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Research Transformation: Change in the era of AI, open and impact: voices from the academic community

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Research Transformation

Change in the era of AI, open and impact: voices from the academic community



TRANSFORMING RESEARCH

The way we interact with information can amplify our ability to make connections, and in doing so transforms how we understand the world. Supercharged by the AI moment that we are in, the steady march of digital transformation in society over the last three decades is primed for rapid evolution. What is true for society, is also doubly so for research. Alongside ground-breaking research and discoveries is the constant invitation to adapt to new knowledge and abilities. Combine the general imperative within the research sector to innovate with the rapidly evolving capabilities of generative AI and it is safe to say that expectations are high. Taking effective advantage of new possibilities as they arise however, requires successful coordination within society and systems.

At Digital Science, we have always sought to be an integral part of research transformation, aiming to provide products that enable the research sector to evolve research practice – from collaboration and discovery through to analytics and administration. Our ability to serve clients from research institutions to funders, publishers, and industry has placed us in a unique position to facilitate change across the sector, not simply within silos, but between them.

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Change in the era of AI, open and impact

Introduction

Change and uncertainty have become our global norm. While some aspects of life are business as usual, our lives have changed and are changing at pace. COVID-19, financial crisis, conflicts, technological advances, climate change and growing societal needs are influencing change in all sectors and facets of life. And academia is no exception. Academia has often been criticized as slow to change, but external pressures from an increasingly complex world are forcing rapid change in the sector.



We need answers to pressing issues and there is a growing expectation for research to deliver. But increasing demands, tightening budgets, and lack of infrastructure can stand in the way of progress. We need solutions and many are turning to emerging technologies for support.

Research transformation

Research Transformation: Change in the era of AI, open and impact report brings to life the opinions of the academic community and offers a deep understanding of the sector's changing needs. It explores how academic roles are evolving, the external drivers of change, and future predictions. We also look at Digital Science's work with the sector to support change, with a particular focus on AI, open and impact.

The report is the culmination of our ongoing investigation into Research Transformation. The series celebrates the art of change and examines how research data can lead to actionable insights, how the changing role of research is affecting academia and industry, and how new technologies can make research more open, inclusive and collaborative.

The first part of the series tells the story of research data transformation, looking at how the structure of research papers has evolved and how transitions in publishing practice have enabled the diversity of the research workforce to become visible. The second part explores the story of connection, including the transformations needed to build effective research collaborations. In this third and final part, we look at research innovation, focusing on the ways emerging technologies like AI are influencing the way research is conducted. In addition to technologies, we explore other drivers of change such as funding policies, sustainability, the open access (OA) movement and social responsibility. We consider the opportunities, overlaps and challenges that come with change, and the innovations required to support research transformation.

Driving progress for all

This is where Digital Science can help. Originally established by the research community as an incubator in 2010, our goal remains to advance global research by solving the community's biggest challenges through innovative technology. We aspire to be at the forefront of progress, supporting change in the sector, and finding new solutions to old and new problems. Our job is to make life easier for everyone in the research world – researchers, universities, funders, industry, and publishers – so that research can become open, fairer, faster, freer and more connected to drive progress for all.

To understand more about how the research world is transforming, what's influencing change and how roles are impacted, we commissioned a report, reaching out to the research community through a global survey and in-depth interviews with thought leaders.

The survey

Findings are based on survey analysis, plus insights from in-depth interviews with thought leaders. The survey was an online questionnaire of open and closed questions that ran between 29 May and 12 July 2024. A total of 380 respondents from 70 countries in Europe, Middle East, and Africa (EMEA), Asia–Pacific (APAC) and the Americas participated in the survey. They held roles within the academic library, research office, faculty and leadership. Detailed interviews carried out by an independent research insights company were held with 15 participants from the academic community over the summer of 2024. Our goal was to learn about the community's experiences, perspectives, and predictions of evolving roles, to help us identify the key areas that need attention and innovation.

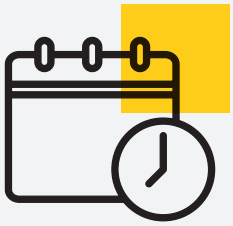
Survey demographics summary

380 Respondents





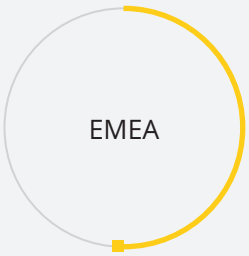




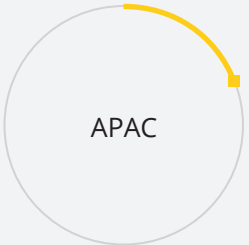
Regions



29%



51%



19%

Job title

Library 38%

Research Office 37%

Leadership 12%

Faculty 10%

Other 3%

Time in current role

<1 year 13%

1-5 years 38%

5-10 years 18%

10+ years 31%

5 Key Findings

Five key themes emerged from our findings in the areas of open research, impact and evaluation, technology and AI, collaboration, and research security.

1. Open research is transforming research, but barriers remain

- Open research cited as most positive change in last five years
- Open research top change the community would like to see in the next five years
- Challenges in open research include lack of awareness, funding, support, resources and infrastructure
- Concerns around data security, research quality and competitiveness.



82%

of respondents say that open research advancements will have the most impact on research over the next five years

2. Research metrics are evolving to emphasize holistic impact and inclusivity

- Frustration with traditional metrics, but they still hold weight
- Call for a more holistic evaluation of research impact and quality
- A limited shift to more responsible use of traditional metrics and introduction of alternative metrics
- Institutes addressing academic culture issues but need greater recognition for non-traditional contributions.



77%

of respondents expect to spend more time on 'Research Impact and Evaluation' over the next five years

3. AI's transformative potential is huge, but bureaucracy and skill gaps threaten progress

- Emerging technologies will continue to impact roles over the next five years
- New technology expected to drive efficiencies in data and analytics, and open research
- Call to address AI skills gap and introduce change management strategies
- Enthusiasm for AI tempered by concerns around ethics, security and integrity, as well as AI bias, hallucinations and impact on critical thinking.



69%

of respondents stated that skills gaps are having an extremely high or moderate impact on their role today

4. Collaboration is booming, but increasing concerns over funding and security

- Interconnected technology and open research support greater global connectivity
- Collaboration has multiple benefits e.g. can increase citations and enhance research quality
- Easy to find collaborators, but scarce funding to support partnership
- Increasing concerns around research security and 'damaging' collaborations.



80%

of respondents believe collaboration outside of academia is changing the way research is performed

5. Security and risk management need a strategic and cultural overhaul

- Security threats putting international research collaborations at risk
- Institutions tasked to balance risk and innovation, but they aren't equipped
- Risk management conflicts with other priorities
- Tendency to 'wait and see', rather than proactive management.



45%

of respondents report an increase in the amount of time they spend on research security compared to five years ago

Key Finding 1

Open research

Open research is transforming research, but barriers remain

Academic research has shifted towards more open practices in recent years, but factors like intellectual property, national security and academic prestige have often limited its practice. Today's open research approach is about transforming the entire scientific process, promising greater transparency, accountability and accessibility in the way research is both conducted and shared. Open research aims to make knowledge freely available to wider audiences to accelerate scientific progress and further the societal impact of research. To this end, open research is taking shape in the form of open collaboration, open research data, open peer review and open access (OA).

Major push for open access

OA publishing is one area that has seen significant growth. It focuses on making the final research output (such as research articles) openly accessible. OA has largely been driven by funder demands on publishing and a push from the sector to make research fair and equitable. Research published OA often benefits from increased citation and usage, along with greater public engagement, collaboration and research impact.

Funder initiatives include Europe's funder-led Plan S, which requires authors funded by public grants to publish their research in OA journals or platforms, and the US Office of Science and Technology's memorandum for federally funded publications to be made immediately and freely accessible to the public by the end of 2025. In India, the proposed 'One Nation One Subscription' (ONOS) initiative requires all national and international journal publications and research papers to be published OA.

Huge growth in open access articles

Dimensions data shows that the number of OA research articles between 2008 and 2023 rose from 712,933 OA publications (32.2% of all articles published) to 3,519,951 (63.3%). Much of the growth has come from OA-only publishers like MDPI and Frontiers, but traditional scholarly publishers are witnessing large increases too. Wiley report that 50% of its citable articles were published OA in 2023, up from 22% in 2019. Springer Nature witnessed similar growth in 2023, announcing that around 44% of its research articles were published OA, up from 38% in 2022.

Uptake of OA articles, reviews and conference papers is also showing an upward trend, reports STM, from 11% in 2013 to 38% in 2023. Interestingly, paywalled, subscription-only content is falling but continues to remain a mainstay, dropping from 70% in 2013 to 52% in 2023.



Open access on shaky ground

OA does appear to be the future, however, there are bumps in the road. OA-only publishers like Hindawi are a case in point, where greater access to publishing infrastructure met with challenges in guarding against publishing content associated with paper mills. Hindawi had shown promise in OA growth and as such was acquired by Wiley in 2021. However, its success was short-lived, and Wiley retired the brand in 2023 following revelations that Hindawi had been compromised by paper mills.

Perhaps in reaction to these challenges, along with growing industry wide concerns around research integrity, OA-only publishers like MDPI and Frontiers are showing a downward trend in the number of OA articles published in 2023/2024.

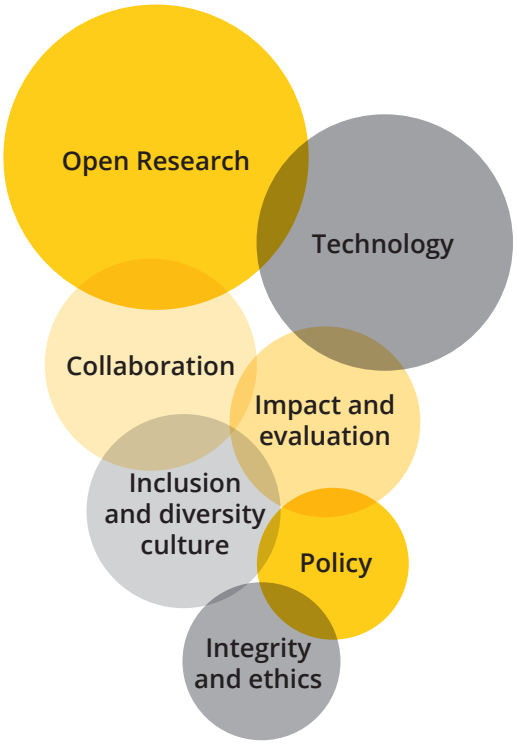
Who pays?

Another potential barrier to OA is the article processing charges (APC) that publishers charge to cover the cost of publishing operations (e.g. copy editing, journal development, commissioning, peer review administration, marketing). APCs are usually paid by the author, or their institution or funder. There are concerns, however, that authors with limited access to funds won't be able to publish OA and therefore APCs might deepen global inequalities.

Open research cited as most positive change in research in last five years

Despite the challenges around OA, survey respondents cited open research as the most positive change to the academic research landscape in the last five years. Beyond breaking down paywalls, open research is a drive for much deeper and wider transparency in research. Open research encourages transparency at every stage – from data collection and analysis to sharing methodologies, tools, and negative results. As such it aims for all research outputs (publications, data, code, software, etc.) to be open and accessible to all levels of society to have the greatest impact and solve global challenges.

The top most positive changes in research in the last five years



Biggest gains in reproducibility and sustainability

Respondents felt that open research policies and infrastructure development had helped to further progress in reproducibility and sustainability. There was also mention of its transformative effect on the remit of library roles.

> *The focus and push for open research infrastructure has provided sustainability to a system that allows for more inclusive, more accessible research."*
>
> **Senior Library Assistant (USA)**

> "*The idea of open science – is great, but in practice – management have to start focusing on more than just 'Papers being OA' imagine we could share OERs as well as Data, and being measured on this too.*"
>
> **Senior Information Officer / Librarian (Denmark)**

> *"Funder mandates re: data management. I truly think this is a huge step forward in solving the reproducibility crisis."*
>
> **Science Librarian (USA)**



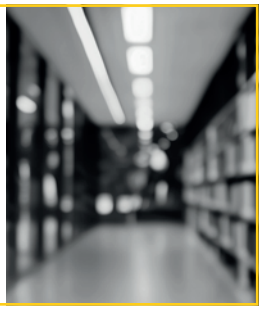
> *Progress toward systemic changes to further OA adoption. It's feeling like we're reaching a tipping point, like ejournals in 1989."*
>
> **Senior Analyst and Strategist for Collection (USA)**

> *Open science has affected research and academia significantly and changed drastically the roles of librarians in academic libraries."*
>
> **Information Librarian (South Africa)**

Future of open research

Open research is expected to remain a transformative force in academia for the foreseeable future, as respondents cite open research as the top change in research they would like to see in the next five years.

> *Greater inclusion of open access and open science principles."*
>
> **Librarian (Spain)**



> *Far more support and adherence around data sharing. Moving away from the journal article format as the only output that matters – more open protocols, open data, preprints etc."*
>
> **Head of Library and Information Services (UK)**

> *I hope to be more open, and more ethical. The other changes are just tools that can be well-used or and poorly used."*
>
> **Librarian (Portugal)**

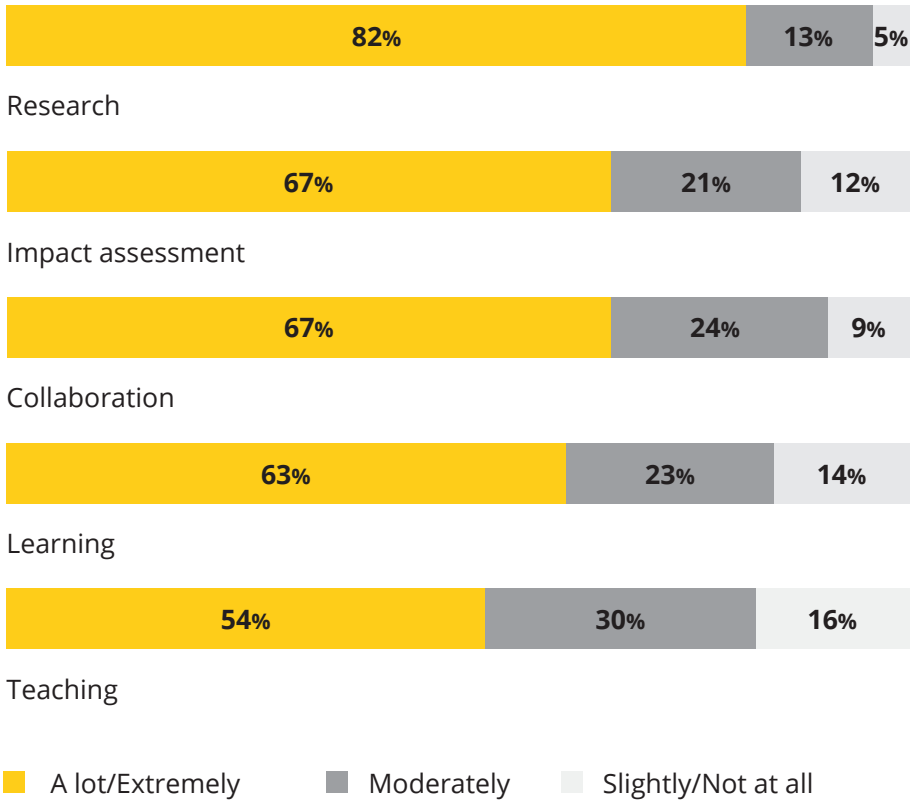
> *More reliance on open source data and metrics. More diamond open access journals."*
>
> **Research Metrics Analyst (UK)**

Where will impact be felt the most?

