekniska Högskolan						3,1
#4	Luleå Tekniska Universitet						3,0
#4	SLU						3,0
#6	Göteborgs universitet						2,8
#6	Högskolan i Halmstad						2,8
#6	Högskolan i Skövde						2,8

SSF Strategic Research Index (SRI), 2024

List View | Grid View | Filter HEIs | 2024 | Sort by SRI Rank | Categories | Reset

Swedish HEI Average

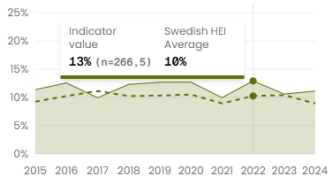


SRI indicator time-development

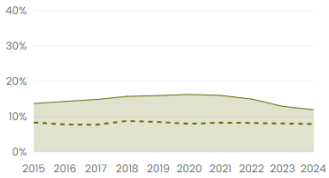
Scroll down to access the full multi-year dataset underlying the aggregated insights above, with detailed indicators and historical context.

Swedish HEI Average (n=number of datapoints)

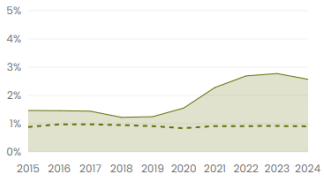
Research
Highly cited publications



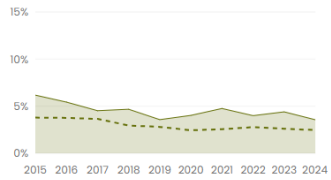
Mobility
Externally employed doctoral students



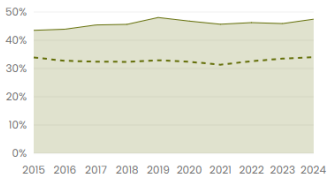
Mobility
Adjunct researchers



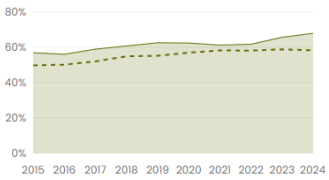
Attractiveness
Industrial funding



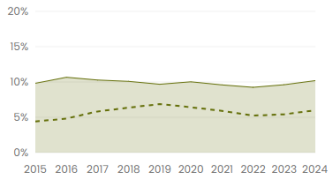
Attractiveness
External national funding



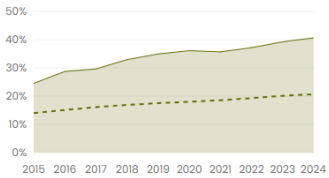
Internationalisation
Internationally co-authored publications



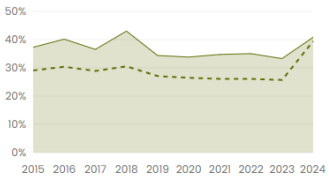
Internationalisation
External international funding



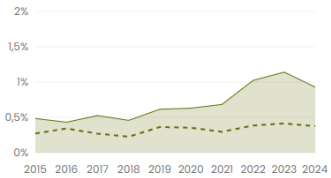
Internationalisation
International research staff



Utilisation
Non-academic collaborations



Utilisation
Publications cited in patents



Learn more about the Strategic Research Index, its methodology and the data behind it.

About the SRI

Learn how to navigate the SRI tool: from overview to detailed insights on individual Higher Education Institutions.

How to use the tool

2 Indicators and data sources

The Strategic Research Index (SRI) **method is to only use indicators where objective data are publicly available**, ensuring SRI credibility and repeatability. Certain desired indicators have therefore been excluded where no reliable data is available, e.g. number of HEI-related patents and spinout companies or HEI-multidisciplinarity, just to give a few examples.

Several indicators have been considered and analysed. The indicators ultimately included are based on established methods, using available data from credible sources that can be repeatedly analysed. The indicator selection has also been discussed in depth with several organizations that have long experience with similar analyses.

The SRI is based on data from **ten indicators**, defining **five main categories**:

The **categories** have been developed with the aim of representing a breadth of capabilities and output that are strongly linked to strategic research.

The **indicators** are derived from three primary data sources, each capturing a different dimension of research and innovation performance:

- Statistics from **the Swedish Higher Education Authority (UKÄ)** provide comprehensive information on Swedish higher education institutions, including size, staffing, education, and research activities.
- Publication data from **the Scopus database** offer a detailed view of scientific output and impact through metrics such as publication counts, citation patterns, and collaboration networks.
- Patent information from **the European Patent Organisation's Patstat** database enables analysis of innovation capacity and knowledge utilisation by linking research to patenting activity.

