



Department
for Business
Innovation & Skills

BIS PERFORMANCE INDICATORS

UK share of highly cited
academic articles

APRIL 2014

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Why is this indicator important?

Science and research provide the foundations for sustainable economic growth by creating and maintaining the knowledge bases and technologies that underpin our competitiveness. In advanced economies like the UK, innovation under all its forms is the main driver of growth in the long run. Innovations that create entirely new products stem from some form of breakthrough discovery and technological progress at the frontier of knowledge. This type of innovation rests on scientific problem solving in state of the art research facilities. This indicator provides a measure of how close to the frontier of knowledge is the scientific problem solving capacity of the UK.

Many scientific advances can be quickly used to develop new products and services or to progressively improve existing ones. However, the full impact of radical breakthroughs can take many years to be known. Intangible assets such as new ways of doing things resulting in organisational and process innovations and improvements in the effectiveness of policy also result from science and research, but are equally difficult to monetise.

In all of these cases, the international standing of the research output as indicated by the quality of publications gives an indication of the potential for problem solving as well as the technical, human and organisational capability of the country.

This indicator fulfils two roles:

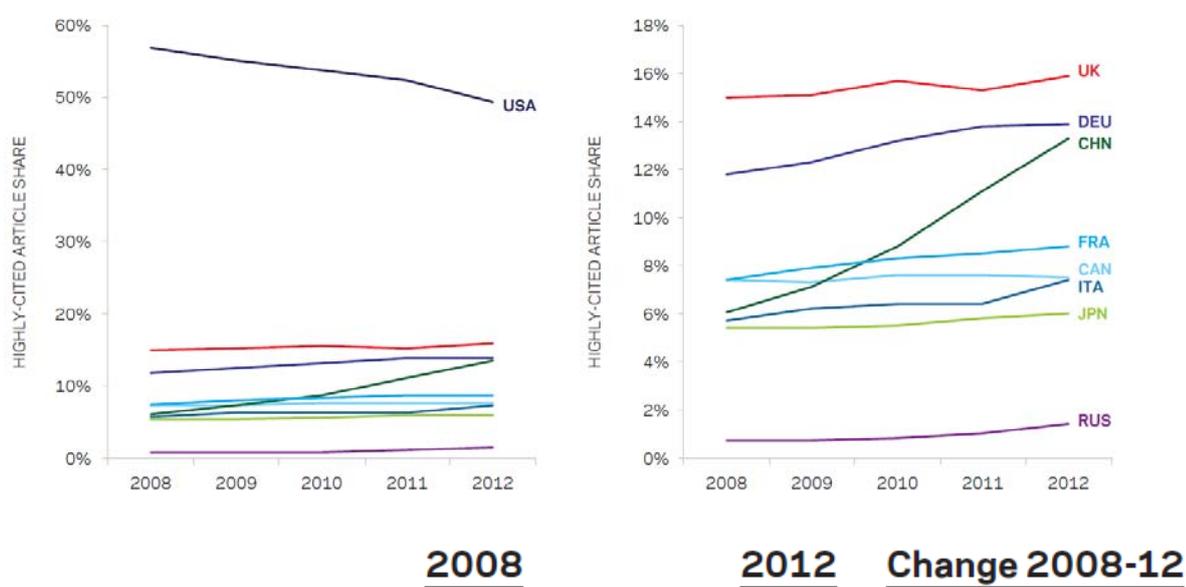
- Research excellence: citations provide away of assessing the scientific value of UK's research by considering not only the use but also the acknowledged influence it is having on world-wide academic debate. An excellent research base is known to attract foreign investment for R&D.
- Research impact high citation papers indicate acknowledged influence in the academic and corporate communities – wider usage and influence of codified knowledge increases the probability of translating research into application.

How are we performing?

Changes in the UK proportion of highly cited articles are published biennially as part of the report on the [International Comparative Performance of the UK Research Base](#)¹.

The 2013 report shows that the UK share of highly cited papers has been increasing steadily from 14.97% in 2008 to 15.9% in 2012.

The figure below shows the share of the world's highly-cited articles (top 1% of the most cited articles) for the UK and comparator countries, 2008-12 with right-hand panel excluding the US for clarity (source: Scopus).



To note that the US share (only country ahead of UK in the world) is falling steadily due to the rise of new research nations so increasing share for the UK when others are reducing is noteworthy.

¹ <https://www.gov.uk/government/publications/performance-of-the-uk-research-base-international-comparison-2013>

What will influence this indicator?

This indicator will be influenced by both the number and quality of the academic articles produced in the UK in relation to the rest of the world. Past research has estimated lags of 5 to 7 years depending on discipline between publication and citation impact so current levels of citation reflect past investment in R&D.

The main determinant of the level and excellence of research is overall investment in R&D (GERD). To the extent that academics are more prone to publish findings than non-academic researchers it is arguable that the part of GERD performed in the HE sector (Indicator 9) is a more direct determinant of this indicator but it has to be noted that problem solving ability is not exclusive to the HE sector and thus Business Expenditure in R&D also contributes to UK performance in this area. Expenditure in R&D in the UK in general is below average for large economies but it is concentrated around high tech sectors that help boost the international standing of the UK in technological knowledge and application.

There is evidence that the degree of international mobility and international collaboration increase citation levels other things being equal. The UK is a net attractor of global talent and just under half of UK publications are co-authored with international collaborators (this proportion has been steadily increasing). These two factors explain at least in part high citation levels in the UK.

What is BIS's role?

BIS manages the Government's budget for Science and Research, £4.6bn a year during the current CSR. This budget is dedicated to funding excellent research aimed at attracting FDI in R&D and improving economic performance through problem solving and the translation of research into tangible and intangible innovation.

Other initiatives complementary to an excellent research base are wide ranging and about using this knowledge as inputs for value creation in the economy. These initiatives are essential for growth and managed by organisations funded by BIS (such as the Technology Strategy Board) and elsewhere in Government (such as the R&D Tax Credit).

Indicator definition

Country shares in the top percentile of cited papers are calculated from the year of publication up to the latest year for which the data are available. So, the share for '2008' is comprised of citations in the period 2008-12 to articles published in 2008, while for '2012' it is comprised of citations in the period 2012 to articles published in 2012.

The underlying data on journals and citations comes from Scopus. Scopus is the largest abstract and citation database of peer-reviewed research literature available, with abstracts and citation information from 50 million documents in over 21,000 journals, books and conference proceedings published by some 5,000 publishers spanning all subject areas (op. cit page 109 in Appendix C: Data Sources).

Methodology

Within each time interval (2008-2012 for articles published in 2008; 2009-2012 for those published in 2009; etc.) the number of publications falling in the top centile of citations is counted for each discipline. Field weighting is important since citation patterns differ by discipline, and thus a country that specialises say in Social Sciences will have fewer citations than a country that specialises in Engineering. For the UK indicator 10 subject fields are considered. For each paper one or more countries may appear as co-authors. The UK share counts the number of papers in the top centile where the UK is an author as a proportion of the total papers in the top centile.

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Medical Research Council

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Related indicators

Proportion of firms who are innovation active²

Expenditure on Research and Development performed in Higher Education³

² <https://www.gov.uk/government/collections/bis-performance-indicators>

³ <https://www.gov.uk/government/collections/bis-performance-indicators>

Status

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