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Libraries reaching for the cloud

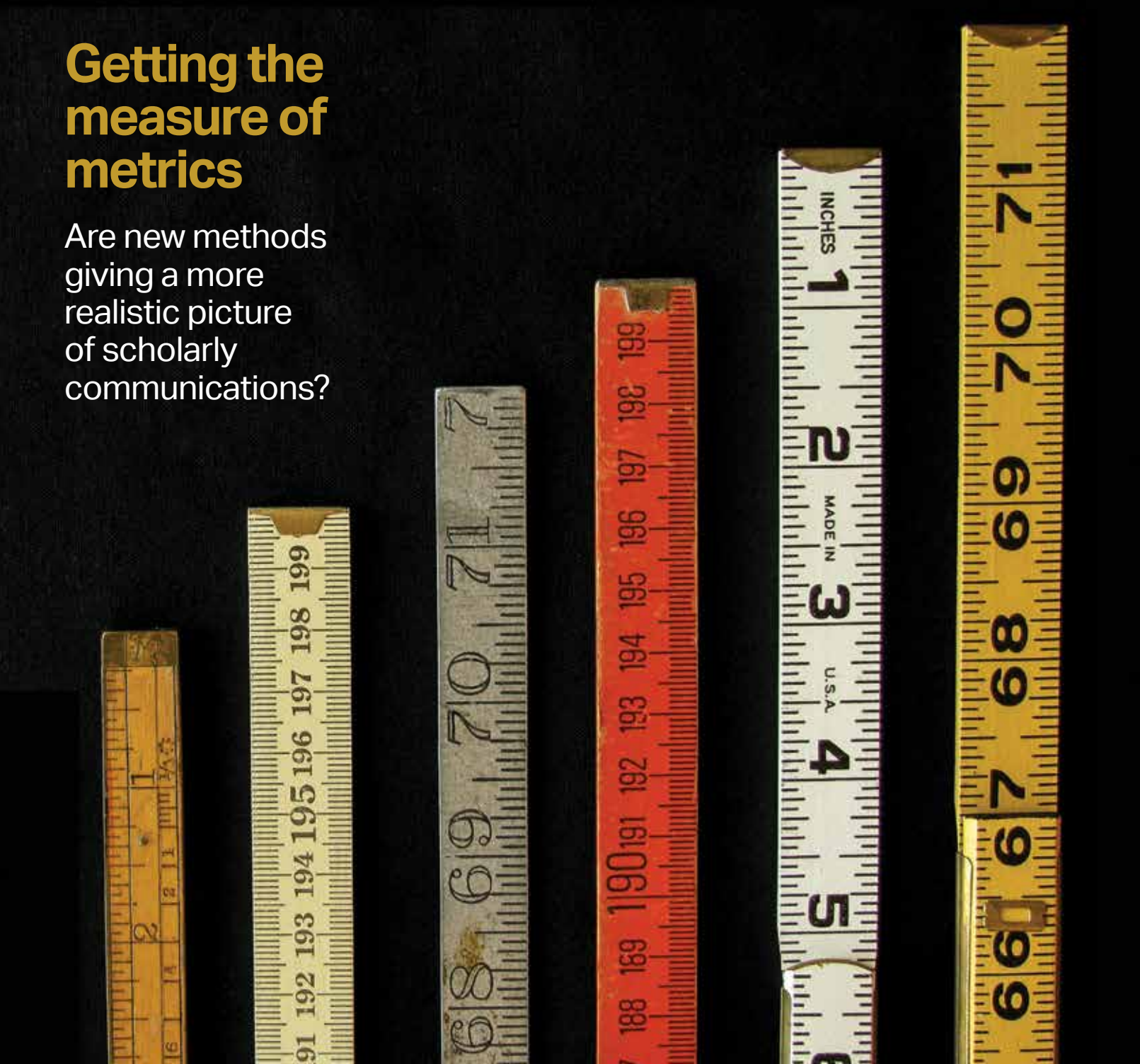
Interview: Mark Hahnel, Figshare

Assessing drivers for preprint use

African scholars facing the crunch

Getting the measure of metrics

Are new methods giving a more realistic picture of scholarly communications?



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SUMMER 2022 • Issue 120

The challenge of measuring scholarly communication 4

David Stuart on new ways of measuring research, providing a more realistic picture of scholarly communication?

Bright future for libraries in the cloud 10

Siân Harris looks at what role cloud-based services play in libraries today, including their benefits and limitations

Featured case study: a 'set and forget' single sign-on solution 15

OpenAthens has created a portal that gives users the easiest, most direct journey to the resources they want

'It just frustrates me to see research not being read and used' 16

Kudos co-founder **Charlie Rapple** shares her passion for accelerating the dissemination – and impact – of science

A mastermind of taxonomy 18

Helen Lippell explains why organisations should learn more about taxonomies, ontologies and metadata - and describes her love of a good quiz...

Working towards a fairer playing field 19

Figshare founder **Mark Hahnel** describes the company's beginnings and raison d'être – and his wider hopes for scholarly communications

Letting go of the way we worked pre-pandemic 20

Antonia Seymour talks about how not being bound by location means we need to re-think how we work

Early sharing not the only driver for preprint use 22

Sowmya Swaminathan discusses the implications for publishers in helping to foster open research practices

Conference highlights early-career research barriers 23

'If scientists are successful, we are successful.' That was the message of **Miriam Maus**, at PubCon – IOP Publishing's staff conference

Another extraordinary year for citation impact 24

Nandita Quaderi explains how the pandemic continues to affect the citation network, and introduces a new kind of citation distortion

African scholars facing economic crunch 25

Oluchi Ojinamma Okere outlines how researchers in sub-Saharan countries are being hamstrung by economics

News 26

A tumult of tales from the scholarly communications industry

Suppliers' directory 29

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Leader: Tim Gillett

A changing view

As summer arrives in the northern hemisphere in a haze of sweltering days and long, languid evenings, thoughts in the scholarly communications industry turn to all things metrics.

At the end of June, Clarivate publishes its Journal Citation Reports, and in these pages we feature the key highlights of the release, an explainer by editor-in-chief Nandita Quaderi – and David Stuart's broader feature on the use of metrics in academic publishing.

On page 10, in a wide-ranging piece, Siân Harris looks at what role cloud-based services play in libraries today, their benefits and limitations and what challenges remain – it's an area that looks set to dominate discussions in the field of library services for years to come.

We are delighted to have secured three interviews with key players in the industry – with Kudos co-founder Charlie Rapple, taxonomy guru Helen Lippell, and Figshare founder Mark Hahnel; all three offer a plethora of insights into this fascinating industry.

On a personal note, this is will be my final issue of *Research Information* – by the time you read this, I will have flown on to pastures new. My eight years at the helm of *Research Information* have been an absolute joy, and I've enjoyed making the acquaintance of so many brilliant people along the way.

There's every chance I'll stay in contact with many of you in the months and years to come, but in the meantime I wish you all the very best and thank you for making my séjour so enjoyable and rewarding.

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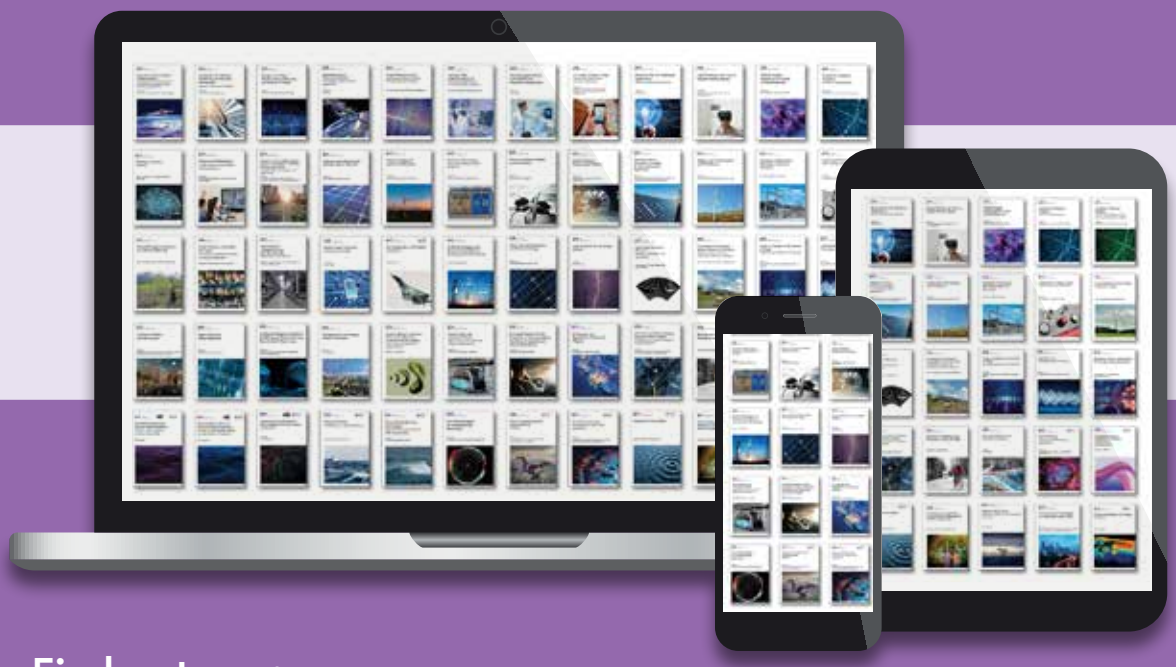

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The challenge of measuring scholarly communication

More data than ever before is being captured about scholarly communication, but whether the new ways of measuring research are providing a more realistic picture of scholarly communication remains an open question, writes David Stuart

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> "Unfortunately, there isn't a simple formula to measure the reach, influence, mobilisation of knowledge and impact in society'"

There have been huge changes in scholarly communication in recent decades, with significant implications for how it is measured.

Not only has the digital transformation of communications enabled a rapid expansion in the amount of data that can be collected, but there have also been changes in the research itself.

As Jonathan Adams, chief scientist at the Institute for Scientific Information (ISI), noted, there are now many more countries publishing in Anglophone journals, new journals, new fields and new subfields have emerged, and there's more international collaboration and a shift towards the North American research culture, with shorter journal articles focused on one key element. This all has implications for measuring research.

The big change, however, has been a widening in what people want to measure. There has been a move from research excellence in purely academic terms, towards research achievement in more societal and economic terms as well.

As Tony Roche, CEO of Emerald Publishing, put it: 'Funders and policy makers are putting more than academic influence on the table. They want to see more from research than great research. Great research is absolutely critical and fundamental, but researchers also need to demonstrate how their work moves beyond the academy.'

Beyond bibliometrics and citation analysis

The desire to measure the impact of research beyond academia is perfectly understandable. governments and taxpayers want to know that money is being spent wisely, and in the best way possible.