The categories and indicators are shown in Table 2.1 on the next page, followed by a full description of the methodology used to construct each indicator.

TABLE 2.1 OVERVIEW OF SRI CATEGORIES AND INDICATORS

	Description	Indicator	Motivation	Source
1. Research	The HEI conducts research with international impact.	**1.1 Highly cited publications [%]**	Indicates world-leading research with high impact (quality).	Scopus
2. Mobility	The HEI R&D staff mobility between societal sectors increases the likelihood that benefits will be created in the long term.	**2.1 Externally employed doctoral students [%]**	Indicates research that responds to the needs of industry.	UKÄ
		2.2 Adjunct researchers [%]	Indicates that research is conducted with a high level of understanding of societal conditions and needs.	UKÄ
3. Attractiveness	The HEI has high competence and a high level of trust.	**3.1 Industrial funding [%]**	Indicates that industry recognizes that the HEI understands industrial and societal needs.	UKÄ
		3.2 External national funding [%]	Indicates that the HEI has high competence and strong trust, enabling it to secure competitive funding.	UKÄ
4. Internationalisation	The HEI is internationally competitive.	**4.1 Internationally co-authored publications [%]**	Increases likelihood of high impact, also internationally.	Scopus
		4.2 External international funding [%]	Indicates that the HEI is internationally competitive as a research performer.	UKÄ
		4.3 International research staff [%]	The fact that international R&D staff choose to work at the HEI indicates that it is internationally recognized and competitive.	UKÄ
5. Utilisation	The HEI's research is needs-oriented and relevant from a societal perspective.	**5.1 Non-academic collaborations [%]**	Co-publications with industry and wider society indicate that the research is relevant for different actors in society.	Scopus
		5.2 Publications cited in patents [%]	Indicates that the research contributes to innovation and technological development.	Patstat

Notably, in 2024 Scopus updated how collaboration networks are stored or exported via an update in their affiliations variable data. This update affects the indicators related to collaborations and co-authorship.

2.1 Research

The Research category is composed of one indicator.

2.1.1 Highly cited publications [%]

Indicates world-leading research with high impact (quality).

A highly cited publication is defined in the analysis as a publication that belongs to the top 10% most cited publications within a research area and year. This is the same definition used by the Swedish Research Council in its Swedish Research Barometer reports. In accordance with the Swedish Research Council's method, the analysis includes only publications of the types *Articles* and *Reviews*. The share of highly cited publications is determined by calculating how many of a HEI's publications have enough citations to be among the top 10% most cited publications in their field.

TABLE 2.2 OVERALL PROCESS FOR IDENTIFYING HIGHLY CITED PUBLICATIONS; A DETAILED DESCRIPTION FOLLOWS BELOW.

Publication data	Download all publications from a university for a specific year from Scopus. In the Scopus data there is the variable "Cited by," which indicates how many citations a publication has received.
Comparison group	To assess whether a publication is highly cited, a global comparison group of publications within the same research field is needed. For this purpose, data for a comparison group are retrieved from Scopus, with classification of research field based on the Scimago Journal Rank (2022).
Calculation of percentiles	Calculate how many citations are required for a publication to be considered among the top 10 % most cited publications globally within each research field. This means that a publication must have at least as many citations as correspond to the threshold for the ninetieth percentile.
Share of top cited articles	Calculate what share of the specific HEI's publications belong to the top 10 % most cited publications in the world for each year.

Detailed description:

- Publication data are retrieved from the Scopus publication database for the selected HEIs and years.
- In Scopus, there is a variable "Cited by" that indicates how many citations a publication has accumulated.

