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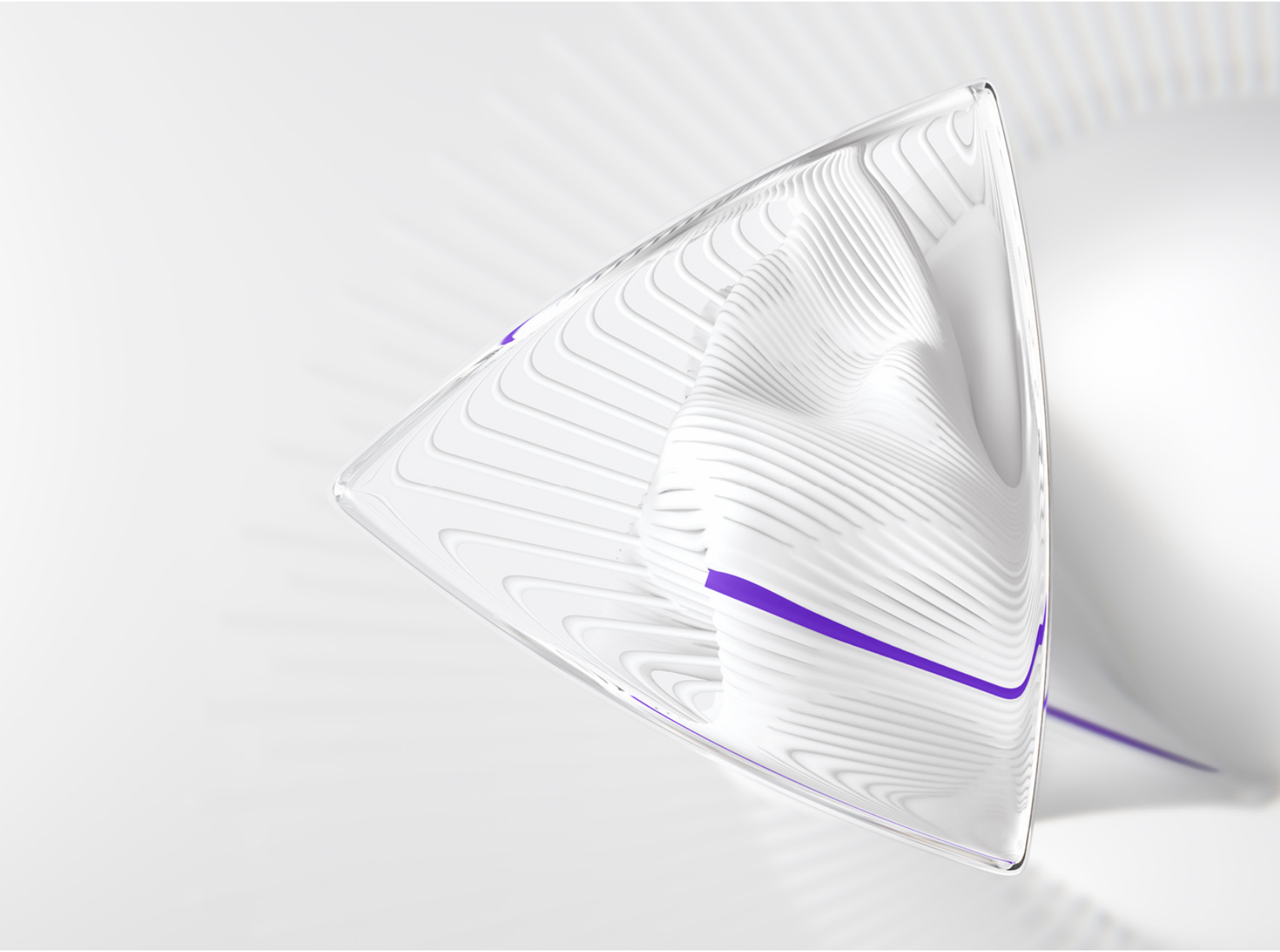
Clarivate Consulting Services

Advance your organizational mission with evidence-based insights on international collaborations



About the author

Joshua Schnell, PhD is a Principal in the Academic & Government Consulting practice at Clarivate, where he oversees a team of consultants and data scientists solving our customer's most-challenging science management problems. He has expertise in science planning and assessment, the evaluation of research and development programs, and in science and technology policy. He has a PhD in molecular biosciences, was a Mirzayan Science & Technology Policy Graduate Fellowship at the US National Academies of Science, Engineering and Medicine and worked in administration at Northwestern University. He is currently co-chair of the Research, Technology and Development Evaluation Topical Interest Group of the American Evaluation Association.

