POLYU RESEARCH
EXCELLENCE REPORT 2025

APPENDIX

APPENDIX A
DESCRIPTION OF INDICATORS

Average percentile

The percentile of a publication is determined by creating a citation frequency distribution for all publications in the same year, subject category, and document type (arranging the papers in ascending order of citation count), and determining the percentage of papers at each level of citation. If a paper has a percentile value of 99, then 99% of the papers in the same subject category, year, and document type have a lower citation count.

A percentile is a normalized indicator because it indicates how a paper performed relative to others in its field, year, and document type. For any set of papers, an Average Percentile can be calculated as the arithmetic mean of all the percentiles of all the papers in the set. In the case that a paper is assigned to more than one category, the category in which the percentile value is closest to 100 is used (the best performing value). Percentile values are rounded to the second decimal place.

Category Normalized Citation Impact (CNCI)

The Category Normalized Citation Impact (CNCI) of a document is calculated by dividing the actual count of citing items by the expected citation rate for publications with the same document type, year of publication and subject area. When a document is assigned to more than one subject area, an average of the ratios of the actual to expected citations is used. The CNCI of a set of publications, for example, the collected works of an individual, institution or country/region, is the average of the CNCI values for all the publications in the set. CNCI is a valuable and unbiased indicator of impact irrespective of age, subject focus, or document type. Therefore, it allows comparisons between entities of different sizes and different subject mixes.

- A CNCI value of 1 represents performance at par with the global average.
- Values above 1 are considered above average.
- Values below 1 are considered below average.
- A CNCI value of 2 is considered twice the global average.

CNCI is an ideal indicator for benchmarking at all organisational levels (institution, region, etc). When dealing with small sets of publications, though, for example, the publications of one individual, the CNCI values may be inflated by a single Highly Cited Paper. More information can be found on the InCites website.

Citations from patents

The number of citations a set of publications has received from patents indexed in Derwent Innovations Index™ on Web of Science. This integration provides unique opportunities to not only assess the impact of patents on publications, but also allows users to explore trends and patterns in innovations further to deliver further insight into emerging fields of research.

Collaboration Category Normalized Citation Impact (Collab-CNCI)

Collab-CNCI compares citation impact to global expected citations, normalized by subject, year, document type and collaboration type. Each publication falls into one of five collaboration types, determined by:

1. The number of distinct countries in the author addresses
2. If all addresses are from the same country, the number of organisations involved

Overview of Collaboration Types

1. Domestic – Single: publications where all authors are affiliated with the same institution in a single country.
2. Domestic – Multiple: Publications where all authors are affiliated with multiple institutions within the same country.
3. International – Bilateral: Publications with author addresses from exactly two distinct countries.
4. International – Trilateral: Publications with author addresses from exactly three distinct countries.
5. International – Quadrilateral +: Publications with author addresses from four or more distinct countries.

Cumulative growth

Cumulative growth shows the total increase in the quantity of publications over a period, accounting for all previous growth.

Documents in Top 1%

Publications in the Top 1% based on citations by category, year, and document type.

Documents in Top 10%

Publications in the Top 10% based on citations by category, year, and document type.

Essential Science Indicators

Essential Science Indicators is an analytics tool that identifies Top performing papers, authors, institutions, countries, and journals across 22 broad disciplines based on citation thresholds.

Growth and average growth

In this study, we visualise the evolution of the number of Web of Science publications for a certain entity and period. To quantify the change in the number of publications from one year to the next, we use the growth

rate. The growth is then the number of publications in the most recent year (Ny2) subtracted from the number of publications in an earlier year (Ny1) and divided by it, and represented as a percentage:
G= (Ny2- Ny1)/ Ny1

Industry collaboration

Papers that contain two or more Organisations with at least one Organisation listing its organisation type as “corporate” or “global corporate”.
When a corporate or a global corporate organisation is searched in InCites, its publications will be captured in the Industry Collaboration indicator.
It is not possible to unify data for every affiliation of all publications in InCites; therefore, only unified entities have an organisation type. There will be corporate affiliations that are not yet unified and without an organisational type. As such, these affiliations will not be identified as an industrial collaboration. Clarivate Analytics has made considerable efforts to identify the largest corporations and unify them; however, these efforts tend to focus on large multinational corporations and may lead to regional bias.