With open research expected to grow over the next five years, which areas of the research landscape will it impact the most? Most respondents agree that open research advancements will have the most impact on research (82%), followed by impact assessment (67%), collaboration (67%), learning (63%) and teaching (54%).



Q: To what degree do you think open research advancements will impact the following?



What are the blockers to open research?

Interviewees cited several barriers to open research, including lack of awareness around open research practices, lack of funds, and fears over research quality. Similar concerns were reported in a study at Leeds University in 2021 that looked at researchers' attitudes to open research. It identified resistance to moving away from cultural norms within research communities and lack of incentives as being challenges to open research, along with having insufficient information, training and time. A lack of funding for APCs was another obstacle to open that was investigated in a Springer Nature report in 2020.



Lazarus Matzirofa, Associate Director of Research, Scholarly Communications, and Digital Assistance, University of Witwatersrand, South Africa, points to a lack of understanding of open science as a major barrier to progress.

"The challenge we have at the moment is ensuring that the executives of the university understand the linkage between open science and university rankings. Other challenges include a major lack of understanding among researchers about open science, and AI related to open science. We also lack the technological capability and infrastructure in the university that could help us harness many opportunities."



Daisy Selematsela, Head of Libraries, University of Witwatersrand, South Africa, explains the library's role in demystifying OA.

"We have a government draft on open science and there are funders which have OA mandates. Libraries wrote the OA policies linking to that, so we guide researchers on data management, transformative agreements, hybrid publishing and so forth."



Jingwen Mu, Director of Institutional Research and Strategic Planning, Hong Kong Baptist University, noted that the university supported OA but some academics had reservations over the quality of OA journals.

"I encourage OA at my institution, but some academics are saying OA journals in their areas are perceived as less prestigious or lower quality. Finding a way to show OA plus high quality journals is something that academics will find very useful, especially for those who have yet to embrace or explore open. Putting that additional information alongside open research will certainly give some academics assurance."



Natalie Dallat, Head of Research Performance and Innovation at Ulster University, UK, said there had been insufficient funding and resources to accelerate open research, but that was changing.

"Although our strategy is very ambitious and we talk a lot about open research, the funds and resources in the university are limited. We always find that we are constantly battling or looking for support. The situation is improving though as we have now appointed a new team within the library where three posts are going to be responsible for open research and open data."

Open data issues

Interviewees also highlighted open data and security as major blockers to open research.



Kevin Dunn, Provost, Western Sydney University, Australia, praised the progress made in open research, but raised concerns over data security.

"There is already more use of measures of OA whether that is data or publications and generally they are good. They are democratic and transparent. However, and this goes to the security and privacy part, I do not think we have sufficiently thought through how we can absolutely be confident about privacy and security at the same time as we go full sail into open."



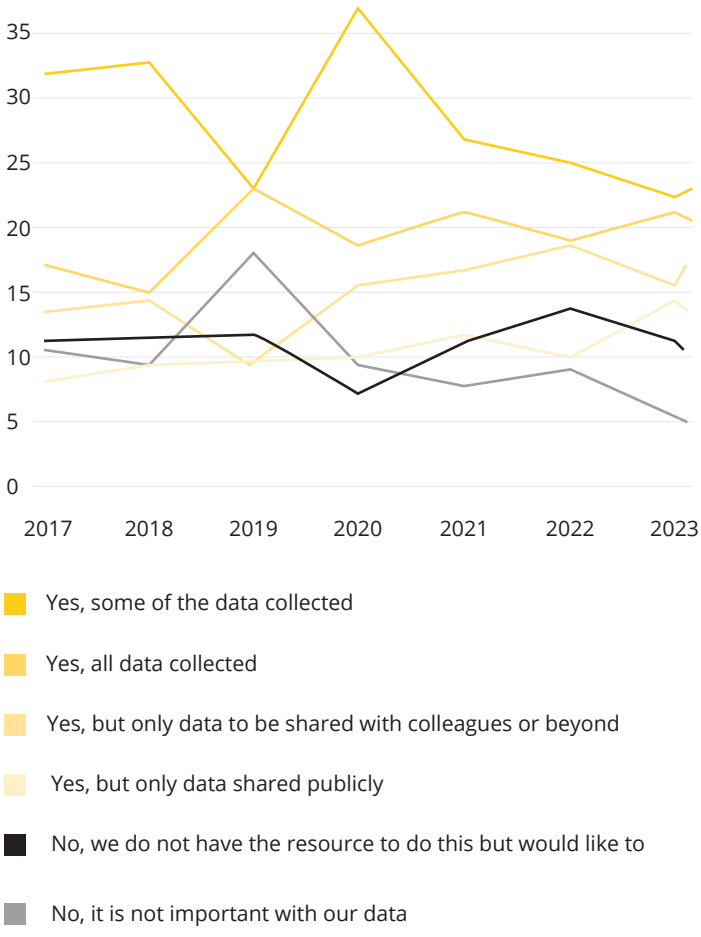
Mahendhiran Sanggaran Nair, Vice Chancellor for Research and Sustainability, Sunway University in Kuala Lumpur, Malaysia, pointed to issues around data security and competitiveness.

"Open science policy is still in its embryonic stage in many developing countries. It is gaining traction among some institutions in the developing world; but many are not aware of it or are concerned about how the information will be used. One of the major challenges is related to trust among the various institutions and industry players. The question is why would firms or educational institutions want to give their data if it means they are going to lose their competitiveness? The governance of open science policy needs to balance between data security and the incentives for firms and educational institutions to participate in the programme. Careful thought must be given to ensure robust governance and incentive systems are in place for broader adoption of open science policy among all players in the ecosystem."

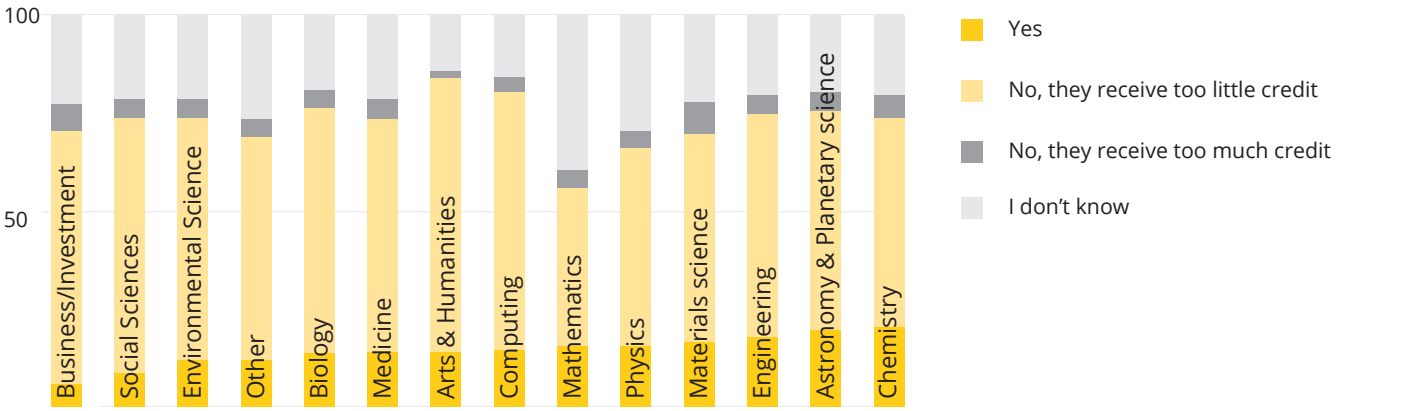
The State of Open Data

Concerns around open data and security were significant themes in Digital Science's The State of Open Data 2023 Report. The report revealed worries over the misuse of openly shared data and lack of credit for open contributions. It also noted that almost three-quarters of academics had never received support for making their data openly available.

Q: During or after data collection, do you curate/ prepare your data for sharing (whether privately or publicly)?



Q: Do researchers receive enough credit for sharing their data? (%)



How can we make progress in open research?

Open research is a goal supported by many institutions globally, but it requires more resources, funding and support, along with better infrastructure and awareness around data security. Change requires commitment and collaboration across the sector and as such initiatives like the Barcelona Declaration on Open Research Information are helping to further progress on open research. The Declaration, supported by organizations including Digital Science, advocates for making openness the default for research information, supporting open infrastructures, fostering collective action, ensuring ethical use, and promoting sustainability. Digital Science has also declared Open Principles around community ownership, infrastructure, stakeholders and trust.

To further support open research, The State of Open Data 2023 report provides a full list of recommendations for policymakers, researchers, academic institutions and publishers. It covers actions around credit for data sharing, access to support with data sharing and open data guidelines and is published in late 2024.

> *Digital Science welcomes the Barcelona Declaration and the global initiative to support open research. Open research principles are part of our company's DNA and they are always something we're striving towards."*
>
> **Daniel Hook, CEO, Digital Science**



Key Finding 2

Impact and evaluation

Research metrics are evolving to emphasize holistic impact and inclusivity

Survey respondents and interviewees expressed frustration with traditional impact and evaluation metrics. They want increased focus on the broad and interconnected implications of research and more efforts to ensure research process and outcomes are accessible and beneficial to all, especially underrepresented or marginalized groups.

Traditionally, research metrics have centered around quantitative measures like citation counts, h-indices, and journal impact factors (JIFs). These are undoubtedly important for assessing scholarly output, but they don't capture the full picture. The JIF was originally intended to help librarians choose journals for their collections but has frequently been misused as a method for assessing the quality of research papers and prestige of authors.

There's a recognition that institutions need to consider impact and evaluation more holistically, shifting from a focus on research outputs to a diverse set of factors including people, societal and cultural impacts.

We are seeing more responsible use of metrics, but progress is limited

The research community, including scholarly publishers and funders have heavily criticised the misuse of JIFs, calling for responsible use of metrics and holistic evaluation of impact. The Leiden Manifesto, The Metric Tide report and initiatives like the San Francisco Declaration on Research Assessment (DORA) are helping to influence change. Over 25,000 publishers, funding agencies, institutions, organisations and individuals in 165 countries have signed DORA.

Many universities have pledged not to use JIFs as a measure of quality of individual research outputs. Utrecht University and Leiden University in the Netherlands are among the organisations that have committed to stop the use of JIFs in hiring and promotion decisions. This comes as a move by Dutch academics to improve their recognition and reward systems. Utrecht also opted out of the Times Higher Education league table in 2023 and follows its sign-up to the INORMS More than our Rank initiative, in which institutions can promote their activities, achievements and ambitions beyond global rankings.

What has been the most positive change in research in the last five years?

> *The penny is finally dropping more broadly around traditional metrics not being suitable (or the only) indicators of research quality; overuse and misuse of metrics; rankings systems being narrow, volatile and changeable. The shift toward valuing contributions toward open science and a focus on the reasons people are doing research (mostly societal benefit) rather than to accumulate citations or have a high h-index. The challenge is how (or if?) we measure the broad contributions in order to incentivise and reward them when the whole system to date is geared in another direction."*
>
> **Director of Research Strategy (Australia)**

> *I would like to see more robust methods of analysing impact...and a more complete impact analysis (including economic and societal) of scientific endeavours."*
>
> **STEM Librarian Associate Dean (USA)**

> *Rewarding the truly valuable work being done, rather than what is easily measured. Quality cannot be quantified."*
>
> **Librarian (USA)**

Funding bodies such as Wellcome and UK Research and Innovation (UKRI) among others discourage the inappropriate use of JIFs and other metrics, and expect assessment to be based on all research outputs e.g. software, patents, commercial activities, etc, in addition to research publications.

Publishers such as Sage, Cambridge University Press and Wiley have committed to making available a range of article-level metrics, including article usage and citations from Crossref and Web of Science. The Altmetric Attention Score is an increasingly used alternative metric and this measures the quality and quantity of attention that research outputs receive online such as through social media, traditional media and blogs.

All these initiatives are making a difference in how research is evaluated and leading to more responsible and holistic approaches that better reflect the diversity and complexity of academic work. Yet, the misuse of JIFs and the pressure to publish in high impact journals remains a significant problem. Continued efforts are needed to further shift the focus from simplistic metrics to more holistic and meaningful assessments of research quality and impact.



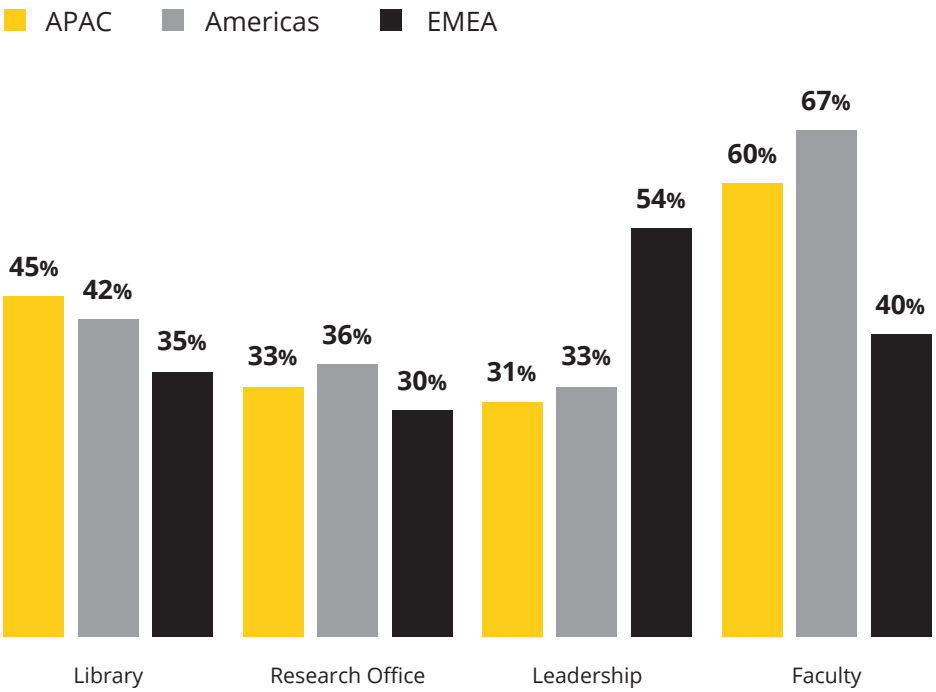
Michelle Vincent, Director of Research Strategy and Performance at Swinburne University of Technology, Australia, points out that while universities may intend to move away from traditional metrics, rankings remain important because of their role in generating income.