Executive summary

As the research landscape continuously changes, the landscape of collaboration is changing too, and quickly.

Not all collaborations are risk-free, and universities need visibility into the research collaborations in which their staff and students are involved. High-quality, timely data are critical for universities to effectively monitor their international networks and make deliberate decisions about where their research is being conducted.

This white paper is intended for academic, government and corporate research staff who are responsible for managing collaborations to advance their organizational mission. It covers important aspects of ensuring balance among the benefits and risks of collaboration, and emphasizes the value of reliable evidence when assessing an organization's collaboration profile.

Gaining resources and knowledge through teamwork

International research collaboration has been critical to many of the most important scientific findings to date and plays an essential role in modern research. For example, the research collaboration between Emmanuelle Charpentier and Jennifer Doudna to develop the CRISPR-CAS9 gene editing system earned both the Nobel Prize in Chemistry in 2020.

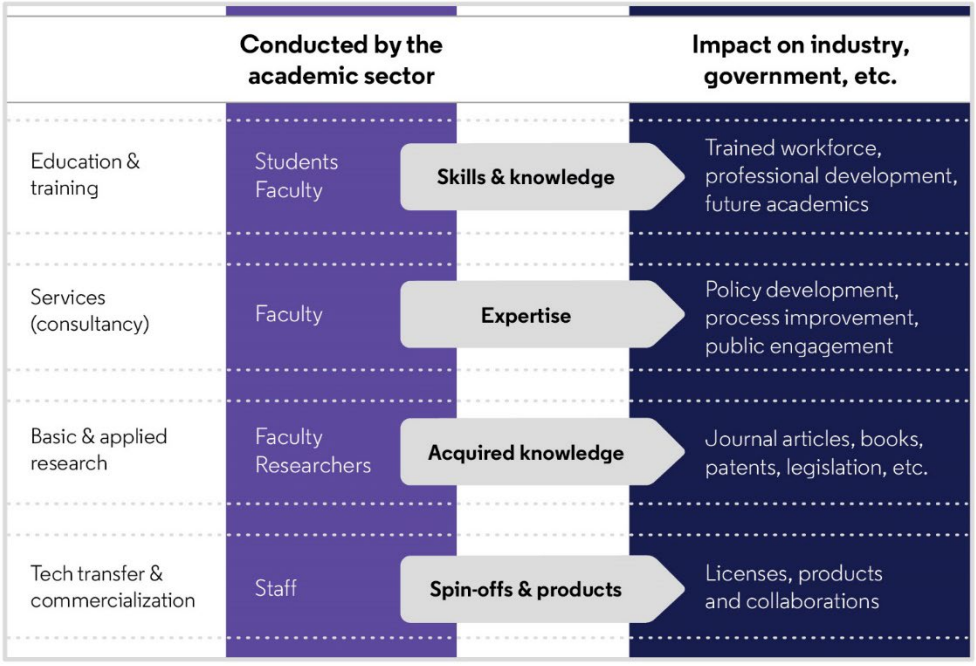
As science becomes more complex and requires resources beyond what might be available within the so-called 'four walls' of an institution, new teamwork models become increasingly necessary to solve problems.

There can be many benefits for researchers that look outside of their own countries or regions for research partners, including:

- international prestige,
- faster innovation,
- access to different perspectives and specialists,
- advantages for citation impact,
- access to specialized equipment,
- larger research populations, and
- additional funding, to name a few.

For universities, colleges and research organizations, research collaborators can be an important ingredient necessary for influencing positive real-world change by contributing either important public policy or new products and treatments. Partnerships can supplement meaningful internal efforts, such as educating students and training the next generation of scientists, engineers and scholars (Figure 1).

Figure 1. Varied missions of academic institutions



Source: Clarivate Academic and Government Consulting Services

For many developing countries, collaboration is a standard and effective method to tap into global research networks. Partners in other regions may have greater access to resources or equipment than local availability provides.

