



White Paper

A CHANGING LANDSCAPE IN COLLABORATION

Insights into trends in research collaboration,
and how institutions are adapting

ADVANCING
DISCOVERY

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Introduction



When considering the future of research, it is widely recognised that collaboration is the way forward. The world's most complex challenges (such as climate change, clean energy generation, and global health) are impossible for any research institution to tackle alone, and solving these problems requires a vast array of international and interdisciplinary approaches. With collaboration becoming more commonplace, academics have been able to share resources, compare different perspectives, and ultimately stimulate innovation, leading to a benefit to research which is absolutely paramount.

Combined with the additional advantages of increased citation rates and impact, and improved university rankings and reputation, it comes as no surprise that research collaborations are still rising rapidly.

Alongside this there is an increased variety in the types of partnerships that are taking place: between researchers in different disciplines within the same institution; between multiple institutions (at local, national and international levels); between academia and industry or community groups and organisations. All of these types of collaborations come with their own unique rewards, but also with their own challenges, and institutions are faced with the responsibility to navigate these complex waters and facilitate successful collaborative initiatives.

For institutions, collaboration operates at different levels, from individual researchers and research projects to the initiatives of different research groups and disciplines, and up to the overarching strategic direction of partnerships.

This white paper brings together insights from five experts within Springer Nature into how the landscape of research collaboration has transformed in recent years, and the ways in which institutions have been developing their practices to both drive and adapt to these changes.

Interviewees from Springer Nature

- Simon Baker, Chief Editor, Nature Index
- Rong Ju, Group Product Manager for Data & Analytics Solutions, Greater China & South Korea
- Ikuko Oba, Director of Commercial Partnerships, Japan, Korea, Southeast Asia & Oceania
- David Payne, Managing Editor, Careers and Supplements, *Nature*
- Steven Riddell, Director of Consulting, Nature Research Intelligence



Part 1: Trends in research collaboration

To begin, the interviewees were asked to discuss some of the major changes they had observed within the landscape of collaboration in recent years. Some of the key highlights are outlined below.

The collaboration landscape is becoming increasingly complex

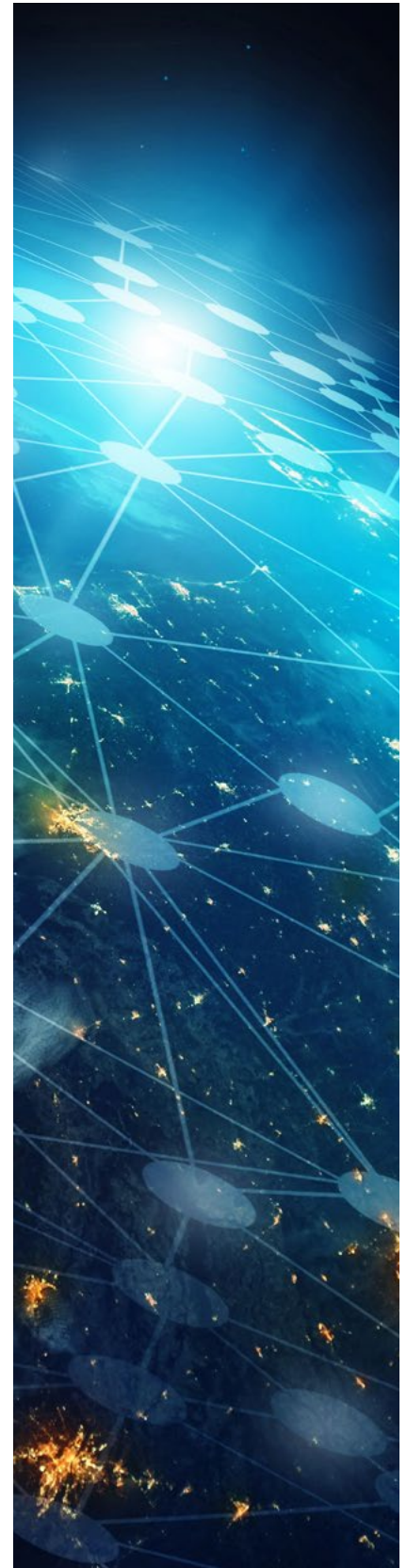
Rong noted that the universal recognition of the benefits of collaboration has made it the “natural choice” for institutions and researchers. Combined with new technologies that make virtual conversations easier, this has led to a dramatic increase in the number of collaborations that are taking place, both in terms of geography and number of authors, and also when it comes to variation in types of partnerships.