"We are mainly funded by teaching international students from China and India. Because those student markets often rely on international rankings to choose where they will study and international rankings use traditional metrics, universities are torn on moving to these better focused things like open for the benefit of society and integrity for the benefit of everyone and we are bound to chasing the bad traditional metrics for international students to fund the research that we should be doing in a transparent manner."

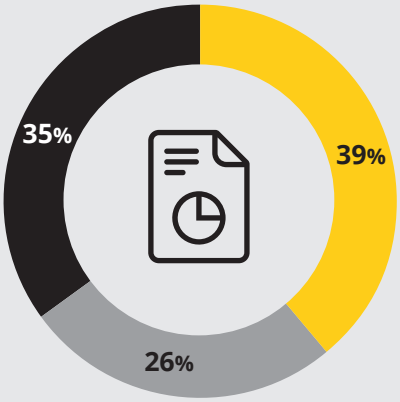
Impact of metrics on jobs

Despite the research community's sentiment to move away from metrics, they still play a crucial role. 65% of respondents told us that an increased focus on metrics was having a moderate to extremely high impact on current roles. Metrics aren't the community's only concern though, with respondents giving weight to a multitude of issues including 'greater complexity' (77%), 'more stakeholders to satisfy' (71%), 'more data to manage' (69%), and 'increased pressure' (69%).

Percentage of respondents impacted by an increased focus on metrics



Q: How significantly does an increased focus on metrics impact you?



A lot/Extremely

Moderately

Slightly/Not at all

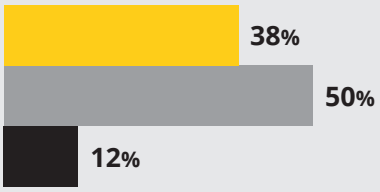
273 Responses

Research impact huge driver of research performance

Research impact, which can include both academic impact as well as broader economic and societal impact, has a major influence on research practices. In our survey, research impact appears among the top three factors influencing change in research performance. 88% of respondents selected 'more emphasis on research' as influencing the way research has been performed over recent years topped only by technological advancements (93%) and increased budget pressures (91%).



Q: How significant has an increased emphasis on research impact been in changing the way research is performed over recent years?

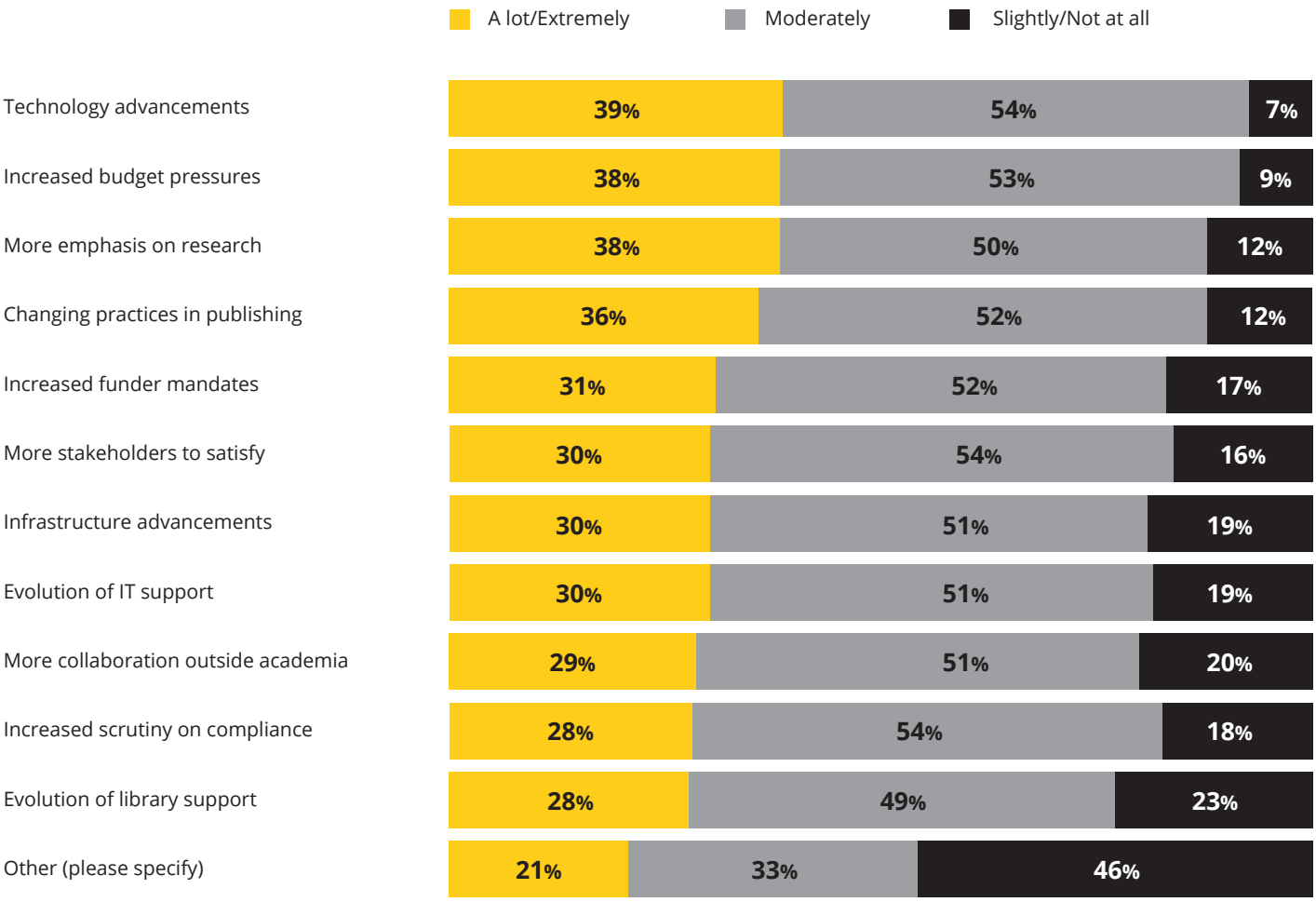


A lot/Extremely

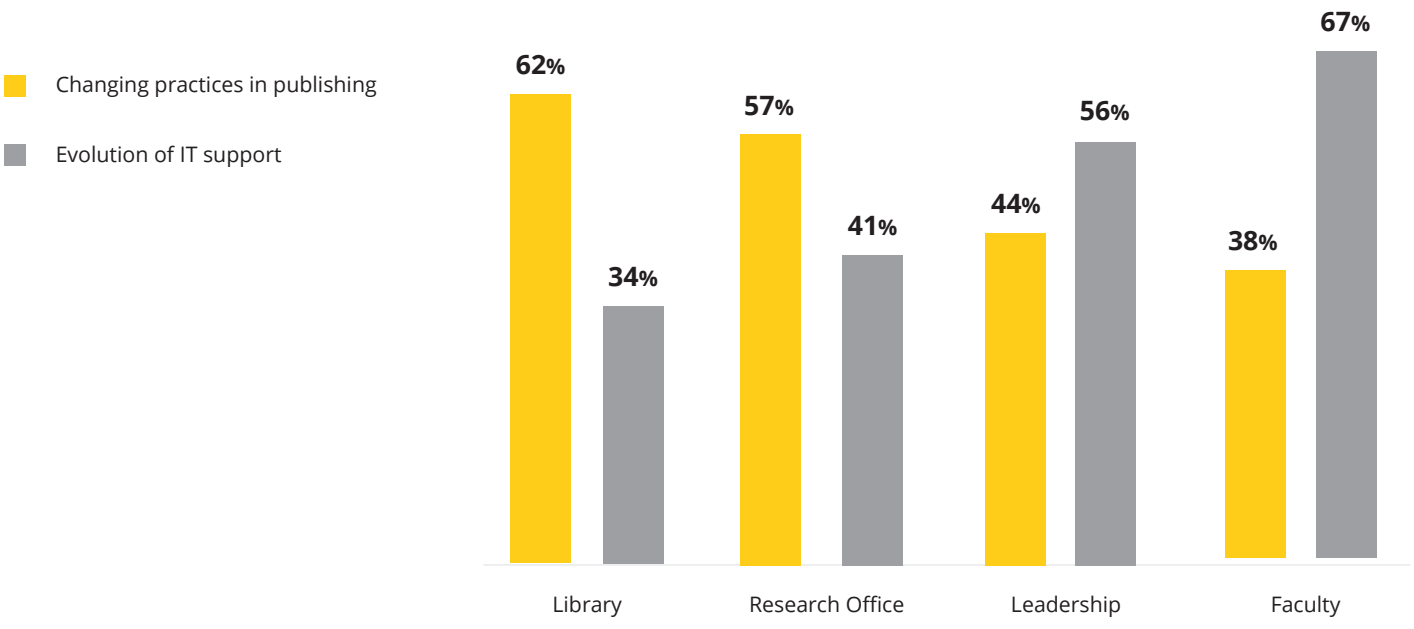
Moderately

Slightly/Not at all

Q: How significant have the following factors been in changing the way research is performed over recent years?



Q: How significant have the following factors been in changing the way research is performed?



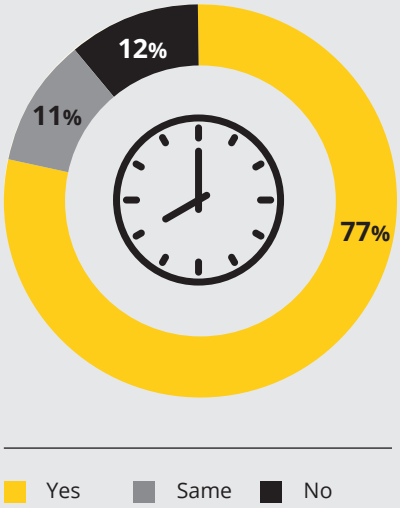
Will research impact and evaluation be important in the future?

There has been a growing interest worldwide in the impact research has on society, particularly among governments and funders as they look to ensure the research they fund makes a real-world difference beyond academia. Research evaluation systems across the world have started to include the assessment of societal impact. The UK's Research Excellence Framework (REF) is probably the most cited and has influenced impact evaluation assessments in other countries, including Poland, Norway and Hong Kong. Governments and funders in countries such as USA, Spain, Sweden and Australia have also introduced some form of broader research impact assessment.

Despite the difficulties around research evaluation, respondents don't see it going away any time soon, and in fact, expect it to become more of a focus in the future.

Additionally, 77% of participants expect to spend more time on 'research impact and evaluation' over the next five years. This answer topped the list, followed by academic leadership (74%) and student success (70%).

Q: Do you expect to spend more time in the next five years on research impact and evaluation?





Kevin Dunn, Provost, Western Sydney University, Australia, discusses the need for more global recognition of the importance of research impact on society. He would also like better evaluation methods for assessing the broader impacts of research.

"In our university, and in the sector to a lesser extent, there has been a move towards research impact as part of research excellence. However, our metrics and measures for impact are still woolly, and across most of the world, most assessment exercises are not really measurements, they are case study based. The other issue is that the global recognition of the importance of impact is not where we want it to be, but again that is changing. You can see that change in the assessment exercises around the world, including in Britain. And, then the final concern is around how we adequately reward impact in universities."



Sally Smith, Director of Research at Trinity College Dublin, highlights the shift from a focus solely on performance metrics to one that is also concerned with improving research culture.

"In recent years, there has been a very welcome emphasis on research culture and open research, and concern with other types of metrics and behaviors that are not as hard-nosed as they once were. I do think there are challenges for truly interdisciplinary work being recognized within structures that are traditionally based in disciplines. At some point very hard choices will have to be made about rankings or engagement with rankings."



Michelle Vincent, Director of Research Strategy and Performance, at Swinburne University of Technology, Australia, observes a transition from metrics to the societal impact of research, and raises the need for better evaluation measures.

"We don't have good ways to measure things that make good research and research culture like leadership, integrity, openness, reuse, and some of the open science principles. We have seen a move from quantity (counting things like the number of papers and citations) to a focus on quality (looking at impact – what is it doing for the real world). Quality is hard to measure but I am sure we can come up with some sorts of ways that are mostly case study based."



Lazarus Matzirofa, Associate Director of Research, Scholarly Communications, and Digital Assistance, University of Witwatersrand, South Africa, noted the increasing use of Altmetrics in demonstrating impact.

"In the past, researchers thought citations were their game, but we are now providing other alternative examples. When we look at the Altmetric usage, the impact on the SDGs (Sustainable Development Goals) – which is not a traditional academic measure in the area of how researchers will check their socio-economic impact – the library is advocating and encouraging researchers to consider how Altmetric tool can add value to how they can understand that citations are their peer impact, whereas alternative metrics are providing them with community engagements through Altmetric and the SDG impact areas."

Addressing research culture

Traditional research evaluation practices have mainly focused on publication outputs as a measure of impact and as such many researchers have felt pressured to publish in high impact journals in order to progress their careers. Such emphasis has led to siloed and competitive work environments and given rise to bullying and mental health impacts. Efforts are underway to address poor research culture, with universities embedding strategies and action plans to recognize non-traditional contributions and open research practices.





Natalie Dallat, Head of Research Performance and Innovation at Ulster University, UK, explains why there must be more recognition for all contributors to research and what this looks like in practice.

"Research culture is all about attitudes and behaviors, how we treat staff, how we recognize them for the research, how we include people who are not traditionally seen as contributing to research. It is making sure that people are recognized and rewarded for how they support the researchers because we are sort of the background people and not seen in the publication, not seen on the awards. So, we are starting to name more people in the awards and publications. Research culture is also about supporting people in their career trajectory and making sure they are getting recognized for things that they are not traditionally recognized for like open research practices."