The problem, however, as Adams explained, is there are no good indicators for measuring societal impact analogous to citations, and the timescale for impact is much longer: 'There really is a paucity of appropriate indicators, and part of that is the nature of research projects themselves. Each project is individual in the way in which it delivers outcomes. What research does conveniently is it gets reported by one academic to other academics in the form of papers, and those papers if used get referenced and cited, and so that's been a very convenient currency for decades.

'Many policymakers have assumed a similar currency can be found in other areas of research activity, but we don't have the history of evaluation through those other routes that have established a proper grounding for what the indicators might be. If you consider the pipeline between research and its broader outcomes, then it can be a very long one, and very variable. When we look at the initial research associated with the impact case studies reported in the 2014 REF, some of that research was 20 years old.'

Of course, that is not to say there have not been useful and interesting metric developments, moving beyond traditional bibliometrics, it's just they are a long way from providing the sorts of robust indicators that governments, policymakers and institutions increasingly want for evaluative purposes.

As Roche explained, there's not a one-size-fits-all solution in these desired metrics, but we need to find the right metrics for the particular research community: 'Publishers are now reporting on speed of publication, usage of content, social media attention, and more recently a number of service providers and publishers are looking at policy implications and uptake of research.

'All of these things are useful, and as a sector we are supporting our customers, our authors and our researchers with more tools and more services. The key point is we need to work very closely with the research community itself. It's all about creating the right resources for the right domains, because unlike the impact factor, which is this generic one size fits all, a lot of these research metrics need to be honed in their appropriate domain.

'Unfortunately, there isn't a simple formula to measure the reach, influence, mobilisation of knowledge and impact in society. The journey to impact is far more heterogeneous than something measured by an impact factor calculation.

'We're all looking for the same sort of solution we got with bibliometrics, and I don't think it exists. We need a far more nuanced and sophisticated approach using both quantitative and qualitative approaches. A combination of the classic quantitative measures, combined with storytelling narratives around how research makes that journey to broader society. That can't be done in a number.' →

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→ **Unrealistic expectations**

The problem is, of course, there are a lot of unrealistic expectations around what metrics should be able to show and how quickly solutions can be found. And then there are the things that metrics just can't tell us.

It's not just that governments want to find ways of improving the socio-economic return on investment from taxpayer-funded research, but part of a whole shift in the use of metrics in society, with league tables promising to show how an ever-increasing number of different types of organisations compare. In such an environment the notion that there may be limits to what can be meaningfully quantified, or the speed with which solutions can be found, is incomprehensible.

Inevitably, it can also lead to a lack of investment and dismay when reliable figures don't come easily. As Adams noted:

> "The big change, however, has been a widening in what people want to measure'"

'There was an expectation, or wishful thinking, on the part of some people that, given time and pressure on academics and others, some ready answers would be produced, but really there has been very little serious investment in developing indicators.

'Government is in no position to think about how such indicators might be developed, and how they might vary, and what's realistic and appropriate. It must come back to the research community itself, but they are not going to do it unless there's engagement with the government, and a dialogue about how this might work, what is significant and what the benefits are to the community. But no such engagement exists.

'Instead we just have this hand waving from government about "academics should be doing something about this, we're looking for indicators, and people are expected to produce these things", but that won't wash. It's got to be a much more engaged process before we get anywhere with this. It's got to be recognised that there's going to be differences, it's not going to be one simple catch-all indicator that gets everybody.'

Adams continued: 'People look for simple quick answers, and there is an important issue to tackle here about what research investment actually delivers for the taxpayer, and the only way of assessing that properly is to put time, effort and resources in to actually develop a proper picture of the landscape and how it works. There is no quick fix. Governments aren't in place long enough to take that seriously.'

Of course, as soon as a metric is introduced, it can very quickly stop becoming a useful metric. There is a need for time to see how the research community responds to new metrics, with different institutions having very different budgets that are available for maximising any new metrics that might be introduced.

As Roche noted: 'If you take, for example, metrics and social reach and influence, the cynic might say the researchers with access to the best marketing budgets can optimise the chances of maximising reach. Does that really speak to the wider influence of the research, or does it speak to the better-funded researchers in the global north at research-intensive institutions having more resources they can put at their disposal to help tell the story?'

Moving on from simple numbers

Although there are undoubtedly unrealistic expectations, there are nonetheless steps that can be taken, and are being taken, to get a better understanding of scholarly communications. As the scholarly publishing community has shown in the way it has responded to the numerous changes over the last 30 years, it can be very responsive to the needs of the community.

As Roche pointed out, while at this point there's unrealistic expectations around research metrics, there's a →

Jonathan Adams, chief scientist at the Institute for Scientific Information (ISI)

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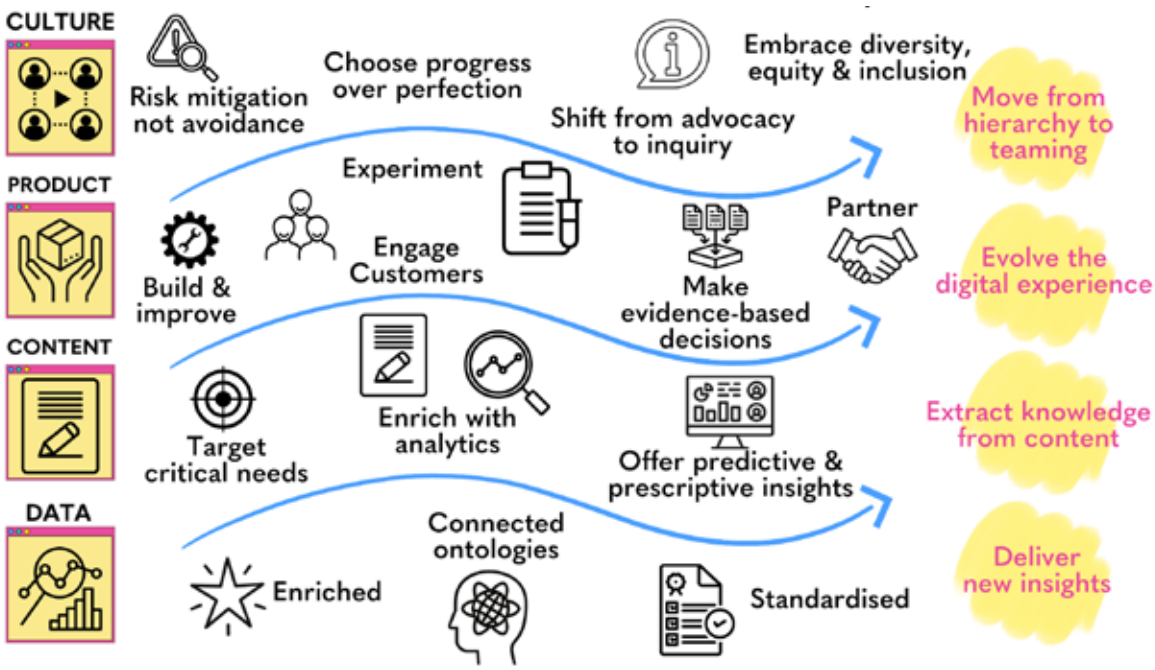

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→ brilliant opportunity, if the sector works together, to develop metrics in a much more sophisticated way: 'Our whole mission is around equity and a fairer and more equitable environment, so that all researchers can participate and generate impact and create change as a result of their work, rather than just get published and then move on.

'We created an impact manifesto back in 2018, and the key thread of that is championing alternatives to traditional academic metrics and traditional rewards. Earlier this year, we relaunched this manifesto to pledge six new commitments for change that will advance ongoing debates around academic culture, incentives and research evaluation, and to call for sector-wide action through our 'Are you in?' campaign.

'We signed DORA in 2018 and we support a number of initiatives that really promote fair holistic evaluation. Initiatives like The Hidden REF, which recognises all research outputs, and the fact that far more people contribute than the people you see listed on a paper. We have an awards programme that really showcases – and rewards – innovative research that is not just publishing highly cited articles, but actually research that can affect positive change beyond the academy.

'Our platform is designed to carry lots more than research papers, but the research community are still rewarded on the paper or the book. If they were to utilise video assets to generate uptake with particular stakeholder groups, which allowed application and real change, that's where research metrics could get really interesting. Technology is part of that solution, but it only works if your communities engage with you on it.

'We're also working with other publishers. It is a competitive environment, but we do need to work together because we are serving the same research community at the end of the day, so if we can help to develop standards in these areas, that's a win for everybody and will make adoption by researchers easier.'

> "We are a long way from getting simple answers, but we are increasingly able to see the complexity of the problem"

Tony Roche, CEO of Emerald Publishing

As more data is collected, and we more fully understand the complexities of scholarly communications, there is inevitably a need for finding new ways to represent that data and complexity.

As Adams noted: 'There's a shift away from looking at just tables of numbers, towards graphical analyses, which provide much more information about what's happening. The only way to get people to appreciate the complexity of the research environment is to see a picture that involves multiple indicators in one go.'

Conclusion

The broadening from wanting to understand the academic impact of research to also wanting to understand the socio-economic impact of research is to be welcomed, but while we undoubtedly have access to more data than ever before, it's not clear we are any closer to getting a true picture of scholarly communications.

The temptation to overly reduce the complexity of the research ecosystem will always be there for the purposes of policymaking, management decisions, or the increasingly ubiquitous ranking tables, but there are no quick fixes to the problem of measuring research impact.

Meaningful metrics have to reflect the complicated and diverse nature of the research, and they will only emerge when all the different parties work together to discover what is important to their particular community.

We are a long way from getting simple answers, but we are increasingly able to see the complexity of the problem. Ri

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Bright future for libraries in the cloud

Siân Harris looks at what role cloud-based services play in libraries today, their benefits and limitations – and what challenges remain

For Tom Shaw, associate director for digital innovation and open research at Lancaster University in the UK, the cloud is 'absolutely fundamental to the way we operate as a library and has been for a number of years'.

He said that, in addition to the collections hosted on vendor platforms, with most of the library's systems and software, the university has taken a strategic decision to use a software as a service approach. This includes using Alma as the main library system, Primo as the discovery tool and other cloud-hosted services. Only a few, more bespoke library services are hosted at the university and even these are on central university servers, not in the library.

Such an approach has become increasingly common over the past decade or so, but why has the cloud become a key part of many libraries?

'We see real advantages in terms of reducing the resourcing implications, the technical overheads of running things ourselves in-house,' Shaw explained. 'With Alma, for instance, we pay Ex Libris to run that as a service on our behalf. If it falls over that's a phone call or a ticket we raise with them, which is a much more efficient way of looking at managing risk. We just don't have the luxury of large numbers of staff who can do the sorts of things that need doing in a non-cloud environment, such as managing hardware and servers, installing patches, upgrading software, as well as doing innovative stuff and building new systems. Cloud has enabled us to free up staffing resource to do the things where we get real impact and real value. And it is also about trying to avoid reinventing the wheel; we can buy something in that usually is better than what we would have built in-house.'

Benefits of scale

Beyond technical capacity and risk, there are benefits of scale with pooling resources, as Matt Hayes, managing director, technology from SAGE (Talis & Lean Library), observed: 'When we think about "libraries in the cloud" at Lean Library and Talis, we think less about the storage benefits and more about improved discovery of all the library has to offer, and the ability to provide added value on the open web, outside the library's digital or physical infrastructure.'