- Publications are assigned to research areas based on the journal in which they are published. The research areas are defined from the Scimago Journal Rank list of journals. In total, 27 different research areas are used in the analysis; these are listed in the appendix.
- Once all publications have been assigned to one or more research areas, we calculate how many citations are required to be in the 90th percentile for each research area. The calculation is based on all publications worldwide within each research area for the given years.
- Publications that are in the 90th percentile are classified as highly cited.
- Journals in the Scimago Journal Rank list may be multidisciplinary. If a publication is classified as belonging to more than one subject (based on the journal), the publication is compared proportionally against the benchmark for each research area. For example, if a publication belongs to two research areas and is in the 90th percentile in one of them, half the publication is counted as highly cited.
- We benchmark against a global comparison group. This means that we compare publications from a specific HEI with all publications worldwide within the same research areas published in the same year.
- To enable fair comparisons between HEIs, we identify the share of all publications (Articles and Reviews) at the HEI that exceed the threshold value by normalizing by the HEI's total number of publications. This constitutes the variable "Highly cited publications [%]".

2.2 Mobility

The Mobility category is composed of two indicators.

2.2.1 Externally employed doctoral students [%]

A high share of externally employed doctoral students indicates research that responds to the needs of industry. The information is retrieved from UKÄ's statistical database and describes externally employed doctoral students expressed as full-time equivalents.

To enable comparisons between HEIs, the statistics are normalized by the total number of PhD students (full-time equivalents) at the HEI.

Researchers are defined here as persons found in UKÄ's employment categories: professors, senior lecturers, fixed-term merit positions, and other research and teaching staff. Persons in the category "other research and teaching staff" are included only if they have a doctoral-level education or equivalent. Furthermore, researchers in artistic subjects have been excluded, in line with UKÄ's definition.

2.2.2 Adjunct researcher [%]

A high share of adjunct researchers indicates that research is conducted with a strong understanding of societal conditions and needs. The number of adjunct researchers is stated as full-time equivalents. The statistics are not publicly available via UKÄ's statistics portal but have been produced by UKÄ specifically for the analysis based on the authority's register data.

To enable comparisons between HEIs, the statistics are normalized by the total number of researchers (full-time equivalents) at the HEI (see definition above).

2.3 Attractiveness

The Attractiveness category is composed of two indicators.

2.3.1 Industrial funding [%]

The share of industrial funding aims to capture the HEI's ability to attract funding from industry. For this indicator, funders have been classified along three dimensions: national–international, competitive–non-competitive, and industrial funding–other funding.

This indicator includes only competitive funding from companies in Sweden and abroad. The information is based on UKÄ's statistics on higher education finances. A detailed description of how funders were classified is provided in the appendix. Note that non-competitive funding is not included in this analysis.

To enable comparisons between HEIs, industrial funding is normalized against the total funding (excluding government core grants) that the HEI receives (%).

2.3.2 External national funding [%]

The share of external national funding aims to capture the HEI's ability to attract competitive funding from Swedish research funders. For this indicator, funders have been classified along three dimensions: national–international, competitive–non-competitive, and industrial funding–other funding.

This indicator includes only competitive funds from Swedish funders (not companies). The information is based on UKÄ's statistics on higher education finances. A detailed description of how funders were classified is provided in the appendix. Note that non-competitive funding is not included in this analysis.

To enable comparisons between HEIs, external Swedish funding is normalized against the total funding (excluding government core grants) that the HEI receives (%).

2.4 Internationalisation

The Internationalisation category is composed of three indicators.

2.4.1 Internationally co-authored publications [%]

Internationally co-authored publications describe the extent to which the HEI publishes together with foreign organizations. Internationally co-authored publications have been identified as important for high scientific impact. The data are based on the HEI's publications identified through Scopus. Through the database, the organizations linked to each individual publication are identified. The organizations are then classified as either Swedish or international. Based on this, the share of publications involving international collaboration can be calculated.

Detailed description:

- Publication data are retrieved from the Scopus publication database for the selected HEIs.
- In Scopus there is a variable "Affiliations" for each publication. The affiliations variable contains information about which organizations the authors of the publication are affiliated with. All organizations are also linked to a country.
- Since a publication can have multiple affiliated organizations, a list of all affiliated organizations for all publications from the HEI is compiled for each year.
- The identified organizations are then classified as either Swedish or foreign.
- The affiliated authors and organizations are then linked back to the publication. A publication with at least one foreign-affiliated author is counted as international.
- The share of publications with internationally co-authored publications is calculated by normalizing the number of publications with at least one international affiliation by the total number of publications from the respective HEI (%).