Academic and government institutions are also increasingly focused on the large, complex problems facing society, so-called "wicked" problems that require researchers to collaborate across disciplinary boundaries. The recent emphasis of the U.S. National Science Foundation on bolstering '*convergence research'* is an example of this.[1] Convergence research is research focused on a complex problem that requires highly collaborative problem framing and solution development; collaboration that integrates knowledge, tools and ways of working across disciplines. As a fundamental feature of convergence research, collaboration across disciplines and indeed borders is prioritized in these initiatives.

Finally, the rapid global response from the scientific community to the COVID-19 pandemic demonstrates how society's biggest challenges often require solutions that span nations, disciplines and industry sectors. Clarivate research demonstrates that research institution-industry partnerships spiked in 2020. Driven by the extraordinary global research effort to find vaccines and treatments for COVID-19, the pharmaceutical industry has looked to academia for breakthroughs.

Three considerations when choosing partners

Recent decades have seen a substantial rise in the volume of international research collaboration. A study published in *Scientometrics* examined this trend, using Web of Science™ data on more than 10 million articles published by researchers in 200 countries. After analyzing the rate of collaboration at selected intervals between 2000 and 2015, the study's authors reported 306% growth in international co-authorship during the period. [2]

306%

growth in international research collaboration between 2000 and 2015

Bibliometric analysis of collaboration tends to highlight the benefits of international co-authorship, such as increased rates of publication and citation and greater visibility for a nation's research enterprise, while the risks and potential costs often receive less attention. However, the possible drawbacks of collaboration underscore a need for thorough, reliable data with which administrators and policy makers can make informed decisions in pursuing international partnerships.

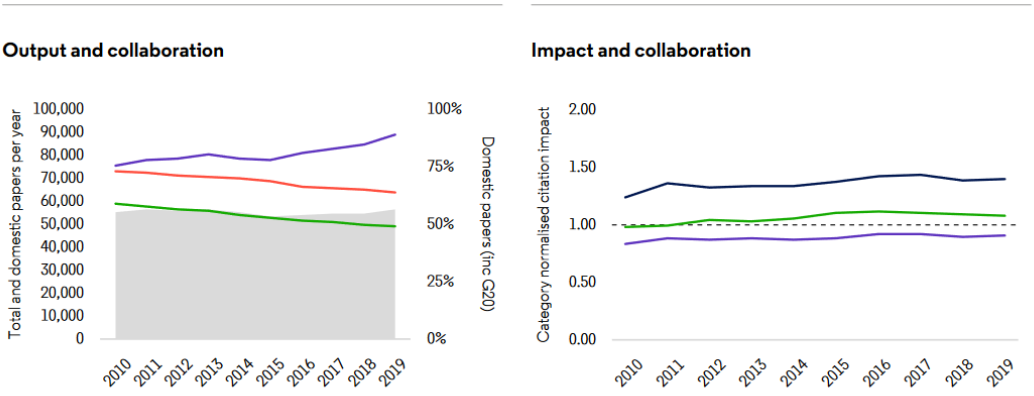
1. International collaboration at the expense of domestic research growth

For many countries, domestic-only research output is decreasing, as international collaborations fill the gap. The bibliographic data in the Annual G20 Scorecard from the Institute for Scientific Information (ISI™),[3] which profiles the research performance of the world's G20 economies, show a clear rise in international collaboration.

For example, Japan's total research output has increased over the last five years (Figure 2, bottom left, purple line), while its domestic-only research output is decreasing (Figure 2, bottom left, red line). Papers published with international authors show a higher normalized citation impact (Figure 2, bottom right). While this increased citation impact from international collaborations indicates important research outcomes, it comes at the expense of strengthening the domestic research base.

Figure 2. G20 scorecard for Japan

	Papers	CNCI	% > world average	% in top 10%
Japan total	807,221	0.89	26.5%	8.2%
Japan domestic	553,210	0.66	20.9%	5.2%
Japan international	254,011	1.37	38.8%	14.8%
G20 total dataset	14,290,971	1.00	32.5%	10.7%