One example he shared is that Lean Library aggregates open access databases on behalf of libraries and provides libraries with tools to surface relevant content from these databases when their patrons encounter paywalls online. The tools also enable the library to provide added context to such content, to support their curation and discovery missions.

'Moving library systems to the cloud would allow for greater interoperability. In that respect, it makes it easier for libraries to deliver their services or resource on third-party websites and platforms – essentially, wherever their users are,' Hayes added.

"Beyond technical capacity and risk, there are benefits of scale with pooling resources"

Gloria Gonzalez, senior agile product owner at Zepheira, part of EBSCO, had a similar observation: '[Our] Library.Link Network is a cloud-based service that is platform agnostic, so it works with any catalogue that libraries use and it transforms their data into a format called BIBFRAME, which allows library data to become decentralised and helps libraries meet their users on the web where they're searching.'

BIBFRAME is a web-native standard that allows libraries to publish structured data so it's more visible on the web. Gonzalez explained the benefits: 'Previously to this new format being available, catalogues didn't show up in library searches. They were not indexed by crawlers. In this new format, all of that [library] data is open on the web. Indexers can crawl that information and provide access into their search engines. Having the same →

→ standards to describe their data makes it easier for libraries to work together to make their data better.'

She added that BIBFRAME data is syndicated directly to partners like Google: 'We launched a borrow option together in 2019 and now people searching in Google, in Australia, the United States and Canada can all find library books near them from the academic and public libraries and national libraries that surround them.' This can be extended to other countries, she continued, once a specific geographical area has enough libraries that are publishing data consistently.

Beyond Google, decentralising data on the web means libraries can be found anywhere they'd like to meet their community, whether it is faculty websites or community partner websites.

Navigating storm clouds

Of course, this openness can raise concerns for libraries when they are thinking about moving their services and systems to the cloud. 'Once you have your data available on the open web it can really be used for any purpose and so when libraries first approach us they ask about these solutions,' observed Gonzalez. 'They are curious to know very specific use cases because it can seem like there's too many options for what they can do.'

Another concern that has sometimes been raised about moving to the cloud is around ensuring ongoing access to the library's data.

'We address them through our data preservation and policy plans,' Gonzalez noted. 'So not only are we providing a host service, but we also, on behalf of our customers, take care of replicating that data and backing it up. So that if there ever were an issue, it could be restored,'.

Long-term sustainability of platforms is an issue that Shaw in Lancaster is also following. 'I'm conscious we might be buying something from a vendor who is cloud hosting it, but it doesn't necessarily mean they own their own cloud infrastructure. Very likely they're using Amazon Web Services or something similar. It does raise some important questions about what would happen if the cloud provider fell over, or decided on taking a very different approach. This is probably something that ought to be a bit more of a consideration as we get deeper into the cloud environment.'

However, he added a counterpoint: 'The other thing is weighing it against the alternative. If we've got IT ourselves on premises, on our servers, you can go and look at racks with spinning disks in and say, "they're in this room that we've got locked", but it doesn't necessarily mean they can't be hacked and aren't vulnerable in some way.'

Clouds and climate

Another aspect of cloud services that has come under increased scrutiny recently is environmental impact.

'Sometimes there is a tendency to think digital means we're not cutting down trees to make print books, therefore it's greener,' observed Shaw. 'The reality is far more complicated and the carbon impact of the cloud can be quite considerable. It's not just power generation involved in the devices that people are using. There is huge amounts of power generation involved in running cloud data servers and networks. Then there is the question of where that energy comes from, what carbon footprint does it have, how sustainable or renewable are any of the sources powering those.

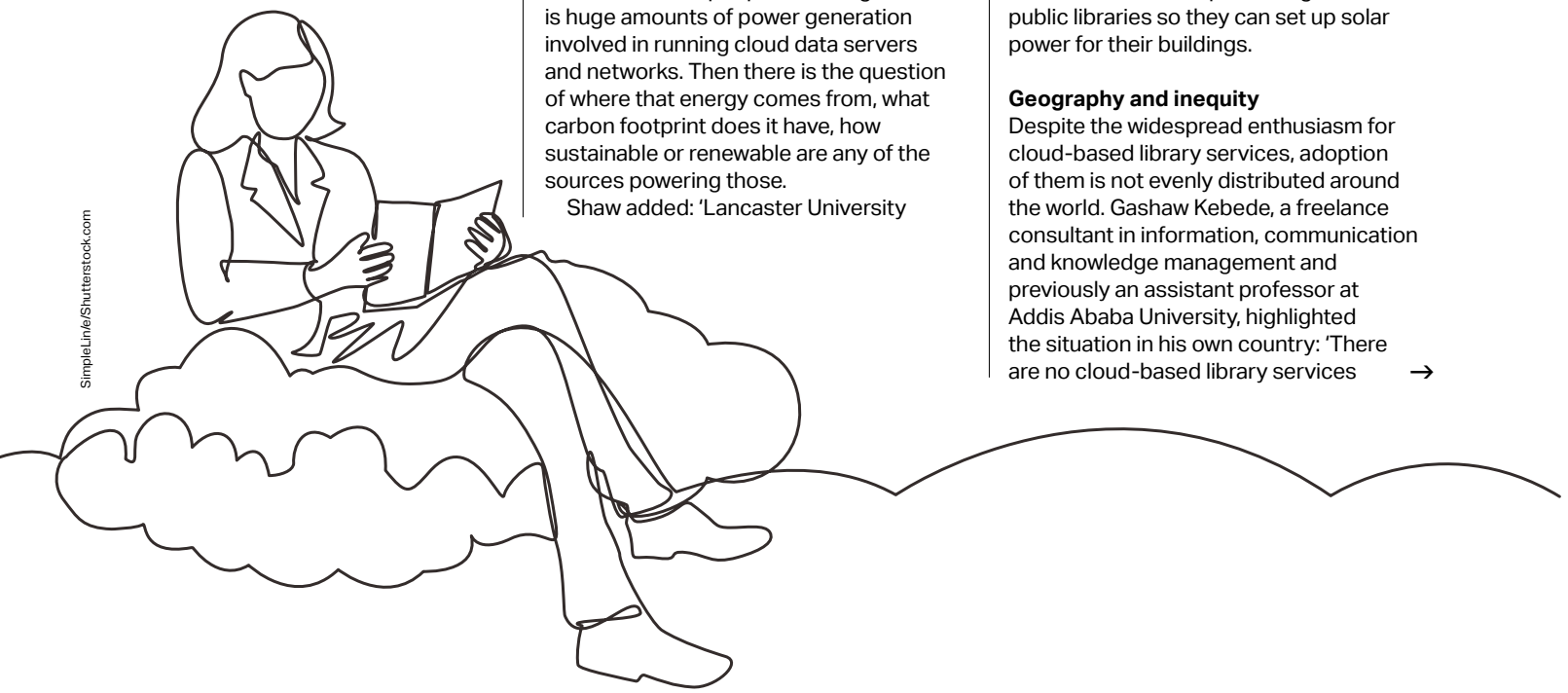
Shaw added: 'Lancaster University has declared a climate emergency and across the university we're really being pushed in terms of how we're going to respond and to make that a meaningful statement. It's really pushing us to think more deeply about the impact of things like the cloud. We're going to be engaging more with our vendors and making it a much more usual part of the process to ask questions about how they power their data centres, what work they have done to understand the environmental impacts of cloud for them, and what is their roadmap for reducing the environmental impact of their activities. I'd also like to work with our procurement team to look at how that can become a much larger part of the procurement process.'

> "Decentralising data on the web means libraries can be found anywhere they'd like to meet their community"

Gonzalez agreed about the challenge: 'Especially during the early adoption of cloud-based services, the environmental impact of cloud services was an issue, and it continues to be an issue. We specifically seek out data centres that are, on average, about three times more efficient than average data centres in the US. Our cloud provider partner is on a path to 100 using 100% renewable energy by 2025.' She added that EBSCO also has an initiative, EBSCO Solar, which provides grants to public libraries so they can set up solar power for their buildings.

Geography and inequity

Despite the widespread enthusiasm for cloud-based library services, adoption of them is not evenly distributed around the world. Gashaw Kebede, a freelance consultant in information, communication and knowledge management and previously an assistant professor at Addis Ababa University, highlighted the situation in his own country: 'There are no cloud-based library services →



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Bodil Dalgaard-Møller, Database Consultant at **DBC D1G1TAL**, the Danish Library Centre with the Danish Union Catalogue (DanBib) and library.dk, emphasizes that "ISSN is important as the official reference for identifying and distinguishing continuing resources".

For 10 years, the **Copyright Licensing Agency** (CLA), a UK non-profit organization, has been using the ISSN Portal. Caroline Baldry-Last, CLA Data Team Manager comments "CLA has had a positive relationship with ISSN Portal for over 10 years. We use their services on a daily basis as a trusted source to identify bibliographic metadata in order for us to accurately distribute our revenue to copyright holders."

In 2021, more than 3 million ISSN visits were made to the ISSN Portal to check and find reliable data on archived, ceased and current publications. Denise Peres, Librarian coordinator at **SciELO** notes that their aim is to benefit from "a reliable source, with a single standardized record format for generating data and indicators."

The latest version of ISO 3297 standard published in 2020 takes into account the requirements of the library and the publishing communities. The standard has been improved by introducing the following items:

- the concept of "cluster **ISSN**" to group serials based on various characteristics, e.g. print and digital media formats or preceding and succeeding titles,
- the expansion of the list of resource types eligible for ISSN assignment, e.g. blogs, conference proceedings,
- the specification of ISSN interoperability with other identification systems, e.g. DOI, EAN, URN.

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→ implemented by the local academic and research libraries in [Ethiopia] (although some of the international organisations located in the country may have some cloud-based library services). And, to my knowledge, there is no concrete plan or public discussions to introduce cloud-based library services and management by the institutions usually charged with coordinating such a task (for example, the Ministry of Education of Ethiopia).

'However, moving to a cloud-based library service is obviously [one of] the top priorities in the wish list of every academic library in the country. There is an increasing awareness of the specific advantages that moving to cloud-based library services could bring, particularly to the improvement of services and capacity of the ever-increasing academic libraries located in the public universities of the country.'

There are several factors that he sees in this low adoption: 'In my view, moving to cloud-based library services will not be an easy option to consider by the local academic and research libraries at the moment, primarily because of: (a) the poor network infrastructure on the ground to connect to the cloud, and (b) the limited digital resources and services owned by the libraries to justify moving to the cloud (less than 100,000 e-books exist among the country's 50+ academic libraries). The majority of the academic and research libraries lack sufficient network connections on the ground, even to participate fully in the national research and education network (introduced by the government under the name EthERNet in 2000). Adding to this is the perennial financial constraints that libraries have to give priority to [over] moving to the cloud.'