2.4.2 External international funding [%]

The share of external international funding indicates that the HEI is internationally competitive as a research organisation. For this indicator, funders have been classified along three dimensions: national–international, competitive–non-competitive, and industrial funding–other funding. This category includes only competitive funding from foreign funders (not industry). The information is based on UKÄ's statistics on higher education finances. A detailed description of how funders were classified is provided in the appendix. Note that non-competitive funding is not included in this analysis.

To enable comparisons between HEIs, external international funding is normalized against the total funding (excluding government core grants) that the HEI receives (%).

2.4.3 International research staff [%]

The share of internationally recruited researchers indicates what proportion of the research staff at the HEI has an international academic background. The ability to recruit international R&D staff indicates that the HEI is competitive in an international context.

The statistics are retrieved from UKÄ, where the definition of internationally recruited is researchers with only foreign degrees. Researchers are defined here as persons found in UKÄ's employment categories: professors, senior lecturers, fixed-term merit positions, and other research and teaching staff. Persons in the category "other research and teaching staff" are included only if they have a doctoral-level education or equivalent. Furthermore, researchers in artistic subjects have been excluded, in line with UKÄ's definition.

The data have been produced by UKÄ and correspond to the data published publicly in UKÄ's statistics database, with the difference that the data used for the indicator are stated as full-time equivalents. To normalize the results, internationally recruited researchers are expressed as a share of the total number of researchers at the HEI in % (see definition above, stated as full-time equivalents).

2.5 Utilisation

The Utilisation category is composed of two indicators.

2.5.1 Non-academic collaborations [%]

Non-academic collaboration refers to the share of co-publications the HEI has with people employed by non-academic organizations, both within Sweden and internationally. Co-publications with actors outside academia indicate that research is relevant to industry and society.

To identify the share of non-academic collaboration, publication data are collected via Scopus. From the database, the organizations that the authors are affiliated with are identified.

To classify whether organizations are academic or not, several steps are carried out. In this context, only universities and university colleges are counted as academic organizations. The starting point of the process is to identify academic institutions and then treat the residual as the basis for analysing non-academic collaboration. Identification of academic organizations takes place in two steps.

- First, academic organizations are identified through keywords. In this step, organizations with purely academic keywords (for example "university", "university college") are identified and classified as academic.

- Next, the list of organizations is matched against a database (Research Organization Registry) of known academic institutions. Organizations identified via matching against the database are classified as academic institutions.

The resulting list of classified organizations is used to identify which article authors represent non-academic organizations. The number of external article authors (not affiliated with the HEI) who represent non-academic organizations is summed and constitutes the basis for the indicator "non-academic collaboration". To enable comparisons between HEIs, the indicator is normalized by the total number of unique external co-authors identified via the HEI's publications (%). This constitutes the indicator "share of non-academic collaboration".

Detailed description of the classification of non-academic organizations:

- Publication data are retrieved from Scopus for the selected HEIs and for the years of interest.
- In the Scopus data there is a variable "Affiliations" for each publication. Affiliations contain which organizations are linked to a publication (a publication can have several affiliations).
- A list of affiliated organizations ("the organization list") stated in the publications is compiled.
- Categorization of organizations (Swedish as well as international) as academic is done in two steps.
- In the first step, classification of organizations in the "organization list" is done using keywords. The words used are purely academic and partial matches are tolerated. The following words are used to classify academic organizations: Uni, Högskol, KTH, Karolinska Institut, Högskola, VCU, Chalmers, Academic, College, Academy, Postgraduate, and Post graduate. Organizations matching the keywords are classified as academic.
- In the second step, organizations remaining in the residual are categorized by matching against the ROR database (Research Organization Registry). The ROR database lists academic organizations. Organizations from the "organization list" are matched with names from the ROR database, and organizations that match are classified as academic.
- The results of the process are a list of academic organizations. The residual—i.e., the organizations that could not be classified as academic—are regarded as non-academic organizations.

Sensitivity analysis

At an overall level, the method for identifying publications involving non-academic collaboration is assessed as robust; however, there are challenges in identifying academic institutions. To our knowledge, there is no established method for identifying

academic organizations in bibliometric analysis. To enable analysis of a very large number of publications (all publications in Sweden during a given year), an automated method had to be developed within the project. The development of the method was carried out iteratively.

In the work, attempts to use keywords proved accurate in the sense that few non-academic organizations were identified (false positives). For this reason, the first step is carried out. At the same time, a large number of academic institutions were identified in the residual. To also capture academic institutions that cannot be identified via generic keywords, data from the Research Organization Registry (ROR) database were used in a second step.