Jingwen Mu, Director of Institutional Research and Strategic Planning at Hong Kong Baptist University, also notes the difficulties of culture change.

"Trying to change the research culture of the university to try and do things like look at public engagement and impact in a way that won't bring you hard metrics. You are often trying to advocate for that change to people that flourished in the old system. That is a real challenge."

Advances in research culture

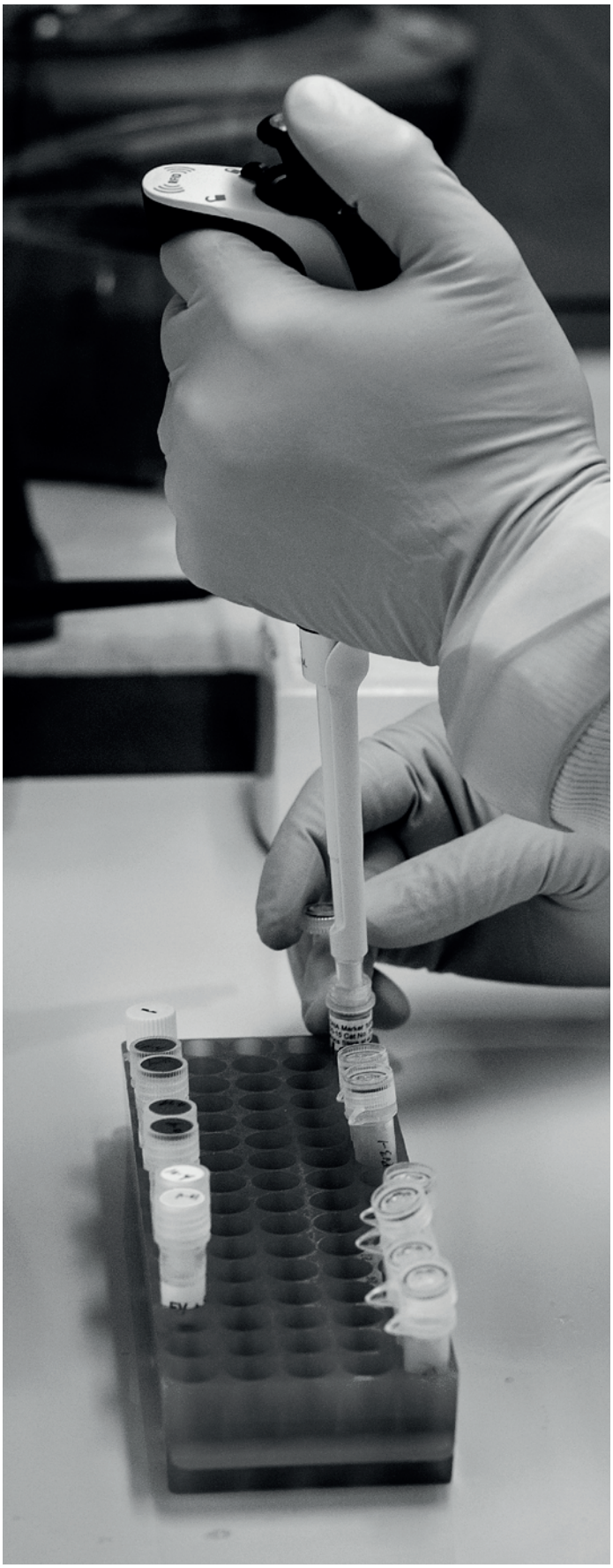
Institutions around the world are working to improve research culture. ETH Zurich in Switzerland, for example, has made significant strides in promoting a fair research environment through its Diversity Strategy. The institution focuses on creating an inclusive culture and supporting diverse talent within the research community. The University of Amsterdam has been proactive in fostering a positive research environment. Its Strategic Research Framework emphasises open science, interdisciplinary collaboration, and responsible research practices. In the USA, Stanford University's Center for Open and Reproducible Science (CORES) promotes transparency and open science, encouraging researchers to share data, code, and findings openly. It also fosters diversity and inclusion and community-mindedness. In the UK, University College London (UCL), has created a 10-year Roadmap in partnership with the research community to deliver a fair, collaborative and inclusive research culture. In 2024, UCL was awarded £1m from Wellcome's Institutional Fund for Research Culture (IFRC) for its 'Enabling collaboration and team science' programme.

Homing in further on the UK, many initiatives are underway at all levels. At a national level, the UK Government has created, the Research and Development People and Culture Strategy, which calls for collective efforts to create a positive and inclusive research culture.

UK organizations and funders are also striving to make a difference to research culture. Wellcome published a report in 2020 that revealed the research culture experiences of more than 4,000 researchers in the UK and globally. Since then, Wellcome has committed to creating a healthier and more inclusive research culture. The Royal Society is another organisation taking steps to improve research culture. Its research culture programme, Changing Expectations, looks at how to support positive culture change in the science community.

There are also grassroots movements in the UK, such as The Hidden REF, which campaigns for a shift in research assessment. The group calls for research evaluation assessments, namely the Research Excellence Framework (REF), to recognise all roles and outputs of impactful research. Supporters hope this will be a consideration in REF 2029, which has already committed to having greater emphasis on people, culture and environment.

All these initiatives illustrate the research community's desire to make research practices fairer, more open and more inclusive, but more collective action is required.



Key Finding 3

Tech and AI

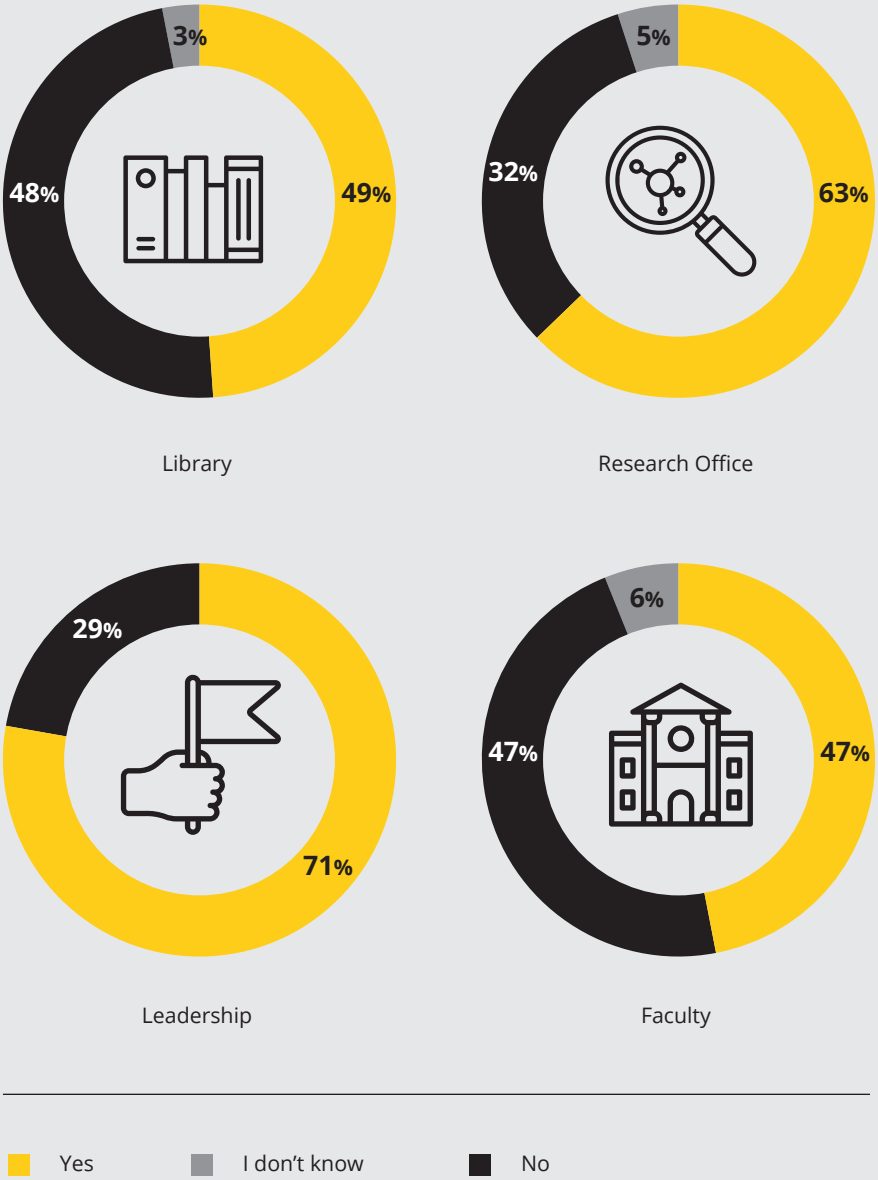
AI's transformative potential is huge, but bureaucracy and skill gaps threaten progress

Artificial intelligence (AI) technologies, including large language models like ChatGPT, and other tools like deep learning and machine learning, are impacting roles within academia. Researchers are using AI tools across multiple fields to streamline processes, improve accuracy and boost creativity. AI is helping them to generate ideas, source and summarize articles, draft literature reviews, analyze massive datasets, improve academic writing, and visually present complex data. In academic libraries AI is increasingly being used to aid discovery improve search accuracy and accelerate workflows. AI tools are transforming content accessibility, information delivery search and discovery and personalization.

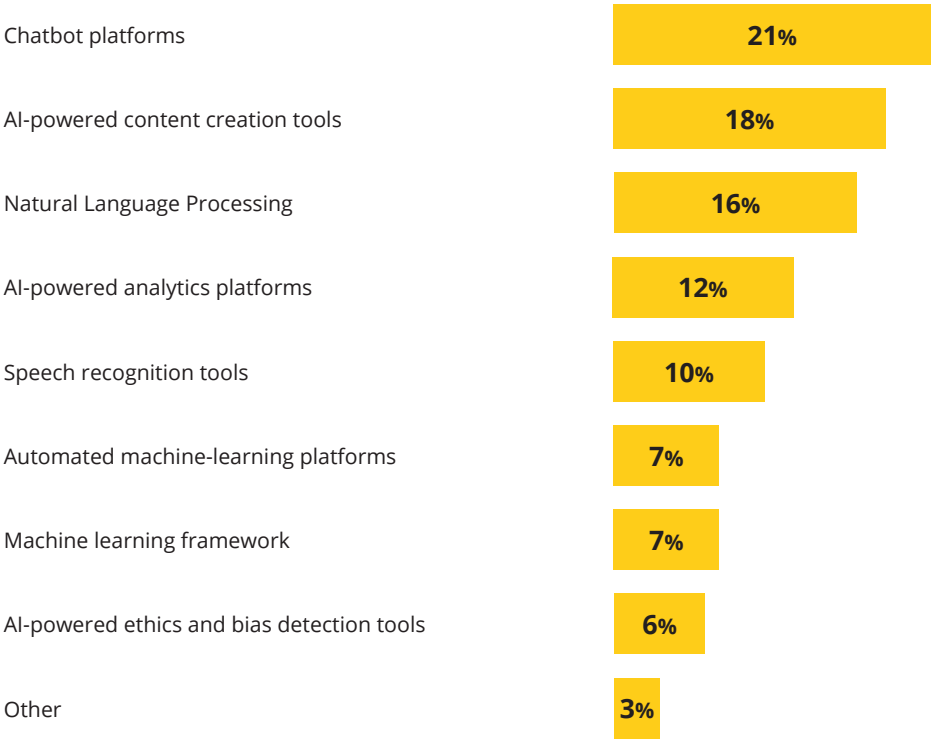
Our survey found that respondents are using AI tools to support current ways of working. Leadership expressed the highest uptake (71%), followed by the Research Office (63%), Library (49%) and Faculty (47%). Chatbot platforms are the most popular tool, chosen by 21% of respondents, followed by AI-powered content creation tools (18%) and Natural Language Processing tools (16%).

Technology has been influential over the last five years: 84% of respondents believe that technological advancements have had a moderate to extremely high influence on their role today.

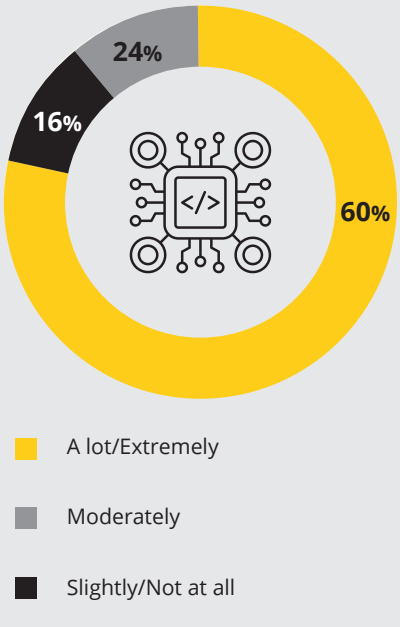
Q: Are you using any AI tools to support current ways of working?