Scholarly output

In this report, scholarly output refers to published peer-reviewed articles, reviews, and conference proceedings that are indexed in the Web of Science database.

Societal impact

The societal impact refers to how academic or scientific research contributes to and influences society beyond the academic community. It includes real-world benefits that research brings to individuals, communities, industries, policy and the environment.

Web of Science Documents

This is an indicator to refer to substantive journal articles, reviews, and proceedings papers, excluding editorials, meeting abstracts, and other types of publications. It is based on the Web of Science Core Collection, as of December 31, 2024.

APPENDIX B
DATA SOURCES AND ANALYTICAL PLATFORMS

Web of Science

The data used in this study came from the Clarivate Web of Science databases, which give access not only to journals but also to conference proceedings, books, patents, websites, and chemical structures, compounds and reactions.

Web of Science has a unified structure that integrates all data and search terms together and, therefore, provides a level of comparability not found in other databases. It is widely acknowledged to be the world’s leading source of citation and bibliometric data. The Web of Science Core Collection is the premier resource on that platform and includes over 22k peer-reviewed, high-quality scholarly journals published worldwide (including Open Access journals), over 308k conferences, over 151k editorially selected books and 92M records going back to 1900.

Coverage is both current and retrospective in the sciences, social sciences, arts and humanities. Clarivate has extensive experience with databases on research inputs, activity and outputs and has developed innovative analytical approaches for benchmarking and interpreting international, national and institutional research impact.
For more details: https://www.webofscience.com/

InCites Benchmarking and Analytics

InCites Benchmarking & Analytics was used in this project to generate relevant metrics and indicators.

InCites is a customised, citation-based research evaluation tool enabling analysis of productivity and benchmarking of output against peers worldwide, with underlying data drawn from the Web of Science Core Collection.

InCites provides disambiguated data for all publications in the Web of Science Core Collection. For more details: https://incites.clarivate.com/

Derwent Innovation

The Derwent World Patents Index (DWPI) is a comprehensive database that compiles patent applications and grants from 59 patent-issuing authorities worldwide. It provides abstracts in English, detailing the nature and use of inventions, and indexes them into technology categories for easy retrieval. DWPI also defines patent families, linking related patents globally around a Basic Patent (the first disclosure of the invention appearing in the database), facilitating the tracking of an invention's protection status internationally as further applications or granted patents published in multiple patent jurisdictions. For more details: https://www.derwentinnovation.com/

APPENDIX C
DATASET CREATION FOR THE TWELVE RESEARCH AREAS

Dataset construction

The dataset used for analysing publications and citations in the twelve chosen research areas was built based on Essential Science Indicators (ESI) subject areas and Web of Science subject categories.

Essential Science Indicators are broken out by 22 major fields of science. Each field is defined by a discrete set of journals.[74]

Web of Science categories refer to the categories assigned to the source publication. There are a total of 254 subject categories. Some source publications are assigned to multiple categories.[75]

PolyU Research Area	Corresponding ESI Subject Area
Engineering	Engineering
	Environment/ Ecology
	Geosciences

Table 1. ESI subject areas for engineering

PolyU Research Area	Corresponding Web of Science Subject Category
Civil engineering	Engineering, Civil
	Construction & Building Technology
	Transportation Science & Technology

Table 2. Web of Science subject categories for civil engineering

PolyU Research Area	Corresponding Web of Science Subject Category
Built environment	Energy & Fuels
	Engineering, Environmental
	Environmental Sciences
	Environmental Studies
	Nuclear Science & Technology
	Water Resources
	Green & Sustainable Science & Technology
	Materials Science, Ceramics
	Materials Science, Multidisciplinary