ROR is a global open registry of research organizations. The database contains over 100,000 unique names of research organizations. ROR is an initiative from the California Digital Library (CDL), Crossref, and DataCite aimed at addressing the problem of classifying research institutions.

The assessment of the method as robust rests primarily on a manual review of organizations classified as academic and non-academic. For organizations classified as academic, the accuracy is assessed as high. The greatest risk with the method is that academic institutions are not identified due to variation in how an organization's name is stated on publications. The impact of this is assessed as limited, however, because the ROR database contains many alternative names and because the keyword search in the first step complements the matching against the ROR database.

2.5.2 Publications cited in patents [%]

Publications cited in patents indicate that research is relevant for innovation and technological development. In the analysis, publications cited in patents are defined as publications published during the preceding three years that are cited among patents published during the study's selected years.

TABLE 2.3 OVERALL PROCESS FOR IDENTIFYING PUBLICATIONS CITED IN PATENTS; A DETAILED DESCRIPTION FOLLOWS BELOW.

Download patent data	Retrieve all published patents for the years of interest from Patstat.
Download publication data	Publications in patents are matched to a three-year period of a HEI's publications. For example, patents from 2022 are matched to publications from 2019, 2020 and 2021. This is because we assume a potential lag between publication date and citation in a patent.
Identify	Identify whether the patents have cited any publications, and in those cases record the DOIs of the cited publications.
Match	Match the specific institution's publications with the publications cited by patents in order to calculate the number of cited publications within the three-year intervals, using DOI.

Detailed description:

- Retrieve published patents for the year or years of interest from Patstat.
- Retrieve an HEI's publication data for relevant intervals.
- For each patent in Patstat, there is a variable indicating whether the patent has cited any publications and, if so, which. These publications are identified by DOI.
- Publications cited in patents are matched against the HEIs' publications during the specified period via DOI (Digital Object Identifier). Publications that are cited in patents are classified as such.
- For each HEI and year, the number of publications cited in patents is compiled.
- Finally, the number of publications cited in patents is normalized by the total number of publications for the HEI within the three-year interval (%).

Sensitivity analysis

The method for identifying publications cited in patents has been developed within the project. The starting point has been a jointly identified need to attempt to track the dissemination of research from the HEIs.

To ensure the robustness of the method, a dialogue has been conducted with experts at the Swedish Patent and Registration Office (PRV). From ADC's side, these discussions have led to the conclusion that the method can be used to illustrate the extent to which publications contribute to innovation and technological development through patents.

However, challenges exist both regarding how the results should be interpreted and more methodological challenges. When interpreting results, it is important to emphasize that citations should not be interpreted as meaning that specific research is being patented. Rather, there are many reasons why research results are cited in patents. They can, for example, be used as reference literature, or in examination of a patent to

show that a technical solution already exists or not. Instead, citations should be interpreted as indicating that the research has industrial relevance, since even citations of the type described above signal relevance for innovation and technological development.

Methodological challenges include, among other things, the choice of publication intervals. The challenge is rooted in the fact that it often takes time for a publication to be commercialized or used in the patenting process in various ways. A longer interval captures more publications. This had to be weighed against the desire to present a more up-to-date picture of the HEI's activities. For this reason, it was decided to track the HEI's outcomes over the preceding three years. Another identified challenge is that the number of publications cited in patents is small, meaning that a single citation can have relatively large impact on the overall result.

An alternative method considered was to analyse publications cited in patents for patents published over a three-year period. Since relatively few publications are cited in patents, there is a risk that extreme values in individual years have a large effect in the index. This would be avoided if patents published over a three-year period were analysed instead. The challenge with this method is that it creates large lags in the statistics, and it could take up to six years before publications from the HEI have an effect in the statistics. This would deviate from the other indicators, where results from the HEI's activities are measured after 0–3 years. For this reason, the alternative method was not chosen in the development of the Strategic Index.

3 Methodology

This section describes how the Strategic Research Index value (SRI) is calculated from the categories and indicators described earlier. Basically, the SRI of an HEI is defined as a weighted mean value, where each category has equal weight, and each indicator composing a category has equal weight.

3.1 Ranking of outcomes

To produce the SRI value, a ranking system is used where each outcome is assigned a ranking between 1 and 5, where 1 indicates a weak result and 5 a strong one. The ranking is based on the distribution of the results for the individual variable in the relevant year.