The average number of authors per publication has been steadily increasing across all disciplines since the 1980s¹, and a *Nature* analysis of the Dimensions database² found that between 2001 and 2020, international collaborations rose by 10%, from 14% to 24% of all papers. By 2021, collaborations involving three or more nations accounted for 30% of international collaborations and 7% of all articles, with similar increases being observed in academic-industry and academic-community partnerships (explored in more detail in later sections).

For institutions, there is a need to monitor this ever-changing landscape, identifying potential areas for collaboration at a strategic level, while also making sure that researchers feel supported in managing increasingly complex collaborative projects and the nuances in funding and legal processes that go along with them.

The world’s biggest challenges are global and interdisciplinary

A key point highlighted by all interviewees was that research collaboration is essential when it comes to addressing the world’s most pressing issues such as the United Nations’ [Sustainable Development Goals](#) (SDGs). As Simon noted, “When you collaborate internationally, you can connect scientists and academics with different perspectives, as well as compare data from different countries, which you can combine to get an overall global view.”



¹ Danielle Fanelli & Vincent Larivière, “Researchers’ individual publication rate has not increased in a century,” *PLoS One* 11, 3 (2016), e0149504, <https://doi.org/10.1371/journal.pone.0149504>.

² Brendan Maher & Richard Van Noorden, “How the COVID pandemic is changing global science collaborations,” *Nature* 94 (2021): 316-319, <https://doi.org/10.1038/d41586-021-01570-2>.

While international partnerships have been an integral part of institutional infrastructure for some time, contributing towards many university rankings and assessment measures, it has taken longer for interdisciplinary research to be valued in the same esteem³. However, all interviewees noticed a clear movement towards interdisciplinarity in SDGs-related research, and a particular focus on including more voices from the Social Sciences and Humanities—disciplines which historically have lower levels of collaborative research. Ikuko observed, “When speaking with the management of universities and research institutions, there is an increasing need to find Social Science and Humanities researchers to tackle global challenges.”

These observations are supported by a recent analysis of the SN Insights database⁴, which found that over 60% of sustainability publications were multidisciplinary or cross-field, of which the Humanities and Social Sciences made up a significant proportion. Interestingly, the analysis also found that collaborations in sustainability research are primarily within a single country, and only a small fraction of partnerships are transnational—indicating that institutions should do more to make sure global cooperation is not forgotten when addressing the SDGs.

Viewing industry-academia collaborations in a new light

Throughout the discussion, effects of the COVID-19 pandemic were unsurprisingly at the forefront of many interviewees' minds. One major trend spurred by these events, David noted, was an improved visibility of academic-industry collaborations: “The pandemic really demonstrated the strength of these partnerships, because with the vaccine rollout we saw these successful collaborations that delivered results very quickly.” Another prominent example was highlighted in *Emerging from Uncertainty*, an independent report commissioned by Springer Nature to investigate the impact of COVID-19 on university research. When three UK universities started working together to produce PPE using rapid prototyping, engaging with local manufacturers allowed them to solve logistical problems at a speed that was previously unachievable⁵.

Though partnerships between universities and industry have been steadily increasing for years, COVID-19 gave a renewed impetus to these collaborations, and reminded both researchers and the general public about how they can make an immediate difference. This is supported by a recent analysis of the SN Insights database⁶ which found that between 2015 and 2019, articles published including authors from both an academic institution and a corporation rose by 10,488 (25%), from 42,792 to 53,280. A comparable jump of 8,837 (17%) was made in just two years between 2019 and 2021, showing the impact of COVID research on academic-industry collaborations.

The pandemic also paved the way for future research by contributing to an increased maturity when it comes to working with industry, along with a growing body of evidence on best practices to handle issues specific to industry collaborations—such as commercial confidentiality and data transparency. However, the SN Insights analysis also pinpointed a downturn in academic-industry collaborations in 2022, with 59,625 papers published, so more may still need to be done to ensure institutions and companies are taking the lessons from COVID-19 into their future strategy.

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David Payne

³ Heidi Ledford, “How to solve the world’s biggest problems,” *Nature* 525 (2015): 308-311, <https://doi.org/10.1038/525308a>.