Kebede believes that, before rolling out many cloud-based services in his country, there is still work to do in strengthening local digital libraries. 'Of course, achieving these will make it easier to move to cloud-based services and other models of service provisions and resource building in the long run,' he observed.

> "There is a need to recognise that standards have evolved differently around the world"

So, what can vendors of library tools do to help address such challenges, particularly where internet access is less reliable? Gonzalez of EBSCO shared an example of one approach her company has taken with a project in a prison, where access to the wider internet is prohibited: 'We created a local version of our EBSCO Discovery service, so people who are not connected to the internet can access their items locally. It is important that we meet all readers, even those who don't have continuous access to the internet.'

She also acknowledged inequality in the adoption of BIBFRAME. She noted: 'EBSCO helps that issue by making it as easy as possible for people to use this standard. The library sends us their catalogue data and we do the entire transformation and publication for them. Their staff doesn't have to learn the ins and outs of the standard before they get access.'

Observing that language can be a barrier too, she added that EBSCO is working to translate the standard documentation into other languages, working, for example, with libraries in South America and the National Library of Qatar, to translate standard documentation to Spanish and Arabic. She continued: 'Our transformation pipeline that we use to publish this data is completely script and language agnostic; if the data is in a certain language, then we preserve that when we publish the data.'

In addition, there is a need to recognise that standards have evolved differently around the world. She said: 'The MARC standard has many different flavours around the world and so we're also expanding our services to work with all versions.'

So, what does the future hold for libraries in the cloud? 'In five or 10 years' time, I see library catalogues and catalogue data being completely decentralised,' said Gonzalez. 'Libraries won't be sharing data based on record systems, but instead they will be able to share more granular pieces of data – for example, descriptions of a particular person or publisher or topic. That will enable libraries to expand the power of their data sharing, to understand what they have in common and what is unique to their collections.'

The continued move to the cloud in libraries is inevitable, concluded Shaw. 'We're seeing both our university and the wider sector moving far more towards the cloud. Even if we in the library said, "this is not the direction that we want to go in", it feels like we'd just be trying to run against the tide. You can either try and turn against it, or you can get involved in a way where you try to steer it in the right direction, like with the environmental considerations. Embracing the cloud has enabled us to think more strategically about how it best fits with the type of library we are, the type of university we are and where we want to go.' **Ri**

A 'set and forget' single sign-on solution

The American Academy of Pediatrics (AAP) is the world's largest publisher in the paediatrics field. Now its resources have been brought together into the AAP Publications Platform. It is hosted by Silverchair, whose collaboration with OpenAthens has created a portal that gives users the easiest, most direct journey to the resources they want

Until recently, AAP offered their resources via two vendors, one of which was OpenAthens. Customers were accessing both of its platforms via OpenAthens using a variety of library management systems, intranet portals, and sometimes a company's active directory. The global OpenAthens Federation is unique because it is available to customers outside the education and research sector.

AAP wanted to bring all their resources together on a single platform to maximise reach and impact via a 'one-stop shop'. To do so successfully, said Alfred Gozun, application support specialist at AAP, meant addressing his customers' biggest asks: 'Librarians, in particular, want the ability to authenticate via SAML protocols because it lightens their workload. And they want their users to be directed to resources via WAYFless access and deep linking. These mean they don't have to sign in again or navigate around unfamiliar websites to find what they want.'

AAP asked Silverchair to help develop a solution that included an OpenAthens Federation integration. They needed a custom build that met customers' needs and ensured seamless compatibility between multiple systems. AAP and Silverchair worked with OpenAthens to ensure a smooth migration from AAP's previous platform, to give users the easiest, most direct journey to the resources they wanted.

Solution

Silverchair and OpenAthens have collaborated in this way several times, but a few things made this project different. It was Silverchair's first build with WAYFless and deep linking, which allows librarians to build links that bypass Silverchair's sign-in page. This means users can get straight onto the AAP portal from their library page with all the authentication happening in the background. This was also

> "Users can get straight onto the AAP portal from their library page with all the authentication happening in the background"

Silverchair's first project migrating the content from two different platforms into a single instance.

'We liaised between OpenAthens and AAP to get the account set-up,' said Patrick Jordan, lead build business analyst at Silverchair. 'We helped to streamline, transfer data and migrate from AAP's old systems. We set-up the metadata and submitted it to the OpenAthens Federation, InCommon Federation in the United States, and the eduGAIN inter-federation service to give the AAP platform the widest possible reach.'

Although this project introduced several firsts, it launched without a hitch. OpenAthens is easy to test and the go-live and switch-over stages went smoothly.

Benefits

One of the stand-out benefits of the new implementation is an improved user experience, said Phil Leahy, key client services manager at OpenAthens: 'In the last five years we've seen requests for deep linking shoot to the top of librarians' wish lists.'

To support this need, OpenAthens developed the Redirector, a tool that provides a scalable way to propagate links. It puts the URL of a page in a resource on the end of a consistent, customer-specific prefix. The Redirector has become the most important OpenAthens feature in the last few years. 'It shaves off friction,' Leahy explained. 'It's a great example of how publishers, platform partners and federation operators are working together to streamline the user's journey.'

AAP staff now receive fewer requests for help from end users and this shows the implementation is working as planned, said Alfred Gozun. Even so, AAP has kept proxy access for users who are still using a proxy server configuration for access. And they expect to do so for some time, so that all customers are supported.

Federated access is freeing up AAP to make better use of its own internal staffing resources. The complexities of onboarding are managed by AAP's customer services team, rather than having technical conversations about peer-to-peer SAML connections and proxy stanzas. The publisher can, as Gozun said, 'set it and forget it'. At the same time, he said 'for the library user it just works seamlessly, it's like magic'.

'Federated access is more important than ever, now that we are seeing a long-term shift towards academic users working off-campus,' said Hannah Heckner, director of product strategy at Silverchair. 'And businesses are experiencing a similar change in attitudes. We're thinking about how they could leverage the federations that universities and research organisations are familiar with to support their own access management requirements.' Ri

To find out more about how our SAML experts make it easy for you to migrate from your existing single sign-on solution to our supported solution, visit **openathens.pub/migration.**

‘It just frustrates me to see research not being read and used’

Kudos co-founder Charlie Rapple explains her passion for accelerating the dissemination – and impact – of science

Tell us a little about your background and qualifications…
I got into the scholarly communication sector by accident. I’d studied history of art and had a holiday job at a fine art publisher. When I graduated and looked for a publishing job, I saw an ad in the local paper for something called an ‘electronic publisher’. I had no idea what that meant, but it had the magic words ‘no experience necessary’, so I applied.

That was at CatchWord, a pioneer of online publishing technology and services. My first role was converting the printers’ postscript files into digital articles complete with live reference links. I had just left university, where I had spent a lot of time in the library, photocopying reference lists, looking up shelf references, hunting down the text cited, and so on. So I really ‘got’ the value and importance of just being able to click on a link in a reference list.

From that I became product manager for metadata, before moving into marketing – kind of by chance, as I was helping cover a colleague’s maternity leave. My boss, Doug Wright, sent me on a Chartered Institute of Marketing course that changed my career – I gained a postgraduate diploma and a new understanding of, and respect for, marketing as a strategic driver of a business. Later, I went to work for my Kudos co-founder Melinda Kenneway at TBI Communications, and spent many happy years consulting for publishers, universities and societies.

What does Kudos do – and have you been involved in any particularly interesting projects recently?
Kudos helps more people find, understand and act on research. The world has so many knowledge gaps and you can see the problems that creates, on everything from Covid to climate to badger culling. People don’t want to be told what to do by ‘authorities’ – they need to be persuaded, which means they need to make sense of the evidence for themselves, and feel they have been given the chance to make their own minds up. I think every bit of research should come with a simple summary of what it’s about and why it’s important, what its findings or recommendations are.

And we need to make those easy for people to find – not hidden in a funding proposal or a university report, but collated and promoted in a centralised way. The word ‘promotion’ is one I shied away from for many years – many people feel research shouldn’t need promotion, that it should stand on its own merits. But that’s conflating two different things. Even the best research isn’t going to make a difference in the world if no-one can find it. I firmly believe it’s not enough just to make information available – you have to proactively make your potential audiences aware of it.

> “The world has so many knowledge gaps and you can see the problems that creates”

For the last 10 years, Kudos has been giving researchers the skills, tools and confidence to communicate more effectively. But in the last couple of years we’ve massively expanded our supporting activities on the promotional side. We now do a lot more to grow the audience for the summaries on our platform, and I’ve been leading our projects in this area. This has involved setting up ‘knowledge cooperatives’, where publishers work together to broaden the audience for research around a public interest topic, such as climate change, artificial intelligence, or diversity and equality.

We have commissioned professionally written summaries of published research on these topics, and run substantial multi-

channel promotional campaigns around them – advertising on search engines, posting about them on social media, doing PR and email campaigns.

One of the bits I have most enjoyed getting to grips with is improving the rankings of research summaries in search engines, so when people search they find information they can understand, but that is based on proper research, rather than more speculative, biased or deliberately misinformative content. This involves identifying trending search terms, targeted clustering of relevant summaries, and the creation of 'pillar pages' and videos. It's stuff that digital marketers in consumer sectors would do in their sleep, but it's exciting to see the same techniques can help more people engage with research.

Is there an area of scholarly communications you are particularly passionate about?

I am very passionate about marketing and communications, as you might be able to tell! It just frustrates me to see research not being read and used. If it's worth doing the research in the first place, it's worth putting a bit of time and effort into making sure it is making a difference to someone, somewhere.

I'm also really passionate about collaboration between the different 'stakeholders' in scholarly communication. About 15 years ago I got involved with UKSG, which is a cross-sector association bringing together libraries, publishers, technology providers, intermediaries and all the other organisations that are involved in 'the information supply chain'. I vividly remember the first UKSG conference I went to and the sense of suddenly accelerating up a learning curve, a blossoming understanding of the day-to-day realities of people that had previously just been names in email threads.

That sort of connection and insight made such a difference to how I did my job. Time and again I've heard people say that about UKSG – that it helped them understand things from a different perspective. Sometimes over the years it has felt like publishers and libraries are adversaries, so it really matters that different groups come together in pursuit of a common goal from time to time – and get to see each other as human beings rather than corporate entities.

What are your wider hopes for the industry over the next 10 years?

Not to bang my drum too incessantly, but… I hope we'll be taking a more active role in communicating research beyond academia. There is a great opportunity for a more joined-up approach, and publishers and libraries – by dint of their existing connections and partnerships – would be really well placed to make this happen. At the moment, only the most prestigious research gets the 'full treatment' in terms of universities' PR outreach. There is great potential for the 'long tail' of research to be more actively publicised.

I think some of what is needed has been derailed by the focus on open access, with a sort of working assumption that enabling the general public, patients, educators and so on to access research papers will be a catalyst for accelerating the impact of that research. But, of course, it isn't – yes, researchers need access to papers, but wider audiences need simpler summaries or more targeted explanations. It still takes years and years for research recommendations to become normal practice, because of the disconnect between research 'producers' and 'users'. I hope that our industry can help close that gap over the next 10 years.