Operationally, the 1–5 ranking is constructed separately for each indicator and year by first identifying the minimum and maximum observed values across HEIs in that year and then dividing the resulting value range (min–max) into five equal-width intervals ("bins"). Each HEI is assigned a rank from 1 to 5 depending on which interval its value falls into. **This implies that the mapping from an indicator value to a rank is *year-specific* (i.e., the interval boundaries are recalculated each year, see 3.2 and 3.4 below).**

Based on the observed minimum and maximum values, the outcome range is divided into five equal-width intervals, which split the outcome interval into five equal-sized parts. This means that:

- The first interval corresponds to the lowest fifth (0–20%) of the outcome *range* (min–max). Observations in this interval are assigned ranking 1.
- The second interval corresponds to the second fifth (21–40%) of the outcome *range* (min–max). Observations in this interval are assigned ranking 2.
- The third interval corresponds to the third fifth (41–60%) of the outcome *range* (min–max). Observations in this interval are assigned ranking 3.
- The fourth interval corresponds to the fourth fifth (61–80%) of the outcome *range* (min–max). Observations in this interval are assigned ranking 4.
- The fifth interval corresponds to the final fifth (81–100%) of the outcome *range* (min–max). Observations in this interval are assigned ranking 5.

3.2 Interpretation and implications

Because the rank intervals are defined from the annual min–max range, the 1–5 scores are most appropriate for *cross-sectional* comparisons of HEIs within the same year (e.g., relative position in 2024). Year-to-year changes in an HEI's 1–5 score can occur even

when its underlying indicator value changes only marginally, because the annual min–max range (and therefore the interval boundaries) can shift as other HEIs improve or decline.

Further, equal-width intervals do not imply that HEIs are evenly distributed across the five ranks (equal interval ≠ equal distribution). Consequently, the Swedish average rank is not expected to equal 3.0 in every year: if performance is skewed (e.g., one HEI is far above the rest on an indicator and occupies the top interval alone), the mean can deviate from the mid-point. Even though the average is not 3.0 the average rank does not correspond to "Swedish performance" with respect to strategic research, it is still a HEI relative measure.

The procedure above partitions the *value range* into five equal-width intervals; it is therefore distinct from "quintiles" defined as equal-sized groups of HEIs (i.e., 20% of HEIs per group). Throughout this report, the term "interval" refers to equal-width bins on the outcome scale, not equal-sized groups of institutions.

Due to this selected method, one must be careful to compare changes between different years' output grade (interval) for specific indicators, especially for a specific indicator change over time for a specific HEI. E.g. Chalmers indicator value drops two stages 2023-2024 for the indicator Utilization. Another example is Stockholm University that drop two stages 2023-2024 for Highly cited publications. The main reason for this drop is that other universities have changed their performance, and not necessarily the specific HEI output. The same phenomenon can be seen for increase of specific indicators over time, e.g. Högskolan i Halmstad highly cited publications 2021-2023.

3.3 Compilation of the indicators into their categories

Since several categories contain multiple indicators, these need to be aggregated. This is done by computing the average ranking of the included indicators by summing them using equal weights (see the example "Internationalisation" below).

For each HEI and year, the category score is first computed as the arithmetic mean of its constituent indicator ranks (equal weights). To obtain the final category rank (1–5), this category score is then mapped to a 1–5 scale using the same year-specific, equal-width interval procedure described above (i.e., based on the annual min–max range of the category scores across HEIs). This becomes the final ranking for the HEI within each category.

3.4 Calculation of the Strategic Research Index value (SRI)

The results from each category above are compiled into an overall Strategic Research Index value for each HEI. The overall ranking is presented as a decimal number between one and five. The SRI is calculated by weighting the result from each category as one fifth of the total, i.e., by giving them equal weights, according to the formula below.

$$\boldsymbol{SRI = 0.2 * Research + 0.2 * Mobility + 0.2 * Attractiveness + 0.2 * Internationalisation + 0.2 * Utilisation}$$

To avoid rounding errors, the calculations are based on the results for the individual indicators that make up each category. For example, the result for the category "Internationalisation" is calculated as:

$$\boldsymbol{Internationalisation = \frac{1}{3} * (External\ international\ funding) + \frac{1}{3} * (International\ research\ staff) + \frac{1}{3} * (Internationally\ co-authored\ publications)}$$

Recommended use over time

For longitudinal interpretation of a single HEI, the underlying indicator values (e.g., shares/percentages shown in histograms) are generally more appropriate for assessing development over time. In contrast, the 1–5 scores and the resulting SRI should be interpreted as year-specific relative positions on an annually re-scaled measurement scale. If "score over time" is displayed, it should therefore be explicitly labelled as a relative, annually re-scaled score to avoid being misread as an absolute performance trend. As mentioned in 3.1 this means that selected method is solid for a specific year, but more volatile over time.