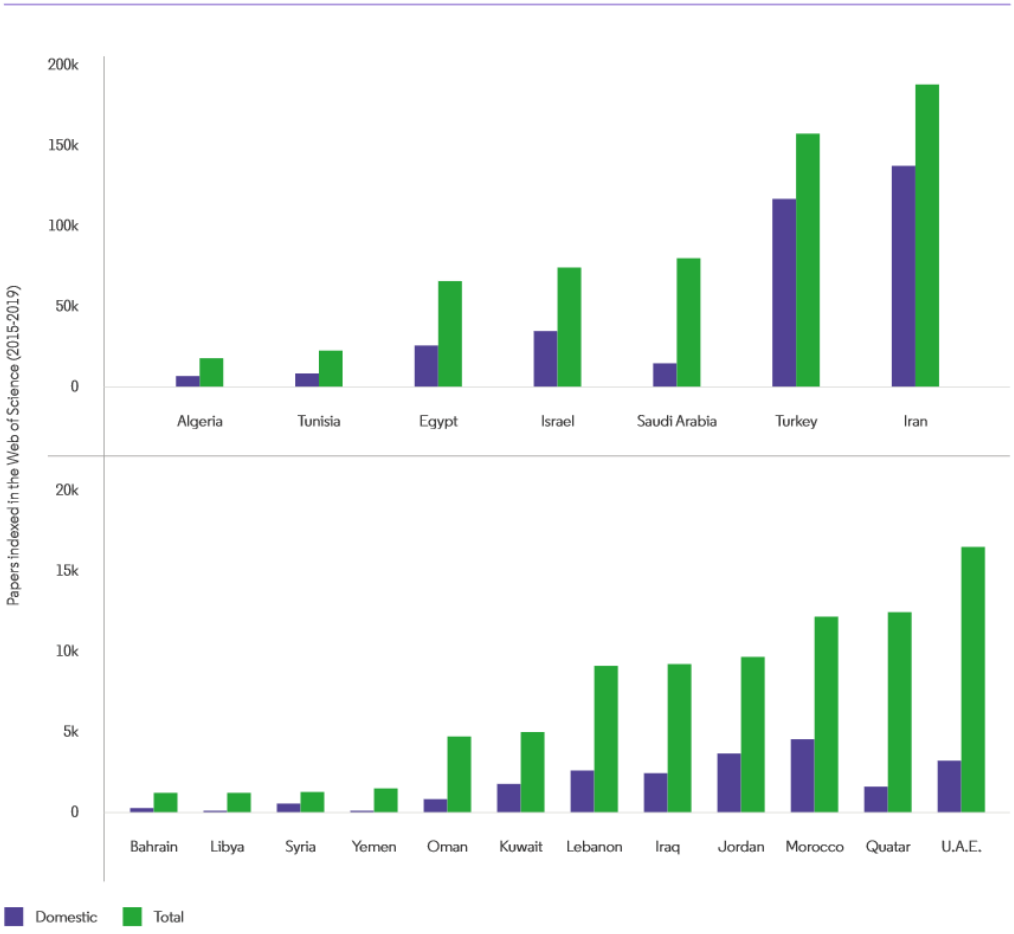


Source: *The Annual G20 Scorecard – Research Performance 2020*, Institute for Scientific Information (ISI™), Clarivate

2. Regional collaboration: A missed opportunity?

Additional research from ISI on the changing research landscape in the Middle East, North Africa and Turkey showed that, for many of the countries studied, international collaboration has become a significant portion of overall research output.[5] In some regional contexts where research ecosystems are rapidly expanding, only a few countries have a significant domestic research base underpinning their national innovation systems (Figure 3).

Figure 3. Domestic and international research output in countries in the Middle East, North Africa and Turkey



Source: *The changing research landscape of the Middle East, North Africa and Turkey*, Institute for Scientific Information (ISI™), Clarivate

Limited regional collaborations could represent a missed opportunity to address the issues affecting the region, particularly when major research nations serve as leading partners (Figure 3). More regional collaboration could also ensure diversity in topic focus and in the impacts of research on society.

3. Trading a global outlook for increased risk exposure at home

The risk of deprioritizing local and regional issues in favor of a global outlook can seem relatively minimal in our increasingly global, connected world. However, an over-dependence on foreign expertise may cost regional experts the opportunity to develop domestic knowledge in strategic technology areas.

We discuss earlier in this paper the ways that the response to the COVID-19 pandemic has depended upon international, research institution-industry collaboration. However, the pandemic also highlighted how a lack of in-country capabilities can be debilitating in the midst of quarantine restrictions, supply chain disruptions and lack of travel. Despite international collaboration, regions have experienced the pandemic differently due to variables across infrastructure, resource availability and domestic leadership.

The earlier example of Japan's increasing citation impact coming at the expense of domestic-only research also underscores the importance of carefully considering and cultivating international research partners as part of any organization's research strategy. Putting resources into more highly cited international publications is valuable but should be weighed against the tradeoff of less resources for domestic-only initiatives.