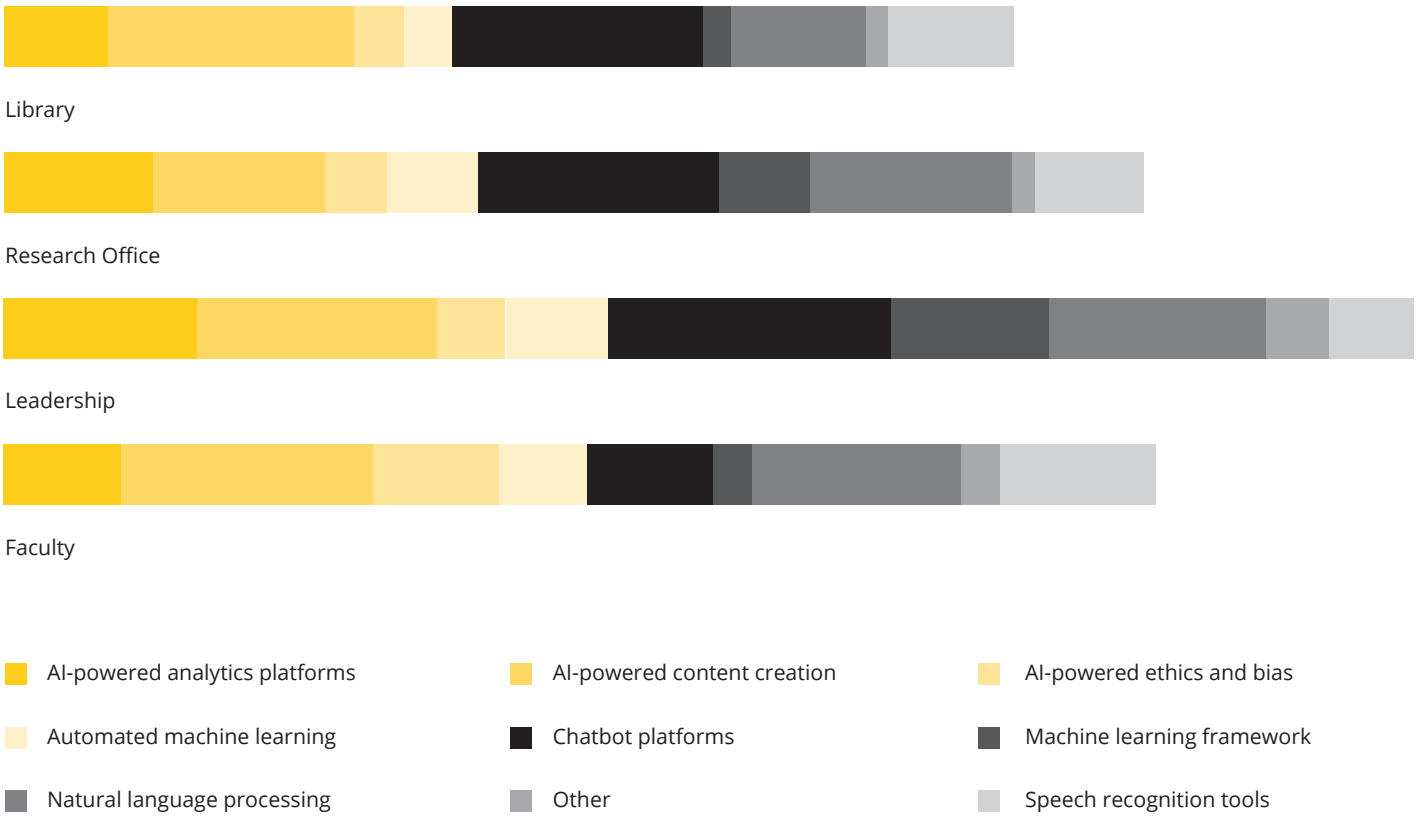
Q: Do you use any of the following AI tools?



Q: To what degree do you see the following external forces influencing your role today?



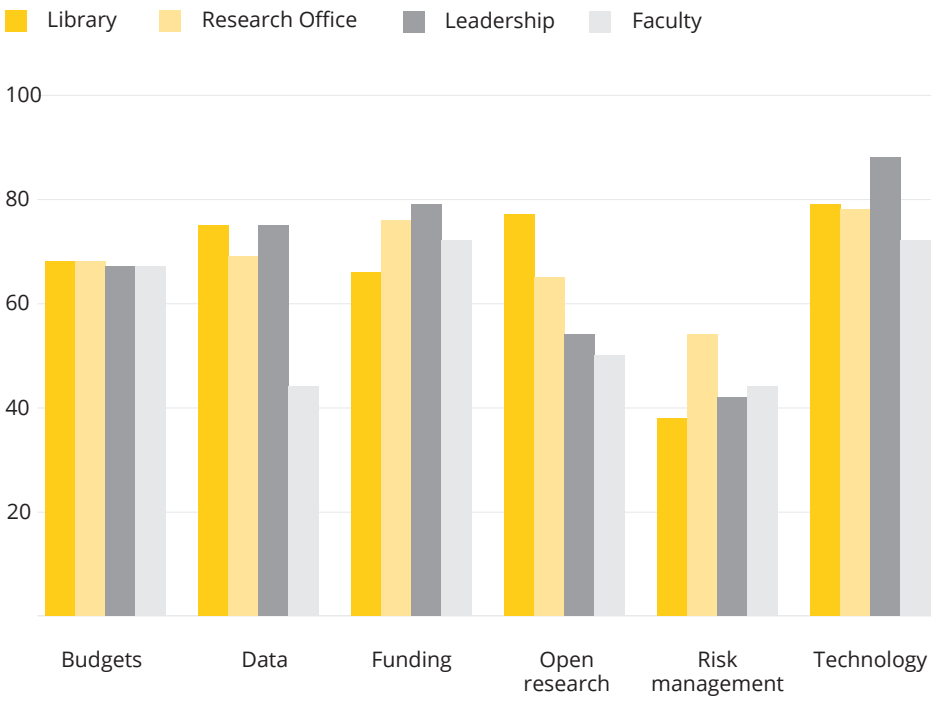
A breakdown of AI tools used across different roles



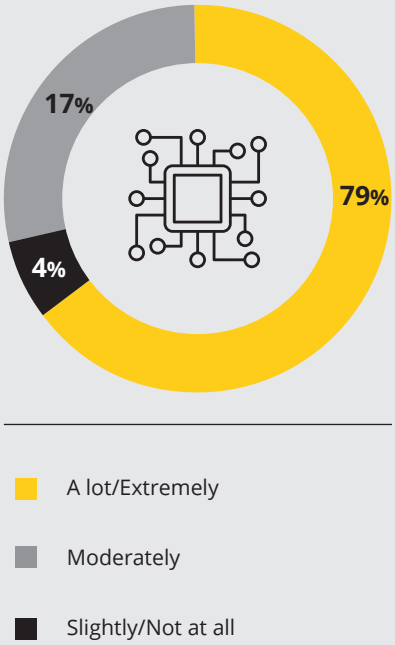
‘Technology’ was selected by respondents as one of the top drivers of change in their role

In our survey, 79% of respondents expect technology to be a ‘very/extremely’ important force in driving change in roles over the next five years. With AI assisted discovery, and more effective technology enabled data and analytics tools, respondents believe technology will be one of the key factors in driving progress. Leadership are steering the charge, with over half endorsing that technology will improve their institution’s efficiency and effectiveness.

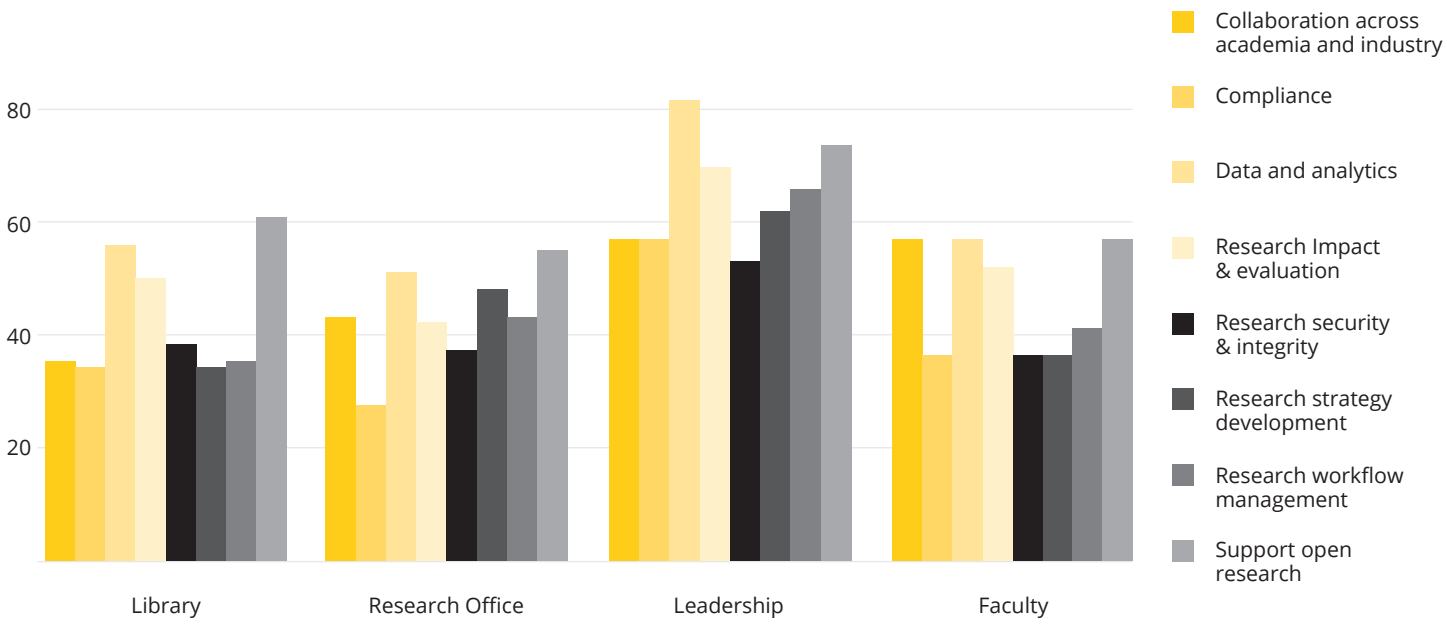
Q: How important do you think the following forces will be in driving change in your role? (%)



Q: How important will technology be in driving change in your role?



Technology advancements driving efficiencies across the board (%)





Mahendhiran Sanggaran Nair, Vice Chancellor for Research and Sustainability, Sunway University in Kuala Lumpur, Malaysia, sees technological advancements as the top influencer of change in academia.

"There is a change taking place in the global technology landscape, where we are seeing converging technology platforms. This is changing the industrial dynamics, which has a significant spillover impact on labor markets across the globe. The labor dynamics powered by new innovative technologies will influence the types of education, training and research programmes offered by institutions of higher learning. Institutions of higher learning need to also be innovative in designing academic and research programmes that prepare the workforce to meet current industry needs; and provide the relevant skillsets to power industries of the future."



Kosta Tabakis, Research Advisor, University of Otago, New Zealand, points to AI's role in transforming the research process.

"I think one of the biggest breakthroughs is the use of artificial intelligence. I am quite keen on the use of AI across the entire research and innovation lifecycle, particularly when it comes to research support. I think that AI plays a role in the ability to review grant applications, contracts – doing your first pass in looking for compliance issues or red flags at a faster rate than a human being."



Jingwen Mu, Director of Institutional Research and Strategic Planning at Hong Kong Baptist University, also notes the difficulties of culture change.

"I see us riding on the trend of technological trends. I have heard academics very excited about how they can evolve their disciplines brought by the disruptive technology – how they are going to bring that into their research and make new things happen. It is about how you embrace it or not, but also about what discipline and what kind of area you are in."

Skills gaps and bureaucracy hindering AI ambitions

Despite recognizing the benefits of how AI advances science, issues around ethics, security and integrity must be addressed. A survey conducted by Oxford University Press found that while most researchers had used some form of AI, there were concerns over intellectual property, AI's impact on research quality, and its impact on critical thinking skills. The Royal Society's report, Science in the Age of AI calls for a balanced approach to the use of AI in science, as well as AI policies and practices that ensure AI tools are used ethically and benefit all.

Along with new policies, there is a push for AI training for faculty, staff and students. Traditionally, the adoption of new technologies has been on the individual, however, as AI is a disruptive technology with transformative potential, researchers are calling for AI training to help them stay at the leading edge of research and innovation.

Many universities have digitalization strategies that set out the transformation they expect from the implementation of different technologies. A study by Educause into the higher education community's experiences of AI found that most institutions were in the process of creating AI-related strategies, which often included AI skills training for staff, faculty and students. More than half of faculty and staff surveyed said they had been given duties related to AI strategy, however, few job roles had been created or restructured to support this change.

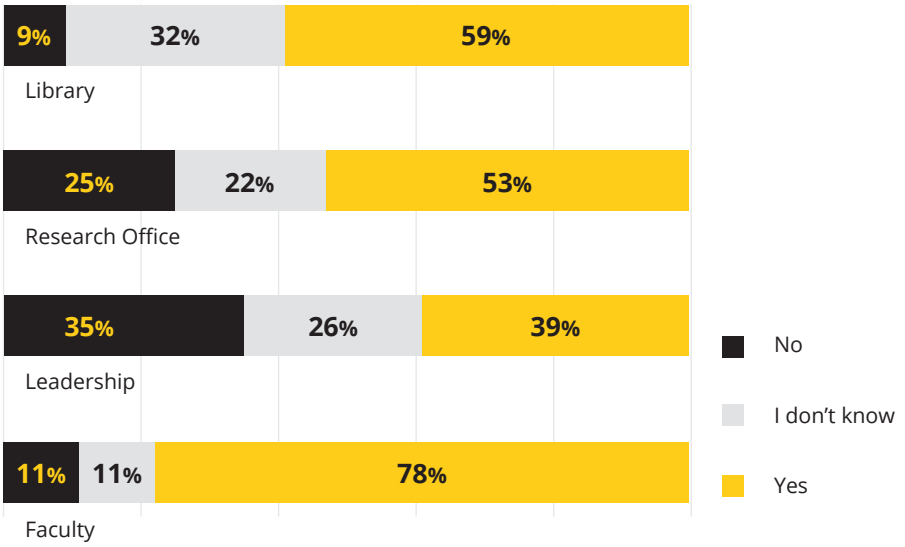
Given the varying degrees of development in digitalization strategies, most respondents in our survey noted a lack of AI skills. Additionally, 69% of respondents agreed that skills shortages are having an extremely high or moderate impact on their role today. Worryingly, more than half (56%) of our respondents expect skills gaps and institutional bureaucracy to hinder the progress and potential of AI across the research landscape.



Skills gaps respondents cited:

- Technical skills in data management and security
- Generative AI technology
- Data analytics and AI/ML skills
- Data/text mining and analysis, AI tools
- Ever-growing changes in ICTs and Information/data overflow
- Data literacy
- Tech skills around AI and data understanding
- Coding, text-mining, PowerBI

Comparison of skills gaps by role type

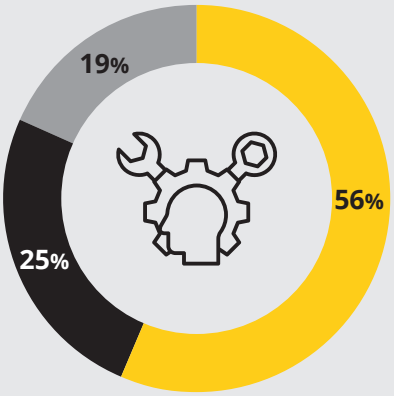


> *New technology always creates skills gaps, if AI develops further, new skills will be needed to understand, use, and teach about AI."*
>
> **Librarian (USA)**

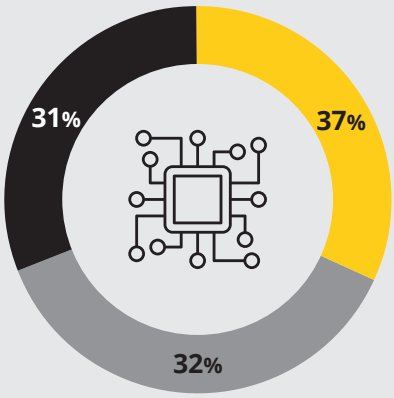


> *"I'm not a technical expert, I'm a theory and concept expert...tech keeps moving faster."*
>
> **Research Data Services Lead (USA)**

Q: Do you expect having skills gaps [in general]?