Table 3. Web of Science subject categories for built environment

74 Essential Science Indicators Journal List, https://esi.help.clarivate.com/Content/journal-list.htm
75 Web of Science Subject Categories, https://webofscience.zendesk.com/hc/en-us/articles/27505726032017-Web-of-Science-Subject-Categories

PolyU Research Area	Corresponding Web of Science Subject Category
Advanced manufacturing	Optics
	Automation & Control Systems
	Engineering, Aerospace
	Engineering, Manufacturing
	Microscopy
	Robotics
	Engineering, Industrial
	Engineering, Multidisciplinary
	Physics, Applied

Table 4. Web of Science subject categories for advanced manufacturing

PolyU Research Area	Corresponding Web of Science Subject Category
Geomatics research	Engineering, Geological
	Geosciences, Multidisciplinary
	Instruments & Instrumentation
	Remote Sensing

Table 5. Web of Science subject categories for geomatics research

PolyU Research Area	Corresponding Web of Science Subject Category
Computer science and artificial intelligence	Computer Science, Artificial Intelligence
	Mathematics, Applied
	Computer Science, Interdisciplinary Applications

Table 6. Web of Science subject categories for computer science and artificial intelligence

PolyU Research Area	Corresponding Web of Science Subject Category
Optometry	Ophthalmology

Table 7. Web of Science subject categories for optometry

PolyU Research Area	Corresponding Web of Science Subject Category
Biomedical engineering	Engineering, Biomedical
	Cell & Tissue Engineering

Table 8. Web of Science subject categories for biomedical engineering

PolyU Research Area	Corresponding Web of Science Subject Category
Rehabilitation sciences	Rehabilitation
	Orthopedics
	Sport Sciences

Table 9. Web of Science subject categories for rehabilitation sciences

PolyU Research Area	Corresponding Web of Science Subject Category
Nursing	Nursing

Table 10. Web of Science subject categories for nursing

PolyU Research Area	Corresponding Web of Science Subject Category
Hotel and tourism management	Hospitality, Leisure, Sports & Tourism

Table 11. Web of Science subject categories for hotel and tourism management

PolyU Research Area	Corresponding Web of Science Subject Category
Fashion and textiles	Materials Science, Textiles

Table 12. Web of Science subject categories for fashion and textiles

PolyU Research Area	Corresponding Web of Science Subject Category
Design	Art

Table 13. Web of Science subject categories for design

ABOUT

This report was developed by the Clarivate Academic and Government Consulting team in partnership with The Hong Kong Polytechnic University (PolyU), who provided funding for this project.

For over half a century Clarivate has pioneered the world of citation indexing and analysis, helping to connect scientific and scholarly thought around the world. Today, academic and research institutions, governments, not-for-profits, funding agencies, and all others with an interest in research, need reliable, objective methods for managing and measuring performance.

The Clarivate Academia and Government Consulting team provides reporting and consultancy services using customised analyses to bring together several indicators of research performance in such a way as to enable customers to rapidly make sense of and interpret a wide range of data points to facilitate research strategy decision making. We have extensive experience with databases on research inputs, activity and outputs and have developed innovative analytical approaches for benchmarking, interpreting and visualising of international, national and institutional research impact.

ABOUT THE HONG KONG POLYTECHNIC UNIVERSITY

With over 85 years of rich heritage, PolyU has evolved alongside Hong Kong, making pivotal contributions to its social and economic development, as well as to the Nation and the world. PolyU aspires to be an innovative world-class university that pursues excellence in education, research and knowledge transfer. Guided by its motto, “To learn and to apply, for the benefit of mankind”, the University nurtures socially responsible professionals and leaders with a strong sense of national pride and a global perspective, while driving world-leading research and innovation for societal benefits. PolyU’s unwavering commitment to excellence, impact, and innovation has earned it widespread international recognition. The University consistently ranks among the world’s Top 100 universities, a testament to its status as a global leader in higher education and cutting-edge research.

ABOUT CLARIVATE

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