> "If it's worth doing the research, it's worth putting time and effort into making sure it is making a difference to someone, somewhere"

Lastly, do you have any fascinating hobbies or pastimes you want to tell us about?

Nothing all-consuming – a bit like work-me, home-me is also a generalist. I love reading, particularly books set in harsh environments, which somehow make me feel cosy and relaxed. I enjoy my travels. I indulge my creative side from time to time with a bit of painting, photography or collage. I love music and festivals. I sing in an occasional choir that does choral evensongs in cathedrals, which marries my love of singing with my love of architecture! Ri

Interview by **Tim Gillett**

A Mastermind of taxonomy

Helen Lippell explains why organisations should learn more about taxonomies, ontologies and metadata – and describes her love of a good quiz

Tell us a little about your background and qualifications…
Like many taxonomists, I didn't train in or plan to move into this field. I was always interested in information. Even as a kid I loved encyclopaedias, dictionaries and lists, so now I joke I was born to do this! My academic background was in Latin and economics – two subjects that, in my opinion, reward methodical thinking, wide reading and understanding how things fit together, whether that is a Roman political system or a national economy.

My first job was as a manual indexer of news. I would apply tags to anything from the Malaysian steel industry to French political news. I loved that these words and little phrases could be so powerful that all this unstructured text from across the globe could be turned into highly tailored feeds for people interested in particular companies, countries, subjects or industries.

I moved on from that work to the automatic indexing side of the operation, where I really got stuck into writing and managing rules for tagging the content. I liked the speed and scale of what could be done once you'd refined the rules, so the technology didn't get confused by ambiguous or vague words. Since then, I've never looked back. I've been independent for over a decade, meaning I can work on a wider range of projects in different types of organisations and apply my skills to various digital systems challenges.

You recently edited a book, can you tell us a little about that?
When someone from Facet Publishing first suggested I do a book about taxonomies, my initial impulse was to head for the hills because it sounded like such a big commitment. But I felt there was a gap in the 'canon' of information management books for a practical guide on taxonomy projects from start to end, without replicating the existing detailed or academic literature.

I wanted to do something that would be a useful reference for full-time taxonomists, but also for people in other digital jobs who might encounter taxonomies.

I decided very quickly I would prefer to do an edited collection, rather than write the whole thing myself. I came up with my 'Fantasy Taxonomists' squad, based on who I knew from my network, and asked them if they'd like to contribute a chapter.

It was my goal from the outset to produce a 'toolkit' of insights for all aspects of taxonomy projects. Every project is unique, of course, but this book can arm you with tips, best practices and advice at every stage. I've been doing taxonomy work for years and I learned loads from developing the chapters with the authors.

Tell us about your wider work related to taxonomies.
There's a vast number of applications for taxonomies these days. They've moved way beyond their roots in cataloguing and libraries to become an essential part of managing digital information. I work on projects to improve search engines, digital asset management, multi-channel content publishing, semantic tagging, data interoperability, and more!

I've worked in lots of different sectors; you don't need to be an expert in a subject to develop strong vocabularies for it. I love applying my skills and professional curiosity to new projects.

What are your wider hopes for the industry over the next 10 years?
I hope organisations continue to learn more about the power of taxonomies, ontologies and metadata to improve their products and services, and improve their internal processes. Businesses in the e-commerce sector are more aware than ever that if they don't describe their products accurately, fully and in line with their customers' mental models, those customers will either find an alternative site, or not buy at all. Public sector organisations deal with lots of information coming in from, and going out to, other agencies, as well as circulating inside the organisation. With good tagging, this information can be found, used and reused more easily. Media companies use taxonomies to manage their text, images and videos so that they can be distributed across any number of channels.

Organisations generate so much content, data and information, and yet continue to waste this investment because of poor findability, poor business processes and poor understanding of the value of their stuff. I am seeing more and more job postings for taxonomy and semantic skill sets; I hope this trend continues.

Lastly, do you have any fascinating hobbies or pastimes you want to tell us about?
My main hobby is quizzing. I have always enjoyed a good pub quiz, but I have taken it to another level in recent years by getting into competitive league quizzing. Like any good sports team, we have been through our share of promotions, relegations, cup runs, heroic last minute wins and heartbreaking defeats. League quizzing was a natural 'gateway' to going onto TV quiz shows. I have been on *Mastermind* twice, *Only Connect*, *Eggheads* and have won an episode of the word game, *Lingo*. Ri

Interview by
Tim Gillett

Working towards a fairer playing field

Figshare founder Mark Hahnel describes the company's beginnings and raison d'être – and his wider hopes for scholarly communications

Tell us a little about your background and qualifications…
I was a stem cell biologist, albeit briefly. My undergraduate was in genetics, my master's in human genetics, and my PhD in stem cell biology. It was all just a natural progression of focusing on an area I found super interesting. I never intended to leave academia, but often wonder how successful I would have been in what I now see to be a very competitive academic landscape.

How, when and why did you found Figshare? Explain a little about the company's raison d'être and activities.
While completing my PhD, I was generating lots of different file formats. To disseminate my research (and due to the concept of 'publish or perish'), I had to write up my work into PDFs. I had a lot of videos of stem cells moving from one side of the screen to the other that were deemed too big by publishers at the time to be published alongside the paper. Most researchers generate more computationally heavy files as technology becomes more accessible. When we think of academic data, it's really just academic computer files. If you think your subject doesn't produce data, ask yourself: 'What files am I producing?'

The fact that I couldn't publish these files caused a lot of frustration. I had to reverse engineer my findings into written text. At the same time, I was frustrated by the idea that so much of my work – which could be useful for others – would never see the light of day.

So, I started making these files available in a way that adhered to best practices as well as I could: data persistence, including persistent identifiers. I opened the platform up to other academics, received some investment from the newly formed Digital Science, and started working on sustainability models to support open data. Our business model now is to provide the best repository infrastructure for organisations looking to disseminate the research of their academics, for compliance or open access reasons, and to track the impact of said research.

You were one of the first people I met in scholarly communications, about eight years ago. What have been the biggest industry developments since then?
In terms of academic publishing and the wider move to open research outputs, there are two types of change that show the trajectory of where we are headed. The first is that we've seen open access papers become the majority over restricted access papers and the steady growth in funder and publisher policies on open data. Probably the most notable of all is the January 2023 policy for open data from the NIH. But with 52 funder policies and counting, it is truly a snowball effect coming to fruition.

The second real change has been preprints. What has been fascinating about the rapid expansion and acceptance of preprints is that it came at a time when fake news, fact checking and alternative truths were hitting the headlines. For me, this highlights how difficult the need for 'fast but good' publishing can be.

The triumvirate of open access fees, the need for faster publication and the necessary quality checks means we have a three-pronged tug of war, where pulling on one end has direct impacts on the other two. While this has its own set of challenges, the fact we have seen such a need and desire for more efficient publication practices shows there is a lot more innovation to come in this space.

Are there any other areas of scholarly communications that you are passionate about?
The bio I use for conferences includes the line: 'Mark is passionate about open science and the potential it has to revolutionise the research community.' I think we are just seeing the beginning of the effect of machine learning and AI on research outputs, most notably the DeepMind AlphaFold project, which is already dramatically accelerating research.

I also love the wider research communication space. Taking complex ideas and translating them to those with non-specialist knowledge is a real skill.

What are your wider hopes for the industry over the next 10 years?
I hope for a fairer playing field, where any interested person has the opportunity to pursue an academic career in a field they care about. I think the real driver for most people working in academia is passion about a subject. We as humanity should encourage these passions. Essential to this is the need for equitable ways to publish, access and disseminate academic content. I see these as things worth striving for.

Lastly, do you have any fascinating hobbies or pastimes you want to tell us about?
I'm learning Icelandic to keep up with my in-laws! So feel free to say 'hæ!' if you see me out conferencing! Ri

Interview by
Tim Gillett

Letting go of the way we worked pre-pandemic

As offices have started to open up, Antonia Seymour talks about how not being bound by location means we need to rethink how we work

Hybrid working has been hailed as the future of work, with lots of organisations moving towards a part-home, part-office mix in the hope it will give their workforce the best of both worlds. At IOP Publishing, we don't see hybrid as being a binary choice between home and office. We just don't believe it's quite that simple.

When we started to see the light at the end of the pandemic tunnel (which, in hindsight, turned out to be a little premature due to subsequent lockdowns), we decided to take our time to really think about how we could combine virtual and in-person work successfully. It was clear our future would be less office-centric, but how could we keep hold of the positives of home working and not lose sight of the importance of face-to-face time, which helps to build culture and community?

Open to options – colleague consultation

Success hinged on us finding a balance that would work for employer and employee.

Our approach couldn't be dictated by the leadership team – we needed to build it around what colleagues wanted. With the help of strategic workplace experts Interaction and Workwell PCS, we consulted with our colleagues across the globe through focus groups, one-to-one interviews and an online survey.

We asked the obvious question about how often they would want to work from the office, but we also went deeper to understand what the best and worst elements of working in the office or from home were and the difficulties they had experienced.

Flexibility driven by purpose

The main message that came from the consultation was that colleagues want to work where they can be most productive. There's no point insisting everyone come into the office for two days a week, if the work they are focussed on at the time could be better done at home. Pre-pandemic, employers would often ask colleagues to explain why they wanted to work from home. Now we need to justify the need to come into the office.

Of course, we also found that not everyone wanted the same thing. Some people indicated they would prefer to work from the office every day, while others found it much easier to work from home most of the time. Being too prescriptive wouldn't work for us and flexibility needed to come in different forms.

Questioning our norms

Our first step was to re-evaluate the norms that had previously been so central to the way we work. Our ways of being and behaviours have always provided the basis of how we work together, but they were based on working in a physical location.

Everything has changed – the way we collaborate, how we raise issues, how we give and receive feedback. Introducing a new set of ways of being and behaviours designed around this change means colleagues take responsibility, make decisions and communicate in this unique, new environment.

We then introduced guidelines to show how the day-to-day could work in practice. Workwell PCS suggested we base these around four elements:

- Anchor – coming together in the office
- Focus – in a quiet space from any location
- Collaborate – regular working in a collaborative space from any location
- Learn – training and development either in the office or online

> "Colleagues want to work where they can be most productive"

It's a big change which is arguably more complicated than the way we worked pre-pandemic. So, these elements help to provide clarity, which in turn supports autonomy. With some guidelines in place, we left it to individual departments to decide on the where, when and how for their own area. Each department created what Workwell PCS calls 'Team Charters', a team level agreement on the ways they will work together and how often they will meet in-person. We have shared these on our intranet so colleagues across the business know how to contact each other.

We continued to think about what else we could change as we move to a less office-centric environment. We've introduced a benefit whereby colleagues can work from another country for up to four weeks of the year. After so many months of being unable to travel, this has been well received. We already had initiatives such as 'no meeting Fridays' and 'screen-free days' to combat online fatigue, and we'll keep these going.