Q: To what degree do you see skills shortages influencing your role today?



Academia grapples with AI

Respondents and interviewees expressed both concerns and optimism about the impact of AI on their roles but agreed that gaining AI skills would be key to success.



I do think that roles will need to evolve, and people will be required to adopt and understand new technology and see how it best applies. I think it's quite true that AI will only take the jobs of people who don't know how to use it. I can see the potential benefit of leveraging AI technology if done right, but that is a big IF. I think the jury is still out on how well we collectively handle those questions. At the same time, that technology is very, very exciting."

Jason Glenn, Director of Research and Information Management Services, Carnegie Mellon University, USA

AI is right there. I have no idea what I think is going to happen there. I think to me, this is the wild west. My feelings, I know nothing. People seem to fall into camps where they think it is freaky and awful or that it is great and there are so many good tools. We are at the beginning of working out what is a mature response to this stuff."

Sally Smith, Director of Research, Trinity College Dublin

"We don't know how disruptive technology like GenAI will affect how we use and produce data. But I take it positively because it is helping with data democracy."

Jingwen Mu, Director of Institutional Research and Strategic Planning, Hong Kong Baptist University

The big issue in the library world is keeping up with technological change."

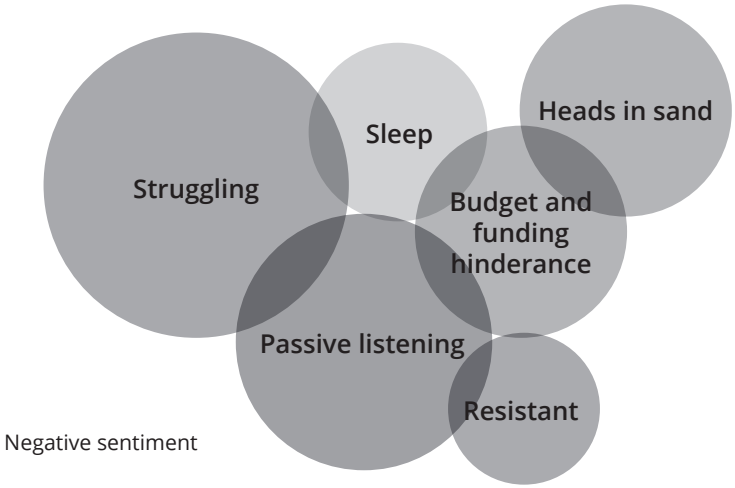
Daniel Becker, Reference, Collections, and Instruction Librarian for the Harvard Botany Libraries, Harvard University, USA

"I think artificial intelligence will be a game changer in terms of the development of the tools that we use primarily to find and discover research. So, I think there are changes coming with that technology that will have some direct impact both on how we do our work on a day-to-day basis and how we're providing access and discovery options for the people we're working with."

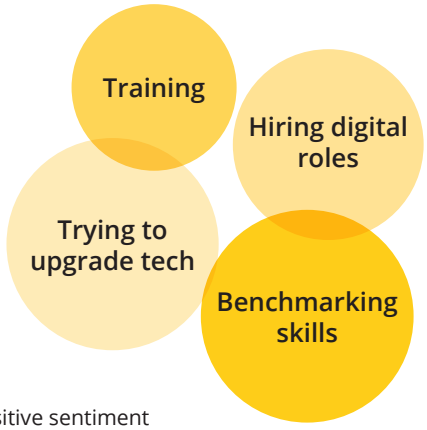
Emily Hart, Science Librarian, Research Impact Lead, Syracuse University.

Bureaucracy blocking uptake of tech

Universities need to be quick to address skills gaps and demystify AI. However, multiple respondents said institutions were too slow to accommodate changes within roles, citing reasons around budgetary constraints, passivity and lack of communication. Meanwhile, respondents who noted that their institution is adapting cited actions around 'Innovation and advancements (increased collaboration, new tools, tech, infrastructure and AI capabilities)', 'Learning and development' and 'Recruitment (data and digital)'.



Negative sentiment



Positive sentiment

Q: How is your institution adapting to accommodate changing roles & expectations?



In a very willy-nilly and inconsistent fashion; communication about this subject is fuzzy at best. Roles are changed and sometimes it isn't even communicated to the rest of the library staff, much less were we involved in developing the changes."

Librarian (USA)

"I would say it isn't, or at least it is doing so poorly."

Director Research Strategy (Australia)

"Our universities have started organizing various training events on the impact of generative AI technologies on education."

Reference Librarian (China)

Poorly. It is very resistant to change and unwilling to consider evidence that things are not working effectively."

Associate Dean (USA)

"Not very well. It is a fraught and complex HE environment and finances are going to be very tough for the next 24 months, at least. We are having to make savings and accommodate significant cuts to both our pay and non-pay library budget. Not much time to think about skills and new roles for our workforce, more's the pity."

Associate Director Research (UK)



We have to identify requirements, review processes, and beg for resources/help/decisions."

Research Information Management (UK)

"At this point, I would describe it as passive listening." **Chief Compliance Officer (USA)**



Jason Glenn, Director of Research and Information Management Services, Carnegie Mellon University, USA, explains that the use of new technologies has to be supported by change management strategies.

"Sometimes people think a technical solution will solve their problems, when really it's a change management problem. So it's not really an issue with technology, but how you change the thinking of people who are ultimately key users. But AI technology is going to have an influence on academia in the next 5-10 years and we are already seeing that in the vision statement of my dean. He is very interested in how we can leverage AI technology to better deliver services across the library, including my group."



Kevin Dunn, Provost, Western Sydney University, Australia, also touches on the need for good management of AI, particularly as it relates to research and teaching.

"Generative AI poses a research integrity challenge, but universities also have the challenge of how to teach the appropriate use of AI in research as well, and then it feeds back into the integrity issue."

Concerns around AI bias and hallucinations

Many respondents raised fears over the impact that AI bias and hallucinations (misleading or incorrect AI-generated information) would have on academia. Concerns range from the impact of new technologies on collaboration and diversity to risks around AI writing aids in hindering diversity of thought and writing styles.

"AI does help to make some mundane tasks easier to complete and as it evolves seems likely be helpful in contribution effort to compliance bureaucracy. There is need to be attentive to biases created by AI and training data that underlay it. AI makes it easier to propagate socially influential misinformation and in turn efforts to mitigate impacts may impede free exchange of information and ideas."

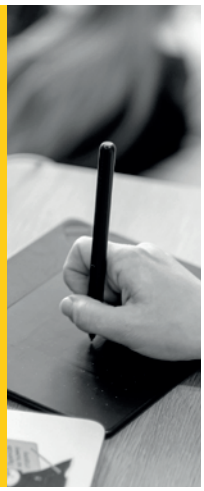
Associate Dean (USA)

"AI tools are reshaping academic/research writing to a formulaic structure. For example, more complex writing structures are being redlined as potential errors to be edited or revised. Question: Will the richness of writing styles change to support simplistic points of view or supported claims?"

Associate Professor (USA)

Tools for summarizing vast amounts of content are useful and are getting better. I do fear the machine's influence on decision-making, especially if it results in making search-and-discovery even more biased than it was before."

Digital Content Editor (USA)



"Fears are to bake in and deepen biases and prejudices and create/spread misinformation/hallucinations."

Director, Collections and Open Strategies (USA)

Challenges: Concern that at some point machines will be doing all the academic writing AND all the academic reading with humans only providing and consuming summaries. AI hallucinations making up facts."

Senior Analyst and Strategist for Collection and Budget (USA)

"Fear that researchers use ChatGPT etc. to write the gender analysis because they don't care and just need it over with. The assessors don't know how to assess the gender analysis anyway and so just accept a bland and generic gender analysis. The wrong people will get funded who never had the intention of doing this work – and EDI work will suffer for it." **Director (Denmark)**

Key Finding 4

Collaboration

Collaboration is booming, but increasing concerns over funding and security

Research collaboration has been on the rise since the 1960s. In 2020, a Springer Nature study found that 24% of all papers resulted from international collaboration, representing a 10% rise on 2001 outputs. COVID-19 was a significant driver for academic and industry collaboration during 2019 and 2021, with a 17% increase in publications. Open Science Monitor also reported growth in open collaboration by looking at some of the possible outputs of these activities. It found an increase in the use of collaborative platforms between scientists and citizen-science, the number of Application Programming Interfaces (APIs), and the amount of projects on Open Hardware Repository.

As researchers look to solve complex global problems like climate change, biodiversity loss, and health crises, collaboration across disciplines, regions and sectors provides access to diverse expertise. Collaboration is also positive for career advancement as it enhances credibility, and increases opportunities for publication, and papers with authors from different institutions often receive more citations.

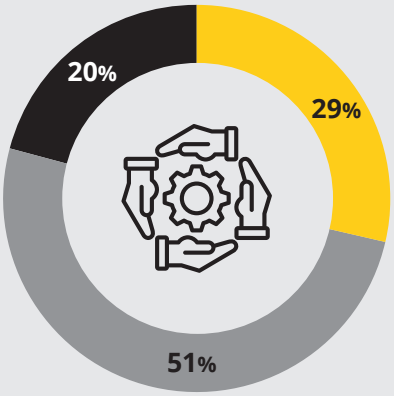
The growing prevalence of research collaboration is supported by funders looking for ways to boost research and innovation and further the positive impact of research on society. Digital platforms and improved connectivity enhance collaboration by enabling easier sharing of data and resources. These developments have made it easier for researchers to work together across different disciplines, sectors, and countries. However, collaboration comes with challenges such as political and/or cultural barriers, coordination difficulties, and credit disputes.

Cross-sector collaboration changing the way research is performed

To probe further into how collaboration is taking shape within academia, we asked respondents and interviewees about their experiences of collaboration. As expected, most respondents (80%) believe that more collaboration outside of academia has had an extremely high (29%) or moderate (51%) impact on changing the way research is performed over recent years.

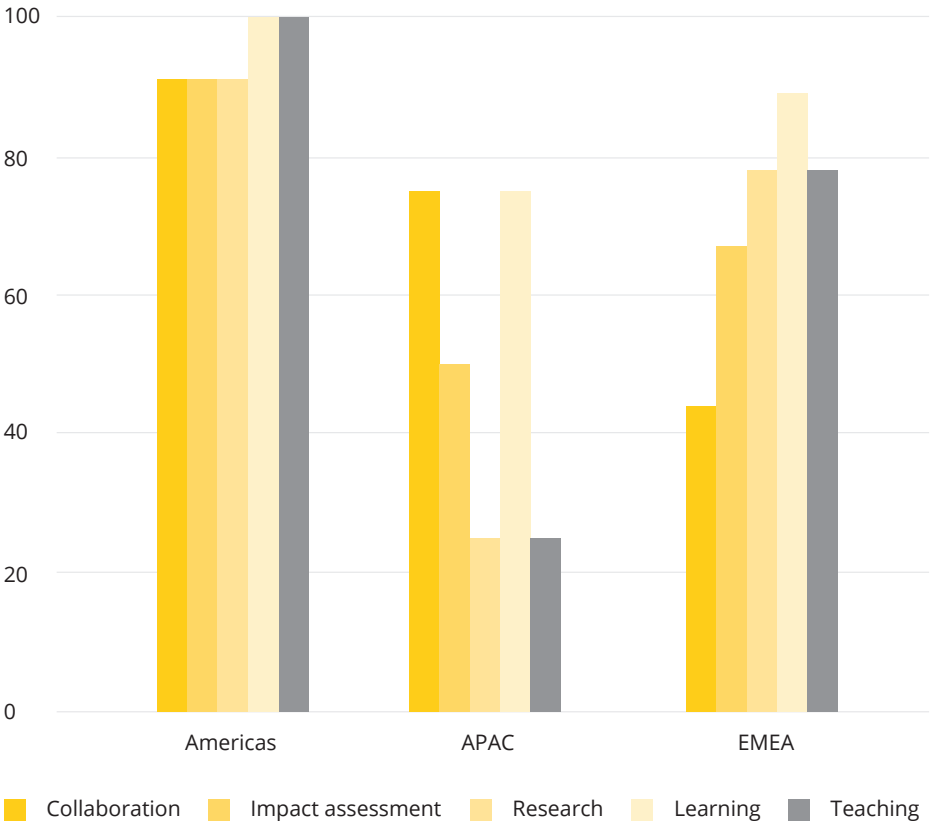
They note that open research, interconnected technology, and the resulting increase in collaboration opportunities are having a positive impact on reducing the barriers to global connectivity and driving inclusion and diversity in research, including greater representation of research from the global south, interdisciplinary projects and discoveries. 80% of researchers believe collaboration outside of academia is changing the way research is performed.

Q: How significant has increased collaboration outside of academia been in changing the way research is performed over recent years?

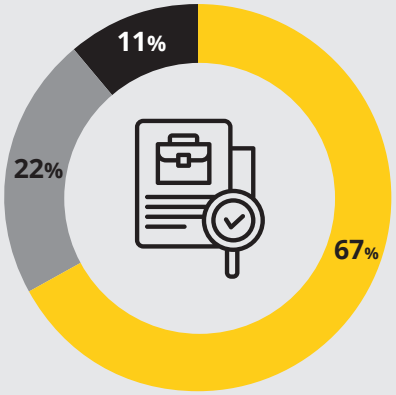




Q: To what degree do you think open research advancements will impact the following? (%)



Q: How important do you think open research will be in driving change in your role?



Q. What do you think has been the most positive change in research over the last five years and why?

"Over the past five years, one of the most positive changes I've observed in research is the increasing emphasis on interdisciplinary collaboration and cross-pollination of ideas between different fields. By bringing together researchers from diverse backgrounds - whether it's computer science, neuroscience, materials science, or the social sciences - we've seen remarkable breakthroughs that would not have been possible through a siloed approach."

Scholarly Communications (Nigeria)



Kevin Dunn, Provost, Western Sydney University, Australia, believes in the benefits of international collaboration and actively encourages it at his university.

"There is no doubt that articles that do have that international collaboration have higher citations, higher reach for all sorts of reasons you would expect. Not only is it in the interest of universities to do this, but secondly, for me, it is one of the ways that we can participate in improving and lifting research performance in the majority South. I am encouraging my university to start to track ourselves in these regards with international collaboration."