⁴ Seeram Ramakrishna, Wayne Hu and Rajan Jose, “Sustainability in Numbers by Data Analytics,” *Circular Economy and Sustainability* (2022): <https://doi.org/10.1007/s43615-022-00201-w>.

⁵ Mattia Fosci et al., “Emerging from uncertainty: International perspectives on the impact of COVID-19 on university research,” Figshare, November 9, 2020, <https://doi.org/10.6084/m9.figshare.13130063.v3>.

⁶ Springer Nature analysis of the SN Insights database, January 2023.

Partnerships with communities can demonstrate real-world impact

Alongside industry collaborations, interviewees also observed an increase in institutional collaborations with communities such as local organisations and patient groups. David credited technological advancements as a key driver of this change: “There are more channels for people to raise a flag about their issues, and the arrival of the internet and social media means that a movement can gain momentum in ways it couldn’t have done 20 years ago.” From the other side, there is an expectation that universities should be anchor institutions in their local areas, as well as a wider understanding of value and good practice when it comes to public involvement and engagement in research.

This trend could also have been influenced by a move towards impact-driven research assessment, with many funders promoting community collaborations as a way to demonstrate real-world impact (for example, the UKRI [Community Research Networks Programme](#) or the Hong Kong [Innovation and Technology Fund for Better Living](#)).

David agreed that these types of collaborations drive impact in a real, tangible way, citing a *Nature* article about the water crisis in Flint, Michigan, where community activists fought to bring officials to account, and drove scientists to test and document lead levels in the water and blood of residents⁷. “This was a really powerful story,” he explained. “It was a collaboration focused on an issue a local community faced, and they motivated researcher colleagues to feel it as passionately as they did, and ultimately come to a solution.” This partnership has had a long-standing impact, and continues to advance work to identify and improve other neighbourhood conditions.

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David Payne

⁷ E. Yvonne Lewis and Richard C. Sadler, “Community-academic partnerships helped Flint through its water crisis,” *Nature* 594 (2021): 326-329, <https://doi.org/10.1038/d41586-021-01586-8>

Part 2: Transforming collaboration infrastructure

Interviewees then collated observations from their interactions with institutions to build a view on how institutions are adapting to the trends outlined above, and the types of practices they are implementing to support a culture of collaboration.

Adapting to a hybrid world

The move to fully virtual ways of working due to the effects of COVID-19, and then a transition to hybrid working post-pandemic, has had a massive impact on collaboration infrastructure—and all interviewees noted both positive and negative results of these changes. Pre-pandemic, collaboration was very much spurred by personal interactions, “‘water-cooler’ conversations”⁸ and meetings at conferences, and Simon observed a concern about “whether the collaborations will be as rich and personally driven” in an online environment.

However, virtual workflows also made collaboration much easier, particularly for researchers with high teaching workloads or other barriers to travel. As Steven noted, “Collaboration is no longer about just meeting at a conference and sending emails; with tools like Google Meet and Zoom, researchers can connect and share ideas so much easier.”

While it is too early to know whether, and to what extent, the shift towards hybrid will continue post-pandemic, the prediction is that it is here to stay. In a recent [podcast](#) and [panel discussion](#) at Charleston Conference, librarians noted lasting changes when it came to hybrid working, but also stressed the importance of university campuses as spaces for connection and idea sharing. Simon also acknowledged the commonality of institutional and researcher commitments to shrink their carbon footprint and reduce air travel, as well as initiatives from funders such as [Wellcome](#) to include information on carbon offsetting in grant applications.

The challenge for institutions, now, is to analyse the effects of virtual working on their research environment, looking at both the positives and the negatives to develop their practices to suit a hybrid world.

Data analysis makes collaboration more strategic

The complex landscape of collaboration, as well as the growth of virtual working, brings a new need for institutions to make their collaborative efforts more strategic, and to assess potential partnership opportunities at an institutional level as well as supporting researchers in forming connections organically. The COVID-19 pandemic also highlighted the need to form long-term strategic partnerships—a 2021 report showed that in the UK, activities with these types of partners were much less negatively affected than those with non-strategic partners⁹.



⁸ Fosci et al., “Emerging from uncertainty.”

⁹ Tomas Coates Ulrichsen, “Innovating during a crisis: The effects of the COVID-19 pandemic on how universities contribute to innovation,” National Centre for Universities and Business, January 2021, <https://www.ncub.co.uk/insight/ucis-and-ncubs-innovating-during-a-crisis-the-effects-of-the-covid-19-pandemic-on-how-universities-contribute-to-innovation/>.