Better physical and digital locations

Having established that the right work would happen in the right place, our focus turned to ensuring we could provide fully supported digital working

combined with a reimagined office space.

We're in the process of moving to a new office building, one that fits our new way of working better. Working with Interaction, we've designed a space that provides a collaborative and social hub with space for quiet work. From an environmental perspective, our new building has an outstanding environmental performance and we've been very conscious of keeping our waste from the move to a minimum by recycling or reusing all the fixtures, fittings and furniture.

One of our most important responsibilities is to ensure that colleagues don't feel sidelined if they're not working in the office. Technology really helped to level the playing field during the pandemic and so we're investing in the latest hybrid conferencing technology to make sure everyone is clearly seen and heard, no matter where they are.

Smart building technology will be instrumental in helping us adapt. We'll have a simple but effective digital solution for desk and room bookings, and the latest in presentation and AV equipment for meeting rooms and hot offices. We've set-up an internal steering group to ensure we implement and maintain the technology that will meet the needs of all colleagues across the business.

We're proud of what we've put in place so far, but we certainly don't presume we have found the golden egg – we're in uncharted territory. We're a learning organisation and are always focused on improving what we do and how we do it. We'll keep listening to colleagues and continue to review, adapt and improve our approach. Ri

Antonia Seymour is chief executive at IOP Publishing

Working in the library post-pandemic – Lancaster University case study

Libraries have long been perceived as an industry that would not be suitable for working from home. After all, we deliver services on site and in person. But the pandemic has heralded a new way of working, even for library staff. It became clear that many employees could work effectively and productively at home, assisted by the right technology.

We learned that expensive travel abroad was not always necessary, and higher education programmes could be delivered online. In addition, we discovered working from home could contribute to wider organisational agendas, such as sustainable practices, by rethinking the use of the library building and a reduction in travel.

At Lancaster University we realise we can't just simply go back to the way we worked pre-pandemic. It would be a step back to return to how we worked before without embracing the positives that have emerged. The challenge is to bring in greater flexibility and trust for colleagues, whilst making sure the campus experience and collegiality isn't lost.

We are a small, research-intensive university and part of our unique offer is the strong community on campus. Making sure our campus remains vibrant where people can connect will also help us maintain income from the shops we have on site.

But we do need clarity for both our organisation and employees as to how we will work in the coming years. We're currently taking the first steps to determine what the guiding principles are for successful and sustainable agile working at Lancaster University.

As we adapt to a digital learning environment, we are curious to hear how other libraries are shaping their 'new normal'. We will focus on how to better work with people and how we can support their wellbeing in the face of continuous change.

Currently, our shelvers are the only people who still need to work full-time in the library. All other roles – even our front-of-house colleagues – for at least part of the week support students from home via the library chat.

The role of the librarian has changed dramatically in the past few years, with new roles and activities being created, and it is evolving with the emergence of new technology. But the core of our duty remains: to connect people and help them expand their knowledge.

Andrew Barker, director of library services and learning development

Early sharing not the only driver for preprint use

Sowmya Swaminathan discusses the implications for publishers in helping to foster open research practices

Sharing research and data early and openly played an essential role in our understanding and development of responses to the pandemic – on the one hand helping to speed up the validation of data so that researchers could trust it, and on the other, helping to combat scientific misinformation, so that wider society could trust it.

Yet despite what 'being open' showed to be possible, there are still some barriers and hesitations around both the development and adoption of open research practices – within and outside of the research community – the early sharing of research being one of them.

A 2021 report released by RORI showed that only 5 per cent of all peer reviewed Covid-19 studies had an associated preprint, despite the awareness of the benefits and enthusiasm for an open research future. The *2021 State of Open Data* report also showed that, despite year-on-year progress being seen around awareness of the principles of sharing, there is a decline in willingness on the part of authors to share their data and research.

In addition, a survey conducted by Springer Nature on authors' general perceptions of preprints, demonstrated that despite 85 per cent of respondents declaring awareness of preprints and support for early sharing, opt-in rates were significantly lower. So why, despite the drive and willingness to move to an open research future and desire for early sharing, is there this gap between willingness and action? Conclusions from the above surveys suggest a number of reasons:

- Lack of understanding around copyright and IP policies;
- Concern around data sharing and its misuse ahead of publication; and
- Lack of credit/ recognition for early sharing.

Springer Nature also recently surveyed over 152,000 users of In Review, a preprint service integrated with peer review. The intention was to better understand the gap between the high number of authors that say they support early sharing, and the lower number that actually opt in to do so, and how authors' experience of In Review could offer insight into what publishers could be doing better to support open research practices and better enable early sharing. The survey demonstrated that key drivers amongst authors for early sharing were:

- Faster communication of research findings (43 per cent) and early feedback (32 per cent);
- No financial cost (41 per cent); and
- Increased research output by being able to share ahead of peer review (27 per cent)

What is interesting is, while early sharing came out as important for authors, it is not their only driving motivator when using and selecting such services and adopting more open research practices. Authors

> "Authors are looking for more integrated services and want those platforms to offer multiple features"

are looking for more integrated services and want those platforms to offer multiple features that not only enhance the sharing, development and discoverability of their work, but also enable them to track and monitor its progress:

The survey found transparency was the top feature for authors when selecting an integrated preprint service:

- 71 per cent of authors said greater transparency of the peer review process at journals was useful. Through its integration with peer review, In Review enables authors to see specific details of peer review and track their article, providing a high level of transparency into an often 'hidden' process;
- 50 per cent said the more transparent the service was, the more they felt it was credible, as it enabled greater accountability for the journal; and
- Integrated early sharing – authors surveyed stated that ease of use (69 per cent) and being able to share their manuscript as a preprint at the same time as submitting it to a journal (BMC/ Springer journals) (83 per cent) had an impact on where they choose to take their work. We also learnt that this type of integrated solution is attractive for researchers in LMICs and early career researchers.

Of those surveyed, 47 per cent of users were first-time preprinters (with a large proportion being early career researchers, or coming from LMIC countries), suggesting that publishers' roles in fostering and integrating open practices, via integrated services such as In Review, has a significant impact on encouraging adoption of early sharing and could provide a model to be replicated to encourage the adoption of other kinds of open practices.

The insights are clear. While we as a community have a long way to travel in terms of supporting the take up of open research practices, publishers have a powerful role to play in motivating, facilitating and shifting norms by offering integrated solutions.

Given the benefits of early sharing, and the recognition of the enormous pressures and challenges confronting researchers, we see our role as publisher to be one of active engagement and collaboration to better enable and support authors in openly sharing their work to support discussion and the growth of open research – and make it simple for them to do so. We continue to work collaboratively to take action and are committed to working with researchers through solutions such as In Review and continue to develop a suite of research solutions to better support a more open workflow.

With many thanks to Greg Goodey, senior research analyst, Springer Nature, for survey and analysis. If you are interested in additional data from the survey, or wish to discuss any of it further, please contact katie.baker@springernature.com Ri

Sowmya Swaminathan is head of collaborations at Springer Nature

Conference highlights early-career research barriers

'If scientists are successful, we are successful.' That was the message of Miriam Maus, at PubCon – IOP Publishing's staff conference

IOP Publishing invited three inspiring early career researchers (ERCs) to the conference. They shared their first-hand insights on the challenges they face in the physical sciences, with a view to inform what publishers can do differently.

First steps into academia

'It is really difficult for us as ERCs to establish ourselves and get recognised by journals,' argued Caitlin Duffy, a PhD student at the High Field Magnet Lab at the Radbout University in The Netherlands. 'You either have to work with someone who is already recognised, or you have to somehow work on an experiment that gets you into science. I think it would be helpful to establish dedicated journal issues that encourage ERCs and discourage the big shots to publish their articles in those outlets.'

'Breaking into the cycle of science is the hardest thing for ERCs', added Jess Wade, a young British physicist in the Blackett Laboratory at Imperial College London. Her public engagement work in science, technology, engineering and mathematics (STEM) advocates for women in physics, as well as tackling systemic biases.

'When we are trying to establish ourselves as scientists, reputation and recognition is what gets you to move up the career ladder. 'This is harder for people from historically marginalised groups. For example, when it comes to peer review, your currency is the number of times your work is cited: it can determine whether you get a fellowship or a permanent position or a promotion. There's a huge amount of evidence that white men are cited more than women and people of colour. If we are excluding people out of the academic cycle due to bias and discrimination, some will never get a chance to establish themselves in academia.'

Credit where credit is due

Another issue that was brought up by the ERCs was the lack of credit ERCs receive for the work they do.

'I've known several ECRs who constantly do peer review for research leaders without knowing they were taking the credit for it, or even what the responses of the reviewers were. Research leaders should never take credit for the work of more junior researchers. It's a bad habit, but it's done throughout the sector,' added Wade. 'A way to address this issue is to encourage ERCs to create their own academic profile, so that journals know who the specialist is and who to contact for reviewing papers on that topic. It will help the ERCs to establish themselves and gain experience and it will help the journals to get expertise without having to ask the same reviewers over and over again.'

> "It's a constant balancing act between networking, conducting experimental research, writing and reviewing work"

Karen Syres, a lecturer in physics at the Jeremiah Horrocks Institute, agreed, suggesting: 'It would be good if people who turn down review requests are asked to suggest one of their postdoctoral researchers or PhD students to review instead.'

When asked what publishers should stop doing to help ERCs progress their careers, all three panellists agreed the peer review process should be more efficient. 'I find submitting papers longwinded and depressing,' said Syres. 'I've been at this game for a few years now, but understanding and navigating the publishing process is hard. You have to go through all sorts of questions you're not expecting – for example, listing software used to create the figures, or sometimes it can take hours to add students or co-authors to the system.'

Be kind by order

Other issues that affect ERCs are heavy workloads and time management. According to Duffy, it's a constant balancing act between networking, conducting experimental research, writing and reviewing work, all alongside her personal life.

'At the university where I work we have a high teaching load,' added Syres. 'I have about 100 lectures a year and I have colleagues who have about 200 lectures a year. I'm lucky enough to have some PhD students, but how else can we carry out research and write papers with so many demands on our time?'

The panellists agreed accredited training that is recognised by institutions could be a valuable means to support ERCs. Training as part of conferences could be an effective way to reach ERCs and more established researchers, as there is a need to better understand the peer review process and what best practice should look like.

IOP Publishing offers Peer Review Excellence, a training programme tailored for the physical sciences and delivered by top-level physicists from around the globe. The accredited training and certification offers a mix of online workshops and digital learning, with the opportunity to gain hands-on review experience. To join IOP Publishing's free peer review excellence training, please register here: ioppublishing.org/peer-review-excellence Ri

Miriam Maus is publishing director at IOP Publishing

Another extraordinary year for citation impact

Nandita Quaderi explains how Covid-19 continues to affect the citation network, and introduces a new kind of citation distortion

Covid-19 changed our world in thousands of ways. It caused millions of deaths, strained health systems worldwide, grounded flights and enforced isolation on communities used to living in a global and connected world. More than two years on, we are starting to understand some of the silver linings associated with the pandemic – from unprecedented scientific collaboration, to the accelerated speed of innovation and discovery for therapies and vaccines. For the second year, the *Journal Citation Reports* (JCR) from Clarivate demonstrates the enormous impact the Covid-19 pandemic has had on scholarly publishing (see more on page 32).