Lazarus Matzirofa, Associate Director of Research, Scholarly Communications, and Digital Assistance, University of Witwatersrand, South Africa, is another leader furthering collaboration within his institute.

"My plan is to enable the research librarians that when they engage with their respective researchers in profiling them online, their goal is to make sure they collaborate. If there is an area that they aspire to be in, we will tell them the top researchers to cite."

Collaboration at risk?

Despite the positive themes around collaboration, respondents believe that future collaboration opportunities are at risk. They cite concerns around research security and mitigating risk for potentially 'damaging' collaborations. Additionally, 31% of respondents express concerns around Siloed Data and Knowledge in their roles today, ranking this the third highest concern after Budget Constraints (16%) and Administrative Burden (11%).

Many funders drive collaboration to advance research impact, but securing funding for research collaborations is still a significant challenge. Respondents note that while they can find partners with the necessary skills and interest for collaboration, securing funding is often problematic, and an outdated focus on single disciplines hinders collaboration. Institutions need to be more intentional in how they support researchers in identifying new collaborations that support broader institutional goals



Michelle Vincent, Director of Research Strategy and Performance, Swinburne University of Technology, points to funding as a major barrier to collaboration.

"Do we have trouble finding partners? Partners with money? Yes. Partners for research? I don't think so. It comes down to the funding, so finding collaborators that have the interest and skills, capacity and capability to do the research with us is not a problem but finding the money to fund that is often a problem."



Sally Smith, Director of Research at Trinity College Dublin, Ireland, also believes that funding is most often the deciding factor in collaboration success.

"You have to step a fine line between allowing everyone's individual collaborations and relationships to flourish while also having a strategic lens. This is one of those areas where money talks. Saying to a bunch of researchers – here is money for travel, here is seed funding, go and talk to these people."



Kevin Dunn, Provost, Western Sydney University, emphasizes the importance of investing in collaboration, noting the benefits of international partnerships such as increased citations and enhanced research quality.

"It is in the interest of the university to be involved in international collaboration. There is no doubt that articles with international collaboration have higher citations, higher reach for all sorts of reasons you would expect. Not only is it in the interest of universities to do this, but secondly, for me, it is one of the ways that we can participate in improving and lifting research performance in the majority South."



Jingwen Mu, Director of Institutional Research and Strategic Planning at Hong Kong Baptist University, discusses the increased focus on collaboration and engagement.

"It is sometimes difficult to establish authentic, local collaborators, but then that pushes people to look out for collaborators or good research institutions elsewhere. We are hiring more roles in research engagement and research partnership, and we are getting researchers to help with research impact. Also, in terms of not just engaging the academics, it is engaging the wider audience on social media and other channels."



Kosta Tabakis, Research Advisor, University of Otago, New Zealand, calls for authentic research collaboration, rather than a tick box exercise.

"What I would like to see is greater collaboration internationally without adhering to local agendas. There is a push towards the introduction of Social Sciences and Humanities across funding opportunities. There needs to be an increased effort in building these collaborations, not just having these researchers on projects as add ons. Often, we see these requirements and just tick the box. I think you need to include this expertise in the entire research lifecycle. I do think that is a growing area."



Daniel Becker, Reference, Collections, and Instruction Librarian for the Harvard Botany Libraries, USA, believes that universities must do more to bolster collaboration between the library and researchers and faculty.

"The big issue in the library world is keeping up with technological change. I see the future of the library being more collaborative with faculty and researchers. As academic librarians, we won't survive as a profession if all we do is manage collections – especially considering we'll see a lot more OA publishing. If the perception is that "everything is available online, for free," librarians will be hard pressed to explain why we're still relevant. Librarians are going to need to up their game a little bit and become more assertive about the value we add to academia's teaching and research missions."



Key Finding 5

Research security

Security and risk management need a strategic and cultural overhaul

The global research community thrives on the values of openness, transparency and collaboration, but these are under threat amid growing concerns around research security. International research collaboration is a particular concern leading governments across the globe to take action to safeguard their academic institutions.

In April 2024, the UK Government warned that states were targeting UK universities and risking UK national security by trying to steal the intellectual property and data of cutting-edge technologies to enhance their own economic and military capabilities. Given this threat, the National Cyber Security Centre (NCSC) and the National Protective Security Agency (NPSA) launched the Trusted Research Evaluation Framework (TREF) tool and various guidance materials to help academic institutions build secure international research collaborations.

To support the research sector in managing risk, Universities UK has also published guidance on the measures institutions should take to protect themselves from security-related risks and ensure academic freedom and openness.

The United States has raised similar concerns over the security issues facing academia and has taken action to reduce risks. The US National Counterintelligence and Security Center has created the Safeguarding Science initiative to help the research community protect itself from the misuse or theft of emerging technologies.

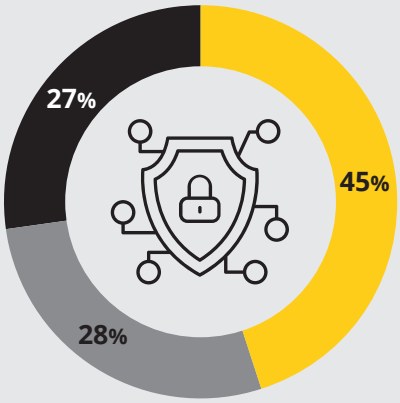
Europe has also taken steps to mitigate security risks over fears that China is using technology to harm their interests. KU Leuven in Belgium is one university that has banned projects with Chinese universities that risked application for military purposes.

Despite the need for measures to reduce security risks, countries are keen that the research community continues to uphold the values of openness and transparency and pursue international research collaboration for research and innovation success. Striking the balance between risk and progress is the task ahead for the academic community.

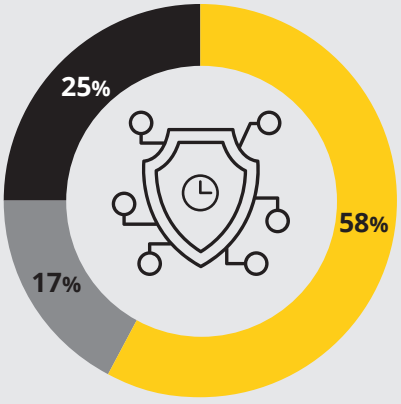
Research security impacting roles

Considering the intensified watch on research security risks, it is of little surprise that security and risk management emerged as issues impacting our survey respondents and interviewees. Respondents said they are spending more time on research security than they did in the past and expect the focus to increase in the years to come. Nearly half (45%) of respondents report an increase in the amount of time they spend on research security now compared to five years ago, and 58% think research security will be more of a focus five years from now.

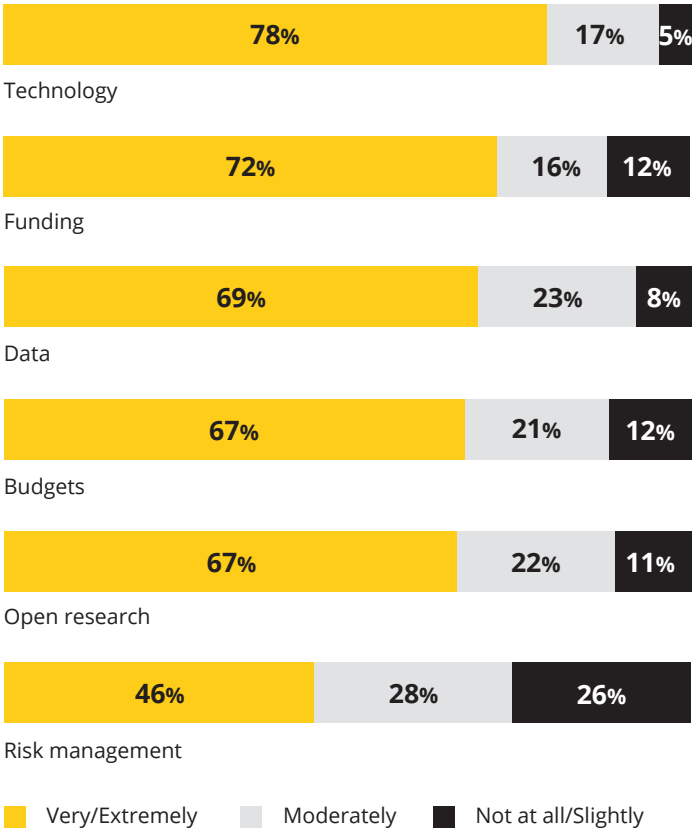
Q: Do you spend more time today than five years ago on research security?



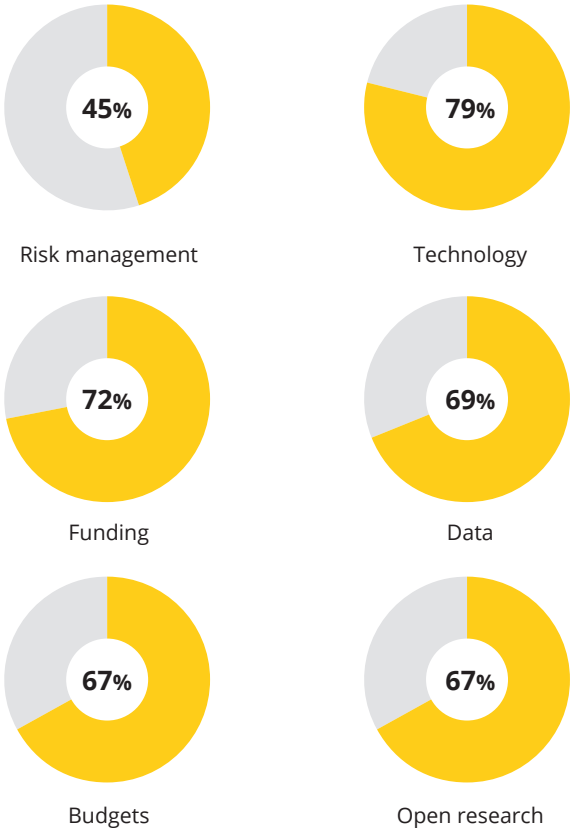
Q: Do you expect to spend more time on research security in five years?



Q: How important do you think the following forces will be in driving change in your role?



Q: Which of the following forces will be driving change in your role?



There were some discrepancies between roles over the extent that risk management advances would impact the research community. The Research Office had the strongest response, anticipating 'High impact' in the Americas and EMEA regions, this was followed by Leadership who expect 'Significant impact' in those regions. The Library felt advances would have a 'Moderate impact' across all regions, with a higher focus in the EMEA region.

Despite the general sentiment that risk management advances would impact roles, less than half of respondents (45%) thought 'Risk management' would drive change in their role. This contrasts with 79% who thought 'Technology', would be the strongest force for change in their role, followed by 'Funding' (72%), 'Data' (69%), 'Budgets' (67%) and 'open research' (67%).

Research security is a growing concern, but lack of buy-in and expertise persists

Research security is gaining more attention within academia but there are challenges. Fundamentally, the sector isn't adequately equipped. International policy is fast-moving, but few in academia have experience in research security. And because the field is still emerging as a professional service, another skills gap has emerged.

Another significant challenge to effective security and risk management is the lack of buy-in, from both researchers and university administration. Many academics resent the rigorous checks and balances, and university administration may not prioritise risk management when budgets are increasingly tightened. This mindset will need to change as risk management becomes essential to mitigating the risk of loss of reputation and income. Ensuring the integrity and credibility of research will become more and more essential as universities strive to compete in a commercial arena, looking to attract the best staff and students and produce high impact research.

'Wait and see' mindset must change

Interview findings suggest that institutions are taking a 'wait and see if something bad happens' approach, rather than a proactive 'carrot and stick'. But security and risk management can no longer be done as an afterthought or secondary to other aspects of academic research management, it must be prioritized and have its own strategy and dedicated resources to protect staff and reputations.



Sally Smith, Director of Research at Trinity College Dublin, Ireland, has concerns about the impact of geopolitical tensions on higher education.

"We are starting to get a lot more focus with legislation on threat of audit, trust and security, research agenda, and export controls in particular. I do see all this concern about knowledge security and good guys and bad guys. I find that antithetical to the principles of the Academy. I don't like that and it worries me. I am worried about geopolitical tensions and closeness, and I certainly have concerns about potential culture wars coming to higher education."



Chris Buckland, Director of Security, Risk & Compliance, Cranfield University, UK, believes more attention is being paid to security, but staff have been left out in the cold.

"Over the last five years, there has been a demonstrable investment and a positive step change in awareness and engagement across the UK HE sector around security and compliance. Given the scale of institutional diversity, we are all at various stages of that journey, however, it is broadly recognized now as a component of a university's governance and compliance architecture. We have a duty of care to protect and empower our staff and students with appropriate training, tools and supporting infrastructure to safely enable their activities and our broader international ambitions. The cultural change necessary remains challenging and if you go back four or five years, for example, we were still in the golden era of UK-China relations and are now having to reassess what was at the time encouraged by government and has resulted in various complex and strategic relationships."



Kevin Dunn, Provost, Western Sydney University, discusses the potential implications of security measures on international collaboration, as well as the real dangers of data infiltration.

"In Australia, in recent times, and it may well be the case in the United States from my observations and what I have heard, but we have had almost a moral panic about foreign interference in universities, particularly China's interference, but beyond that as well. I say moral panic because I think the concern was inflated and the steps that we had to take in Australia, mandated, regulatory, were burdensome and onerous. It is a good thing to reflect on whether or not our staff have been influenced in any way or sovereign Intellectual Property is being diluted or exfiltrated, but I think that went a little too far, and some of the politics associated with it, in particular, were nefarious and had a chilling effect on our ability to collaborate internationally in some regards. But having said that, going back to security of data and those sorts of things, these are important matters."



Kosta Tabakis, Research Advisor, University of Otago, New Zealand, highlights concerns around data security.

"There is another big thing with hostile actors breaching various systems around the world to access intellectual property that is not their own. The UK is taking it very seriously."

Reflections: understanding the future of academic research transformation

Digital Science's **Mark Hahnel**, VP Open Research, and **Simon Porter**, VP of Research Futures.

Our report speaks loudly of the technological advancements, new research practices and global problems driving change in academia. These transformations have created both opportunities and obstacles for institutions and the sector at large. As we reflect on the findings, we consider how academic institutions can position themselves to deliver meaningful research in the era of 'AI', 'open' and 'impact'. We also look at Digital Science's collaborative work with the sector to support these changing needs.