The risk of diverting resources from pressing national or regional issues should be weighed among other complications when considering international collaborations.

Informed decision-making for strategic collaborations

Making strategic research collaboration decisions

While collaboration is well-trod territory for academic and industry researchers, it is critical that organizations approach collaborations strategically. All parties will benefit from awareness of the risks and benefits of the engagement, and from partnered efforts to balance these dynamics.

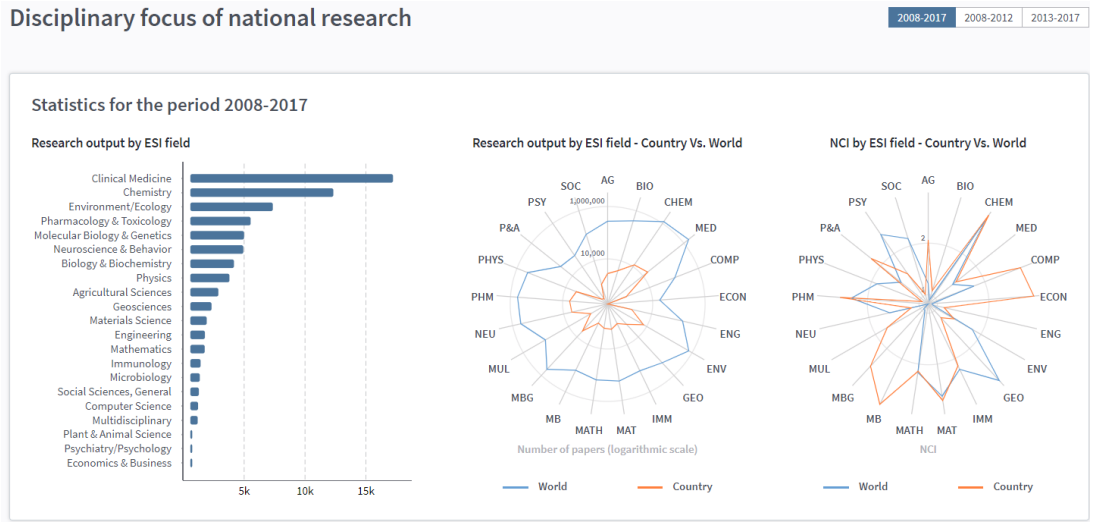
Within an institution or country, larger partnerships are often known, but smaller-scale researcher-driven partnerships can occur without broader knowledge by organizational leadership. For example, a graduate student returning to their home country might continue to work with their supervisor under whom they studied, even after they proceed to develop their own independent research career.

Being aware of research partnerships at your institution is key to a successful research strategy that effectively leverages collaborations. Yet, compiling all the data necessary to track and monitor collaborations across a large research university can be challenging, especially if you are relying on staff and students to report all their partnerships.

This is where bibliometrics can complement data from faculty surveys or reporting from university leaders. To monitor and evaluate collaborative initiatives, institutional reporting – for example, via dashboards built on data sources such as the Web of Science – can allow academic institutions and governments to:

- map collaborations to strengths or areas of opportunity,
- assess against relevant benchmarks, and
- consider collaborations in regional and global contexts.

Figure 4. Dashboard to understand national research



Source: Web of Science, Clarivate

Figure 5. Dashboard for benchmarking activities

Source: Web of Science, Clarivate

In addition, bibliometric analysis is an excellent way to understand opportunities for expanding collaborations. Published research in a particular discipline combined with records of funding agencies supporting these publications provide evidence of a potential collaborator's past performance, expertise and resources. By leveraging these data, institutions can make confident decisions about their collaborations within their broader research strategy.

Maximizing partnerships while limiting risk

The benefits of partnering with researchers internationally are well-known, but risks are less documented. Tapping into intelligence about collaborations can help research managers to ensure that collaboration strategies are aligned with their organization's mission and maximize their partnerships' fullest impact, while limiting their risk profile.

Speak to our consultancy team to learn how you can develop the right evaluation and management strategy for your organization's collaborations.

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About Clarivate

Clarivate™ is a global leader in providing solutions to accelerate the lifecycle of innovation. Our bold mission is to help customers solve some of the world's most complex problems by providing actionable information and insights that reduce the time from new ideas to life-changing inventions in the areas of science and intellectual property.

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