The annual JCR release enables the research community to evaluate the world's high-quality academic journals using a range of indicators, descriptive data and visualisations. This year's JCR contains more than 21,000 journals, across 254 research categories from 114 countries. It is based on 2021 data compiled from the Web of Science Core Collection, the leading collection of quality journals, books and conference proceedings in the world's largest publisher-neutral global citation database. The data include 35,000 publications (journals, books and conference proceedings), 2.7 million citable items and 145 million cited references.

Through this data we can fully appreciate and understand the enormous impact of the academic community's rapid response to Covid-19. Last year's release was the first to show the impact of Covid-19 research, with a rise in Journal Impact Factors (JIF) across the board. This year, we continue to observe increases in citation impact for journals in the fields of general medicine, critical care, public health, infectious diseases, immunology and basic biomedical sciences.

Exceptional performance

Perhaps the most surprising increase is that of *The Lancet*. The general medical journal increased its JIF to 202.731, which moves it to the #1 position in the general and internal medicine category, overtaking the *New England Journal of Medicine* – the top-ranked title in that category since the first release of the JCR 45 years ago. Of the 10 articles with the highest citation count in 2021, three appeared in *The Lancet*. They were all Covid-19 articles and describe the clinical features of patients in Wuhan infected with the virus; examine risk factors for mortality; and examine the epidemiological and clinical characteristics of cases in Wuhan.

This year, *Nature* earns the distinction of being the first ever journal to accumulate more than one million total citations in one year. *Nature* published 16 items with over 500 JIF citations – of which 12 items were Covid-19 related. To put this in context, the first *Journal Citation Reports* in 1975 summarised the 1974 data from the Science Citation Index and included a total of four million citations in the whole data extraction (compared to 143 million citations this year).

> "We have found a new trend in citation distortion, which we have defined as 'self-stacking'"

Seven journals had JIFs of more than 100 for the first time, all of which published high quantities of Covid-19-related research.

Upholding research integrity and a new type of citation distortion

While it is important to acknowledge and celebrate the journals and research communities that have made exceptional impacts on their fields over the last two years, upholding the importance of research integrity and sound citation practice is important too. Every year, our editorial team analyses the data to ensure the metrics accurately reflect the contribution of those journals to the literature.

Every year we identify journals where the citation data show anomalies when compared to others in the same category. We suppress their JIFs, including where there is evidence of excessive journal self-citation and/or citation stacking.

We do not presume a motive or accuse these journals of wrongdoing – sometimes it may be accidental, sometimes it may be malicious, and it is not always black and white. Suppressed journals remain in the Web of Science Core Collection – although they may be subject to re-evaluation and will be removed from coverage if they fail – and will be eligible for inclusion in the *Journal Citation Reports* again the following year.

We have found a new trend in citation distortion, which we have defined as 'self-stacking'. This is where the journal contains one or more documents with citations that are highly concentrated to the JIF numerator of the title itself – for example, a review or retrospective which predominantly includes citations that would contribute to the journal's JIF. This is the first year we have formally defined the criteria for self-stacking suppression, and we have issued a warning to six journals. Going forward, journal self-stacking will result in suppression of JIF.

Scholarly publishing continues to be based on trust, but new forms of manipulation have emerged as some stakeholders seek to gain an unfair advantage, and fraudulent enterprises have appeared that exploit the increased pressure to publish and be cited. One of the factors contributing to the growth of citation manipulation is the over-emphasis on bibliometric indicators during research assessment and the misuse of journal-level metrics to directly evaluate researchers.

It is wonderful to see high-impact journals get the attention they deserve, but seeking to secure high citation impact without a solid foundation should not be a goal in itself for researchers and can damage the integrity of the scholarly record. This is not a phenomenon that can be stopped solely by metrics providers, but needs cooperation and active participation from publishers, institutions, funders and governments. We continuously review content with the goal of developing additional screening for distortions of the JIF, and will continue to do so, considering every option to promote best practice for research, citation behaviour and research evaluation. Ri

Nandita Quaderi is editor-in-chief and vice president of Web of Science Editorial

African scholars facing economic crunch

Oluchi Ojinamma Okere outlines how researchers in sub-Saharan countries are being hamstrung by economics

Taiwo Odunuga is an early career researcher in a biological science discipline at one of the public universities in sub-Saharan Africa.

By dint of hard work, he has attained the rank of Lecturer II in his (teaching and research-focused) institution, but he knows the journey to achieving self-actualisation is a long one. He aspires to be promoted in two years' time when – by rights – he would be due for one. But this is conditional on his submission to at least four journals, with at least three being recent – that is, published after his last promotion.

The young academic is aware of the opportunities available to publish his work. He could publish in a local journal, but they have limited visibility – despite the opportunities offered by digital technology.

Moreover, the university has specifications regarding the number of local and international journals, and even impact value. There is also the option of publishing in readily accessible journals, which would charge quite a lot of money, but would get his article published within a short time, and would also guarantee its visibility. The problem with these is, they are tagged as predatory and could be flagged, eventually. However, Taiwo knows the best option is to publish in an open access journal with impact-factor value.

Sadly, by experience, he perceives the chances of his manuscripts getting accepted in these types of journals are narrow. For some reason, the rejection rate for articles from his side of the world seems high. Additionally, aside from the problem of long turnaround periods (due to reviewing and processing), there is the thorny issue of exorbitant article processing charges (APC).

A lot of factors affect the chances of acceptance of papers from sub-Saharan Africa by editors in the North. But even when the scholars outdo themselves or surpass expectations, the publication fees charged by international open access journals are so high as to be out of reach. True enough, some journal publishers offer waivers to researchers from developing countries, but such journal publishers are few and far between. There is also the prospect of getting grants to support publishing in open access journals, but these are competitive and sometimes laced with local politics. The option of self-sponsorship is definitely out of the question. With an average annual salary of about €4,200 ($4,500), considering publishing a single article in even a moderately priced journal at about €1,220 ($1,510) is almost preposterous for an African academic.

> "Inclusiveness, equity and diversity are part of the 'openness' paradigm, which means so much to the growth of science"

The high exchange rate of most African currencies and the low per capita income make it almost impossible for researchers to publish in international journals, whether genuine or predatory. For instance, aside from a few African countries, such as Tunisia, Libya, Ghana and Morocco, many sub-Saharan countries like Nigeria, Cote d'Ivoire, Botswana, Kenya and Zimbabwe, among many others, with an average annual GDP growth of 0.2 per cent, have very low economic indices. Meanwhile, researchers must thrive, not just for recognition and impact, but for the sake of globalisation and international integration.

Inclusiveness, equity and diversity are part of the 'openness' paradigm, which means so much to the growth of science. The incapacity of researchers in low and middle income countries (LMIC) to contribute to global science has implications for the development of their continents and the world at large.

Incidentally, the global North (North America and Europe) and Asia host the largest percentage of the most visible and impactful journals globally. Realising the Sustainable Development Goals depends heavily on science. Unfortunately, African nations not only contribute the least to global literature, but are also reputed to spend the least on research and development, unlike Europe, Asia and North America, which expend upwards of 27 per cent of their GDP on research and development. These poor indicators indeed leave Africa in the wilderness of global research productivity.

Some studies have accused international journal editors of neo-colonial science and bias against research that emanates from the South. While still battling these perceived or real threats to African science and productivity in the global scene, paywalls and subscriptions, lack of access to funding, high exchange rates and highly priced publication fees are another form of discrimination perpetuated by many gold, open access APC-based journals against disadvantaged researchers in an era that prides itself with openness, globalisation, diversity and sustainability. Ri

Oluchi Ojinamma Okere is an e-resources librarian at the Federal University of Technology Akure, Nigeria

Journal Citation Reports 2022 published by Clarivate

Clarivate has released the 2022 update to its annual Journal Citation Reports (JCR). The annual JCR release helps the research community evaluate the world's high-quality academic journals using a range of indicators, descriptive data and visualisations. The reports are used by academic publishers across the globe to understand the scholarly impact of their journals, relative to their field, and promote them to the research community.

The JCR is based on 2021 data compiled from the Web of Science Core Collection, a set of journals, books and conference proceedings in the world's largest publisher-neutral global citation database. Publications are evaluated by a global team of in-house editors at Clarivate. The data from selected content is then curated to ensure accuracy in the JCR metrics, together with a wide body of descriptive data. These insights enable researchers, publishers, editors, librarians and funders to explore the key drivers of a journal's value for diverse audiences.

The report shows that Cthe pandemic continues to influence every aspect of scholarly publishing, just as it has affected every aspect of society.

Nandita Quaderi, editor-in-chief and vice-president editorial, Web of Science at Clarivate, said: 'Through the carefully selected and curated data within the Journal Citation Reports, we can fully appreciate and understand the enormous impact of the academic community's rapid response to the Covid-19 pandemic.

'As researchers explored the origins, spread and ramifications of the virus, working at speed to create new therapies and vaccines, we see this reflected in the trusted insights contained in the annual JCR. The effects of this pandemic will continue to be seen in the literature and citation impact for decades, particularly under the lens of the UN's Sustainable Development Goals (SDGs) on Health and Wellbeing. We are proud to support the research community and the UN SDGs with expertly curated data that informs decisions and helps it accelerate the pace of innovation.'

This year's release sees continued notable increases in citation impact for journals in the varied fields of general medicine, critical care, public health, infectious diseases, immunology and basic biomedical sciences:

- This year, *The Lancet's* Journal Impact Factor (JIF) of 202.731 has moved it to the #1 position in the general & internal medicine category, overtaking the *New England Journal of Medicine* – top-ranked title in that category since the first release of the JCR 45 years ago. Of the 10 articles with the highest citation count in 2021, three appeared in *The Lancet* and are related to the characterisation and treatment of Covid-19
- This year, *Nature* earns the distinction of being the first-ever journal to accumulate more than one million total citations in one year. *Nature* published 16 items with more than 500 JIF citations – of which 12 items were Covid-19 related

> "The effects of this pandemic will continue to be seen ... for decades"

- Seven journals had JIFs of more than 100 for the first time, all of which published high quantities of Covid-19-related research. These are the *Journal of the American Medical Association*, *The Lancet*, *Lancet Respiratory Medicine*, *Nature Reviews Drug Discovery*, *Nature Reviews Immunology, Nature Reviews Molecular Cell Biology* and the *New England Journal of Medicine*.