Reflection #1: AI

AI will significantly impact academic research, particularly in data analysis and open research initiatives. However, the survey indicates that institutions struggle with skill gaps and are concerned about AI's ethical implications. Bureaucratic hurdles and resistance to change are also slowing the adoption of AI-driven tools and processes. We need to work together as a sector to address these issues and drive momentum forward.

Key questions our community needs to address:

- How can we share a framework where we can trust the automation AI provides throughout researcher workflows?
- Should AI be accepted as assistants, co-pilots or even co-authors in the future?
- What research should generative AI consume?
- How can institutions achieve cultural change in time to support effective AI adoption?
- Does AI introduce an 'open' imperative?

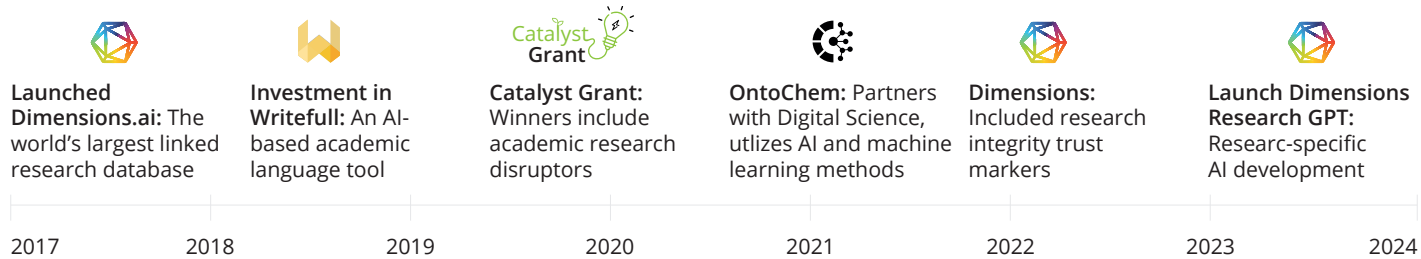
Our responsible use of AI

At Digital Science, we recognize the potential of new technologies to positively impact the academic sector, particularly in enhancing workplace efficiency. However, we also understand the importance of implementing safeguards to ensure responsible use. For many years, we have been dedicated to the responsible application of AI, collaborating closely with the research community to create practical, forward-thinking solutions. Dimensions.ai is one of the tools we created to help the research community and policymakers gain insights into research trends and impact. Another is Writefull, which provides language feedback for academic writing.

To further support institutions with AI, in 2024 we launched Dimensions Research GPT and AI Summarization Tools. These AI tools help institutions analyse research data and generate insights, reducing administrative burdens, and allowing researchers and administrators to focus on more strategic tasks.

Discover more about our commitment to supporting AI in research

A pioneer in the responsible application of AI



Reflection #2: Open

In our survey, 'open research' is cited as the most positive change in academia in the last five years. The move towards open research has been gaining momentum and support for many years and there are some spaces in which open, transparent and reproducible research has become a mandated practice. In 2017, we entered a world where most papers were published OA. Open academic data is following a similar trend, with mandates from over 50 funders globally. At the same time, we are blurring the lines between publishing peer-reviewed and non-peer-reviewed content.

While our report highlights the positive and ultimately transformative force of open research, there is a clear indication that continuing down this path comes with crucial challenges. The existing commitment to open research must continue to realise its ideals, but our report highlights that institutions are facing real difficulties in implementing open data practices, managing compliance with funder mandates and supporting what is ultimately a culture change towards the openness of all research. This, along with growing concerns about research security and integrity, creates a constantly changing and potentially risky environment for the academic community to navigate.

Trust and security

Engagement with society is the goal of open science. Making research available rapidly is important, but human checks on the content are too, as it must not only be openly available but also easily discoverable and reusable. Both preprints and data are among the new types of formats in which academic findings are disseminated.

While every preprint published on well-known preprint platforms has a basic human check – most data published in generalist repositories does not. Newer types of content, such as data or code publishing, benefit from not having legacy workflows, sustainability models or the concept of prestige. As such, the cost and complexity to make data publishing 'trusted' is orders of magnitude less than to make traditional paper publication fast, open or cost effective. By leveraging large volumes of FAIR (findable, accessible, interoperable and reusable) data, machines can accelerate the processing and analysis of information, leading to the generation of new knowledge and empowering researchers in their endeavours.

Open research collaboration

Open research encourages collaboration, but our survey revealed that institutions significantly face security concerns in international collaborations and are often unprepared to manage them proactively. This lack of preparedness conflicts with other institutional priorities and poses risks to the integrity and success of research collaborations. Anecdotally from attending events and following online conversations, this seems to us to be an area where the conversation is shifting, with more conferences seeming to dedicate time to this topic on their agendas. Security at all levels is a real threat to credibility within the academic world. It affects all roles within an institution and is no surprise to be highlighted as a topic that cuts across all levels.

Key questions our community needs to address:

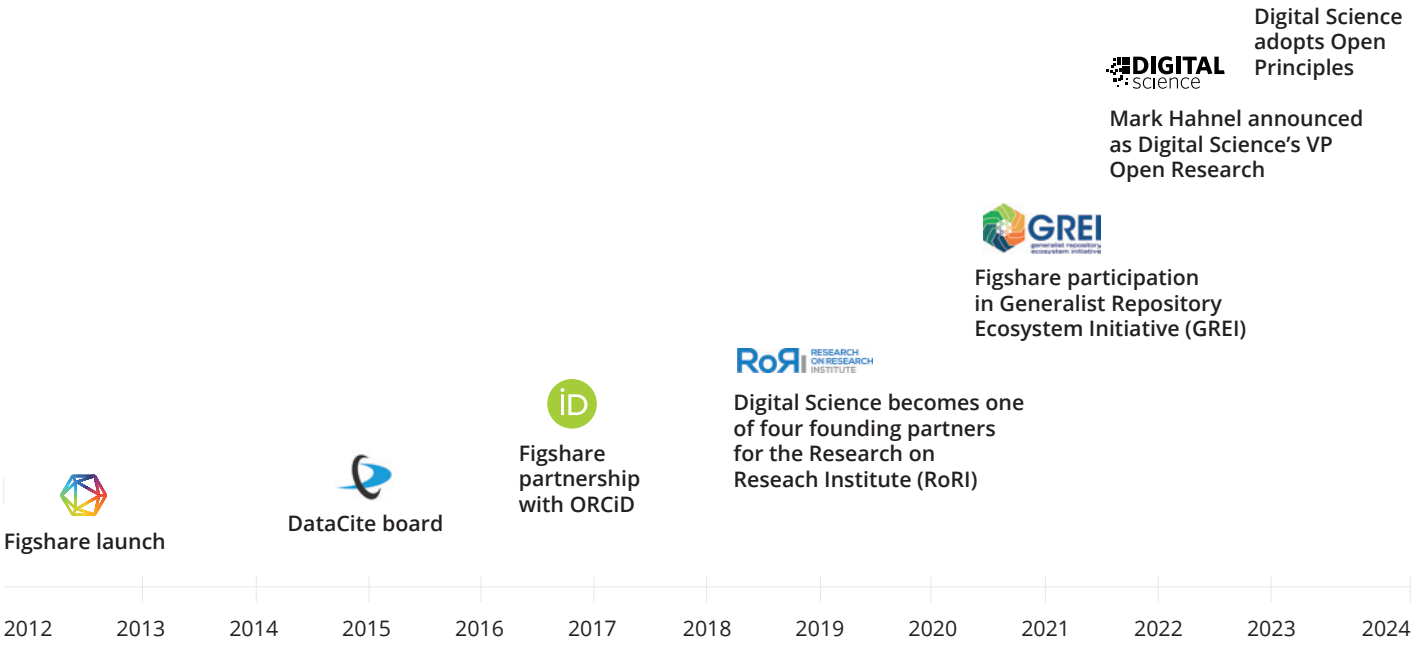
- Is open research an inevitability?
- How can we automate trust, or have better provenance for trusted research in a post-AI world?
- How do we define research security in the context of open research, where academic freedom is balanced with responsibility?
- How do you reconcile the goal of diverse collaboration in open research with growing concerns over research security and international collaborators?
- How do we develop a more mature research management infrastructure that's interconnected and minimises burden on researchers?

Our open research initiatives

For more than a decade, Digital Science has partnered with the research community to collectively drive efforts in the open research space. Through our research management solutions Symplectic Elements and Figshare, we are invested in finding those workflows that help move us forward as a community. The Figshare team has collaborated on the NIH-funded Generalist Repository Ecosystem Initiative for several years. By working with other players in the space, we can ensure that repository infrastructure is interoperable and optimised for both human and machine consumption.

As far back as 2008, Symplectic Elements was the first Current Research Information Systems (CRIS) system to provide integration with external OA repositories, and since the launch of Figshare in 2013, Digital Science has helped lead the way in approaches to support the sharing of research datasets.

Figshare and Symplectic Elements play an integral role in many universities' research management systems, allowing institutions to oversee all research outputs – such as publications and datasets – in one place. These tools help academic institutions comply with open research mandates and ensure that their research is accessible to the public. The Open Access Monitor tool in Symplectic Elements simplifies tracking and reporting on OA compliance, reducing administrative workload by automating many aspects of the process and helping institutions meet funder requirements more efficiently.



Discover how Duke University is automating NIH compliance with the support of Symplectic Elements

Showcase your research expertise with Symplectic Elements Public Profiles

In 2024, we bolstered efforts to drive open research by introducing Digital Science Open Principles, which reflect our belief in the pivotal role of open research in driving societal progress and generating wide-ranging benefits. These principles are not just for internal use, they represent our broader commitment to the entire research ecosystem.

1. **Community ownership:** we believe that research outcomes are owned by the global community and should be available to all

2. **Participating in open infrastructure:** we commit to support the use of open standards and to build, contribute to, and extend open infrastructures

3. **Stakeholders' primacy:** we believe that a trusted stakeholder in the research ecosystem must be responsible, transparent and sustainable.

"It's my hope that our new Open Principles will help reflect to the research community just how important we feel open research is in creating benefits for society. These are not just internal principles, they represent our broader commitment to the entire research ecosystem."

Mark Hahnel, VP Open Research, Digital Science

Supporting open research infrastructure

Research management infrastructure is a crucial component of a university's open research ecosystem. By implementing a more open and comprehensive research management solution, institutions can streamline the process of sharing, showcasing, and managing all research outputs in one centralised location and reduce the burden on researchers. Our Figshare Institutional Repository and Symplectic Elements Research Information Management Systems (RIMS) can form key pillars of this infrastructure, playing a vital role in supporting open research practices at universities.

Figshare data repository supports the University of Malta drive open data culture change.

Tackling collaboration risks

To support institutions in minimising collaboration risks, we offer Dimensions' Research Security, which helps institutions identify potential risks by reviewing research networks and verifying disclosures. This enables institutions to assess the integrity of their partnerships, ensuring secure and compliant collaborations. At the same time, we enhance collaborative efforts through Overleaf, our platform for seamless, collaborative writing and research.

Read our guide to understanding the history of research security

Visit digital-science.com/academic/open-research to discover more about our commitment to supporting Open Research

Reflection #3: Impact

Traditional metrics, such as citations, remain important, but there has been a growing desire for a more holistic evaluation of research impact for many years now. The survey indicates that institutions are increasingly seeking metrics that recognize a wider range of contributions, including societal impact, collaboration efforts and research culture. However, the transition to more responsible and inclusive metrics is still in its early stages. Traditional research metrics are now deemed by many research managers as not sufficient for measuring the true impact of academic work.

At Digital Science, we envision a future where a trusted, seamless and collaborative research ecosystem fosters progress for everyone. The Declaration on Research Assessment (DORA) acknowledges the need for better ways to evaluate scholarly research outputs, and Digital Science was among the early signatories in support of this initiative.

Inclusive, responsible research evaluation

We are also working with academic and industry partners to develop new frameworks for research evaluation that prioritise inclusivity and responsibility. This includes recognizing non-traditional research contributions and emphasising the importance of research culture and integrity.

The stories we tell with the information we collect are also evolving. As the survey shows, it's becoming just as important to measure research culture and integrity as it is to track traditional impact metrics. To support this, we work with the broader community to develop methods for recognising research practice through trust markers in Dimensions.

Key questions our community needs to address:

- What is 'real impact', and can it be measured beyond rankings?
- If the SDGs targets are missed, what role will impact play after 2030?
- With geopolitics creating an environment that reduces opportunities for collaboration, what are the implications for academia in a more siloed research world?

Our support for holistic and inclusive metrics

Digital Science is helping institutions transition to more holistic and inclusive metrics by providing tools that offer a broader view of research contributions and in turn adopt a more responsible approach to evaluating research. Altmetric moves beyond traditional bibliometrics to provide a more holistic view of the online attention of research across news outlets, websites, blogs and social media.

Earlier this year, we published the Altmetric 500, a report that explores the context of research output and the detailed measures of attention by source. Built using the Altmetric on Google's BigQuery (GBQ), the data can be tweaked or customised to give an understanding of how, where and by whom published content is being shared across numerous different channels.

Discover the Altmetric 500: the universities whose researchers have published influential articles across a range of disciplines and areas in 2023

Impact records

As experts in the research assessment ecosystem, we collaborate closely with the academic community to ensure they have the tools and support necessary to navigate the changing requirements for research assessment. Impact doesn't happen overnight, so the Symplectic Elements Impact Module allows researchers (or their proxies) to build up their impact records over time, adding narrative fields to capture events as they happen as well as adding associated files, links and references. Elements helps institutions build their own collection of structured, reusable impact records, ready to be curated into case studies, developed into news stories or included in reports to funders.

Discover how University of Technology Sydney is embedding research impact assessment into the fabric of their research lifecycle using Symplectic Elements

Visit digital-science.com/academic/impact-evaluation to discover more about our commitment to supporting research impact evaluation

Recommendations

For leadership

- Foster a culture of transparency and collaboration, ensuring that leadership principles filter throughout the institution
- Take a proactive approach to research security, rather than waiting for issues to arise, actively look for anomalies and unusual behaviours that may be putting researchers and institutions at risk

For the Research Office

- Proactively identify potential security risks, ensuring that partnerships and collaborations align with institutional policies and remain compliant
- Encourage the adoption of a broader range of impact metrics that go beyond traditional citations and a wider range of outputs for which to give credit. Signing up for initiatives like DORA can promote responsible research assessment

For library and information services

- Build on historical role as an early player in information literacy, and continue evolving by teaching researchers how to use AI tools effectively
- Advocate for open research practices, including training in publishing more research outputs and guidance on associated licensing



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