Data comparability across years (bibliometrics and affiliation matching)

Some indicators rely on bibliometric sources where coverage, definitions, and affiliation matching procedures can change over time (for example, changes in how affiliations are registered). Such changes can contribute to apparent discontinuities between years that are not fully attributable to changes in HEI performance. This consideration is particularly relevant when interpreting shifts between 2024 and earlier years for indicators derived from co-publications and collaboration**.**

4 Appendix

4.1 Subject areas for classifying publications

Publications are classified into research areas based on the Scimago Journal Rank list[1]. Publications are classified into 27 different research areas, listed below. The publications are compared with publications within the same research area to identify the share of highly cited publications.

1. Medicine
2. Economics, Econometrics and Finance
3. Biochemistry, Genetics and Molecular Biology
4. Environmental Science
5. Health Professions
6. Social Sciences
7. Chemical Engineering
8. Engineering
9. Immunology and Microbiology
10. Energy
11. Materials Science
12. Multidisciplinary
13. Physics and Astronomy
14. Pharmacology, Toxicology and Pharmaceutics
15. Chemistry
16. Arts and Humanities
17. Business, Management and Accounting
18. Earth and Planetary Sciences
19. Computer Science
20. Neuroscience
21. Agricultural and Biological Sciences
22. Psychology
23. Decision Sciences
24. Mathematics

[1] https://www.scimagojr.com/journalrank.php

25. Nursing
26. Veterinary
27. Dentistry

4.2 Classification of funders

The HEI's ability to attract different types of funding has been identified as an important indicator for strategic research. Overall, there are three indicators that capture different aspects of the HEI's funding, namely:

- Industrial funding
- External Swedish funding
- External international funding

In addition, the sum of these (i.e., an HEI's total funding excluding government core grants) is used to normalize certain indicators so that comparisons can be made between HEIs of different sizes.

The analysis is based on UKÄ's compilation of HEIs' revenues. The information is reported annually by universities to UKÄ and is available in full on UKÄ's website.

Selected indicators in the Strategic Research Index are based on a three-dimensional classification of funders:

- Funders in UKÄ's database have been classified as either competitive or non-competitive. Note that only funds assessed as competitive are included in this analysis, since the SRI seeks to capture different HEIs' outcomes independent of static variables such as dedicated funding.
- Funds have been categorized based on origin as Swedish or foreign.
- Funds have been classified based on whether they come from industry or not.

The three categories used in the compilation have the following definitions:

- Industrial funding: Competitive funds that come from industry in Sweden or abroad.
- External Swedish funding: Competitive funds that come from funders (not industry) in Sweden.
- External international funding: Competitive funds that come from funders (not industry) abroad.

The classification of funders was carried out jointly by SSF and ADC. To clarify uncertainties regarding categories in UKÄ's underlying data, UKÄ was also involved in the process. This included interviews with staff responsible for statistics at UKÄ as well as reviews of documentation related to the annual collection that UKÄ conducts from Sweden's HEIs.

At an overall level, the classification of funders is assessed as robust. However, several factors should be considered. One challenge in classification stems from UKÄ's data collection. The HEIs themselves report the statistics, which is thus a potential source of error. A specific issue in the statistics is the so-called "principle of origin", where revenues should be stated based on the original source of funding. The extent to which HEIs do this in practice is difficult to assess.

There are also challenges in categorizing competitive funds. The assessment is based on whether funding is based on competitive applications where multiple HEIs have the opportunity to apply. This means, among other things, that foundations that only fund individual HEIs are categorized as non-competitive.