Upholding research integrity and a new type of citation distortion

To support objectivity in journal selection and the integrity of the reports, Clarivate has suppressed three journals from the JCR (without presumption or accusation of wrong doing), representing 0.01 per cent of the journals listed. Clarivate monitors and excludes journals that demonstrate anomalous citation behaviour, including where there is evidence of excessive journal self-citation and/or citation stacking. The methodology and parameters for the effect of journal self-citation on JCR metrics were updated in 2020 to better account for discipline norms. The suppression of a journal from the JCR does not equate to a de-listing from the Web of Science Core Collection.

In addition, this year the editorial integrity team at Clarivate identified a new type of anomalous citation behaviour: self stacking. This is where the journal contains one or more documents with citations that are highly concentrated to the JIF numerator of the title itself. This is the first year the company has formally defined the criteria for self-stacking suppression and, as such, made the decision to issue a warning to six journals rather than suppress the journal's JIF. Going forward, continued journal self-stacking will result in suppression of JIF, Clarivate says.

The Journal Citation Reports contains more than 21,000 journals, from 254 research categories and 114 countries. This includes:

- 12,800 science journals
- 6,600 social science journals
- 3,000 arts and humanities journals
- Almost 13,000 journals with at least one gold open-access publication
- More than 5,300 journals that publish all of their content via open access
- 192 journals that received a Journal Impact Factor for the first time.

Each journal profile in the JCR provides a rich array of journal intelligence metrics and allows users to filter by category and rank. These include:

- The Journal Citation Indicator, which represents the average category-normalised citation impact for papers published in the prior three-year period. All journals in the JCR are eligible to receive this metric as of 2021
- The Immediacy Index, which measures how frequently the journal's content is cited within the same year as publication
- The journal's rank in category, determined by Journal Impact Factor, expressed as a percentile
- Cited half-life, which is the median age, in years, of items in the journal that were cited during the JCR year
- The Journal Impact Factor, which is given to journals in SCIE and SSCI, and which scales the citations received to recent content by a measure of the size of the journal's scholarly output.

In addition, the Journal Citation Reports include descriptive data such as open-access content, top contributing institutions and regions.

Cambridge transformative journals see 70% leap in research published OA

The amount of new research published open access (OA) in Cambridge's transformative journals (TJs) soared by almost 70 per cent in 2021.

Cambridge University Press has revealed the figure in an update to the cOAlition S group of funders on the progress of its TJ programme.

The update also shows that the programme exceeded its open access growth target for the year, playing an important role in Cambridge's plans to transform the vast majority of the research publishing in its journals to OA by 2025.

Overall, the proportion of research articles published Gold OA in Cambridge journals increased to 36 per cent last year – a 47 per cent increase on 2020. The publisher expects that to have reached 50 per cent by the end of this year.

Mandy Hill, managing director of Cambridge University Press, said: 'We are very proud of the progress we have made with our Transformative Journals programme over the last year and with the overall increase in the amount of research we are publishing open access.

'We are building an open future, unlocking the potential of research through the greater collaboration, transparency and accessibility that open access brings.'

The update clearly shows the impact of publishing open access, with OA articles getting about 1.6 times more citations and about 3.5 times more full text views

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on Cambridge's publishing platform, Cambridge Core.

Uptake of Gold OA in Cambridge journals has also been driven by the increasing number of transformative agreements the publisher has reached with higher education and research institutions around the world, repurposing their existing subscription spend to provide opportunities for their researchers to publish OA. As more and more authors become eligible for Gold OA under such agreements, so more journals will be able to increase the number of articles that they publish OA.

While not all journals in the TJ programme met their individual targets last year, these have been granted an exception by cOAlition S, meaning authors can continue to publish with those journals in compliance with Plan S requirements.

Hill said: 'We will continue to be a strong voice for the benefits of open; to register new TJs as quickly as we are able and look forward to making it possible for every author to publish their research as open access.'

ResearchGate and Royal Society partner to increase accessibility

The Royal Society, the UK's national science academy, and ResearchGate, the professional network for researchers, have announced a content syndication partnership that will see the addition of 5,000 open access (OA) articles from journals *Open Biology* and *Royal Society Open Science* to ResearchGate.

The goal of the partnership is to increase the visibility, accessibility, and consumption of Royal Society gold open access publications in alignment with the Society's purpose to recognise, promote, and support excellence in science and encourage the development and use of science for the benefit of humanity. The Royal Society publishes international, high-quality journals that cover the full spectrum of science. Since creating the world's first science journal, *Philosophical Transactions*, in 1665, the Society continues to innovate by supporting open access and advocating open science policies. As a non-profit society publisher, any income generated goes back into supporting and progressing the global scientific community.

Sören Hofmayer, co-founder and chief strategy officer at ResearchGate, said: 'The Royal Society has been helping to change science for 350 years. We share a belief that the world's challenges must be tackled through collaboration and with the researcher at the centre. We are delighted to support their continued innovation by bringing their publications to our global community of over 20 million researchers. Together, we are driving the transition to an open access, author-centric world that can have far-reaching benefits for scientists and society.'

Stuart Taylor, publishing director at the Royal Society, added: 'We are very pleased to be embarking on a new partnership with ResearchGate to expand the reach and impact of our open access articles. Early career researchers are a very important audience for us and, as they are well represented in ResearchGate's large userbase, we are excited about the prospect of reaching them better.'

Jisc helps project to improve international research collaboration

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Jisc is helping a consortium, led by the Association of Research Managers and Administrators (ARMA), to assess the feasibility of, and scope for, a platform to help international research collaboration.

The aim is to streamline and standardise due diligence processes to increase research efficiency and quality and promote trusted research.

The project, funded by the Research England Development (RED) Fund, aims to implement recommendations in ARMA's April 2021 report 'Due Diligence in International Research - Options for Improved Efficiency, Equity and Quality' to 'establish a due diligence clearing house and national service in support of due diligence for international research'.

The project aims to create a process to help researchers and education institutions comply with guidelines and legislation, such as the NSI Act.

Thanks to its expertise in providing digital infrastructure and services, Jisc is acting as a technical partner, helping to assess the feasibility of a clearing house platform to help make due diligence easier, quicker and more secure.

Over the next few months, the consortium – which includes Northumbria University and the University of Stirling – will explore ownership and funding models and will produce a detailed cost-benefit analysis to quantify the potential saving that can be modelled for the sector. A series of stakeholder engagement events is planned and a written report will be presented to funders, Research England, in October 2022.

Victoria Moody, Jisc's director of research and innovation sector strategy, said: 'Jisc is very pleased to help assess the feasibility of, and scope for, technology to support trusted research and research security, helping international research collaboration and enhancing trusted research. We are delighted to be working with ARMA to scope and design it.'

Remote collaboration 'leading to more scientific breakthroughs'

A new working paper from the Oxford Martin Programme on the Future of Work has determined that, during the past decade, remote collaboration between academic teams has led to more scientific breakthroughs. Analysis of data for more than ten million research teams, across 11 academic fields from 1961 to 2020, revealed a reversal of what was observed from the 1960s to the 2000s, when remote collaboration led to fewer scientific breakthroughs and more incidents of incremental innovation.

At first, this might seem to contradict the established understanding that face-to-face and serendipitous interactions spark creativity and new discoveries. However, researchers think that remote collaborations are complementary and additive to working in-person.

Carl Benedikt Frey, director of the Oxford Martin Programme on the Future of Work, said: 'What we think we are seeing here is the impact of cross-pollinating ideas across different institutions and cities. When remote collaborations happen, individual academics still discuss their ideas within their knowledge networks at their institution. That means we might be seeing a multiplying effect of serendipitous encounters and complementary skills of multiple individuals from different institutions sparking breakthroughs across remote teams.'

This research comes against the background of disruptive ideas and scientific breakthroughs becoming increasingly rare and harder to find, with incremental discovery now more common than groundbreaking new findings.

Yet the research could indicate change in the near future. New teams tend to create more disruptive science than existing teams, and academics with access to better digital infrastructure see better results from remote collaborations. As broadband internet access continues to expand, and more researchers and institutions can harness the new benefits of remote collaboration in the digital age, we may see this change.

'We could be at the start of a new J-curve of research productivity,' continued Frey. 'Looking at the historical record we see that steam and electricity led to delayed productivity gains between their introduction and the time it took to improve and learn how to use them efficiently. It is possible that we will see science and innovation at the start of the 21st century mirroring the start of the 20th as the benefits of digital collaboration tools enable researchers to think and work differently.'

'As we are learning to succeed with remote work – minimising its drawbacks while maximising its benefits – not just in day-to-day operations, but also in science and innovation, productivity seems set to surge.'

The working paper, 'Disrupting Science', is published in full by the Oxford Martin School at **www.oxfordmartin.ox.ac.uk/publications/disrupting-science/**.

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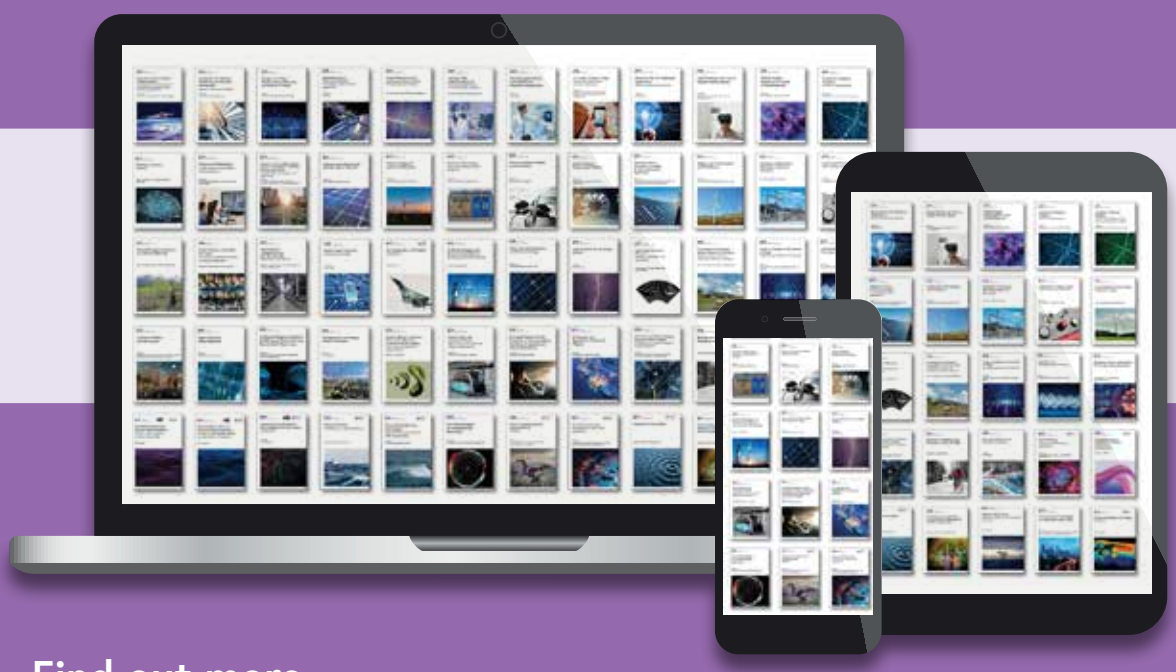

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