All five interviewees mentioned the increased sophistication of analytical tools as a key driver which is enabling institutions to make collaboration more strategic—by allowing them to get a view of their existing network as well as pinpointing new opportunities through bibliometric data. As Rong pointed out, “The key to successful collaboration is to find the right person, but it’s very difficult for a single researcher to obtain a full picture of the research landscape. Institutions have the advantage to pursue this kind of intelligence and support their researchers with the necessary information—by building a talent database, for example.” Ikuko added that institutional support is particularly important to help researchers find potential collaborators in fields outside of their expertise, where they may have fewer contacts.

Steven, who helps Springer Nature customers implement [Nature Navigator](#), a solution which helps institutions get a view on emerging research topics, agreed that the teams he works with are “becoming far more sophisticated in identifying those experts from around the world”. By using analytical tools such as Nature Navigator, they are able to pinpoint those researching and publishing in the same fields for long-term partnerships, and also explore adjacent and related topics for interdisciplinary collaboration.

Supporting researchers with information and training

Zooming in on the project level of research collaborations, there are a number of avenues institutions are exploring to ensure successful partnerships once the connections have been made. Collaborative projects require skills such as project and people management, negotiation and communication across cultures and disciplines. These areas can often be overlooked when it comes to professional development for researchers, but their importance is paramount—not only because they need to be addressed in detail for many funding applications (including Horizon Europe).

A recent Springer Nature white paper¹⁰ found that 86% of researchers thought collaboration an “extremely or very important” skill for professional development, with 72% claiming they would benefit from training in it (n=1,322). To meet this need, many institutions are investing in training opportunities such as the Nature Masterclasses online course ‘[Effective Collaboration in Research](#)’ to help their researchers develop the soft skills necessary to form and lead a successful collaboration.

Institutional support is particularly key for early career researchers. As David noted, “An experienced researcher will have an established network of people. But researchers just coming into academia often don’t know where to start, and they need much more support in finding collaborative opportunities.” He added that in a world where travel is becoming less encouraged, institutions have more to do to ensure that early career researchers have as many (if not more) opportunities to attend conferences, to join professional associations, and also to take advantage of any dedicated funding available to them.

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David Payne

¹⁰“Research, publication and beyond: The support researchers are asking for,” Springer Nature, accessed December 21, 2022, <https://www.springernature.com/gp/librarians/landing/support-researchers-asking-for>.

Innovations in models of collaboration and assessment

Institutions also have a key role to play when it comes to finding new ways to collaborate and facilitate conversations between researchers. Though funders and policymakers are integral to this progress, institutions are developing new practices that encourage collaboration in a changing landscape. For interdisciplinary collaboration, Steven gave the example of “speed-dating” sessions to facilitate conversations between researchers in different departments.

For international collaborations, requiring researchers to meet with other research groups as a necessary part of a conference visit is a practice that worked well, and is now quite commonplace. But many institutions are taking this even further, implementing a global approach as part of the fabric of the learning culture—for example, by forming global alliances and networks, or introducing schemes for visiting researchers or researchers who want to spend some time in a different country. David highlighted joint supervision degrees, where doctoral students spend some time in a partner institution as a particularly successful initiative. He explained, “That period where they are overseas ends up being crucial to their ongoing career. They forge links with people during the course of that time, and then cement those relationships when they go back.”

Part and parcel of this is a move away from the lone researcher, driven by research assessment and developments in research culture to recognise the wider team involved in research projects. Alongside developing new models to facilitate collaboration, innovations are also being made to incentivise collaborative research at a project level—partially due an increased emphasis on impact as mentioned previously, but also because institutions are embedding collaboration into frameworks for career development and progression. These initiatives have borne fruit (with a 2021 study showing that large collaboration networks positively impact career progression¹¹) and can be continued and enhanced into the future.

¹¹Jessica E. M. van der Wal, Rose Thorogood and Nicholas P. C. Horrocks, “Collaboration enhances career progression in academic science, especially for female researchers,” *Proceedings of the Royal Society B* 288, 1958 (2021), <https://doi.org/10.1098/rspb.2021.0219>.

Key takeaways

From these discussions, the takeaways for institutions can be categorised into two broad segments: ways to improve the strategic direction of their collaborative efforts, and ways to support and encourage researchers with individual collaborative projects.



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