Below is a summary of how different funding sources have been classified in this work:

TABLE 4.1 FUNDING CLASSIFICATION

Funder	Funder type	Type of funding
Företag i utlandet	Companies abroad	Competitive
Företag i Sverige	Companies Sweden	Competitive
Vetenskapsrådet	External Swedish	Competitive
Organisationer utan vinstsyfte i Sverige	External Swedish	Competitive
Wallenbergstiftelser	External Swedish	Competitive
Formas	External Swedish	Competitive
Vinnova	External Swedish	Competitive
Statliga myndigheter exkl. universitet och högskolor	External Swedish	Competitive
Energimyndigheten	External Swedish	Competitive
Cancerfonden	External Swedish	Competitive
Forte	External Swedish	Competitive
SSF	External Swedish	Competitive
Övriga statliga myndigheter	External Swedish	Competitive
Övrigt	External Swedish	Competitive
Stiftelsen Riksbankens jubileumsfond	External Swedish	Competitive
Hjärt-lungfonden	External Swedish	Competitive
Trafikverket	External Swedish	Competitive
Mistra	External Swedish	Competitive
Rymdstyrelsen	External Swedish	Competitive
Naturvårdsverket	External Swedish	Competitive
Myndigheten för samhällsskydd och beredskap (MSB)	External Swedish	Competitive
Försvarsmyndigheter	External Swedish	Competitive
STINT	External Swedish	Competitive
KK-stiftelsen	External Swedish	Competitive
Stiftelser förvaltade av lärosäte	External Swedish	Competitive

Sida/SAREC	External Swedish	Competitive
EU:s ramprogram exkl. ERC	External international	Competitive
Organisationer utan vinstsyfte i utlandet	External international	Competitive
Europeiska forskningsrådet (ERC)	External international	Competitive
EU, ej ramprogram	External international	Competitive
National Institutes of Health	External international	Competitive
EU	External international	Competitive
National Science Foundation (NSF)	External international	Competitive
Hjärt- Lungfonden	External Swedish	Competitive
Basresurs	Not external	Non-competitive
Ersättning för klinisk forskning	External Swedish	Non-competitive
Statliga universitet och högskolor	Not external	Non-competitive
SLU	Not external	Non-competitive
Regioner/landsting	Not external	Non-competitive
Finansiella intäkter	Not external	Non-competitive
Kommuner	Not external	Non-competitive
Kammarkollegiet	Not external	Non-competitive
Östersjöstiftelsen	Not external	Non-competitive
Forskning och konstnärligt utvecklingsarbete	External Swedish	Non-competitive
Enskilda utbildningsanordnare	Not external	Non-competitive
Nationellt centrum för kvinnofrid	External Swedish	Non-competitive
Länsstyrelser	Not external	Non-competitive
Arbetsförmedlingen	Not external	Non-competitive
Särskilda åtaganden	Not external	Non-competitive
Övriga anslag	Not external	Non-competitive
Industriell miljöekonomi	Not external	Non-competitive
Vårdalstiftelsen	Not external	Non-competitive
Landsting	Not external	Non-competitive
Kommuner och landsting	Not external	Non-competitive

4.3 Clarification of indicator calculations

The table below clarifies how each indicator is calculated.

Indicator	Numerator (n)	Unit of numerator	Denominator	Share, final indicator
Research	Highly cited publications	*Number of publications*	Articles and reviews	Highly cited publications/ Articles and reviews
Mobility	Externally employed doctoral students	*FTE, count*	Doctoral students	Externally employed doctoral students/ Doctoral students
Mobility	Adjunct researchers	*FTE, count*	Total number of researchers	Adjunct researchers/ Total number of researchers
Attractiveness	Industrial funding	*SEK, 1000s*	Total income	Industrial funding/ Total income
Attractiveness	External national funding	*SEK, 1000s*	Total income	External national funding/ Total income
Internationalisation	International research staff	*FTE, count*	Total number of researchers	International research staff/ Total number of researchers
Internationalisation	Internationally co-authored publications	*Number of publications*	Total number of publications	Internationally co-authored publications/ Total number of publications
Internationalisation	External international funding	*SEK, 1000s*	Total income	External international funding/ Total income
Utilisation	Non-academic collaborations	*Number of collaborations*	Total collaborations	Non-academic collaborations/ Total collaborations
Utilisation	Publications cited in patents (three-year period)	*Number of publications*	Total number of publications (three-year period)	Publications cited in patents (three-year period)/ Total number of publications (three-year period)