

Growing international collaboration not yet enough to halt decline in Japan's research output

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nature INDEX 2019 JAPAN

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**FEMALE LEADERS
NEEDED**
A call from the top

THE NETWORKERS
Scientists taking Japan
to the world

JOINING THE DOTS

*Can global connections
lift Japan's science?*



Nature Index 2019 Japan. Credit: Springer Nature

Japan's contribution to high-quality scientific research fell by 19.9 per cent between January 2012 and October 2018 according to the Nature Index. But efforts to increase international collaboration, seen as one way to address this trend, are paying off. Since 2014, the proportion of articles from journals tracked by the Index with international co-authors originating from Japanese institutions has increased from 46 to 56 per cent.

This supplement, published today, discusses the role that [international collaboration](#) has in boosting high-quality research output from Japan and also outlines the major changes needed for Japan to become an attractive research destination for international scientists.

An overview [article](#) outlines how Japan is seeking to boost its scientific research performance by transforming its universities to better accommodate international [collaboration](#). Then, six scientists with exceptionally strong research links outside Japan describe how they are bringing global research to Japan and taking Japanese research to the world.

David Swinbanks, Founder of the Nature Index, said: "For decades Japanese academics and government science policymakers have talked of the need to internationalize Japan's science and it is encouraging to see some significant steps forward on this front in recent years, albeit against a backdrop of an ongoing decline in high-quality research output."

Further features in the supplement include an interview with two leading female Japanese researchers who call for more women to seize

opportunities to become leaders and principal investigators. Finally, an article on academia-industry partnerships discusses the barriers to getting the two sectors to work more closely together in Japan.

The Nature Index 2019 Japan is based on data from natureindex.com, covering articles published during the period 1 January 2012 to 31 October 2018. All references to the year 2018 in tables and graphs include data for the 12 months preceding 31 October.

The Nature Index is a database of author affiliations and institutional relationships. The [index](#) tracks contributions to research articles published in 82 high-quality [natural](#) science journals, chosen by an independent group of researchers.

The Nature Index provides absolute and fractional counts of article publication at the institutional and national level and, as such, is an indicator of global high-quality research output and collaboration. Data in the Nature Index are updated regularly, with the most recent 12 months made available under a Creative Commons licence at natureindex.com. The database is compiled by Springer Nature.

The Nature Index metrics

The Nature Index provides several metrics to track research output and collaboration. These include article count (AC), fractional count (FC), and multilateral and bilateral collaboration scores.

A country/region or an [institution](#) is given an AC of 1 for each article that has at least one author from that country/region or institution. This is the case regardless of the number of authors an article has, and it means that the same article can contribute to the AC of multiple countries/regions or institutions.

FC takes into account the relative contribution of each author to an article. The maximum FC per paper is 1, and this is shared between all authors under the assumption that each contributed equally. For instance, each author on a paper with 10 authors would receive a FC of 0.1.

The multilateral collaboration score (MCS) is an indicator of collaboration between multiple institutions and can be calculated for an individual institution or a group of institutions. MCS takes account of the number of collaborating institutions on a given article, so it can be added across multiple institutions, always resulting in a total FC of 1 for each article.

The bilateral collaboration score (CS) between two institutions A+B is the sum of each of their FCs on the papers to which both have contributed. A bilateral collaboration can be between any two institutions or countries/regions co-authoring at least one article in the journals tracked by the Nature Index.

Provided by Springer

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