



ELSEVIER

# *Charting the Path Forward: Future Trends and Innovative Strategies*

SEA Libraries of the Future Summit 2024

Penang, Malaysia June 11, 2024

Gwen Evans

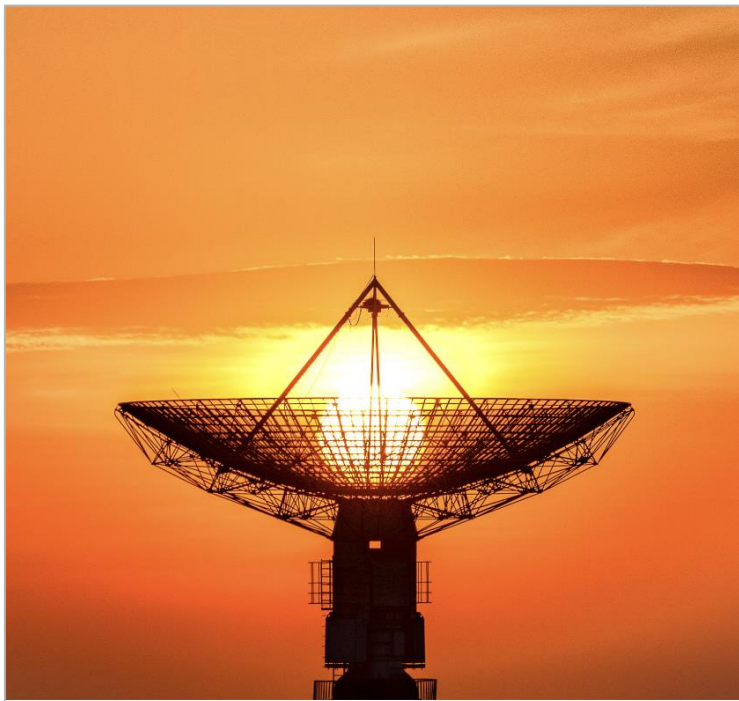
VP of Global Library Relations, Elsevier



# Agenda



- View from the Top: Academic Leaders and Funders
- 25 Years of Science Direct
- Opportunities and Challenges
  - Drivers of change in scholarly communication and the academy
  - Research Integrity
  - AI and GenAI
- Takeaways for Library Leaders



## View from the top

Academic leaders' and funders'  
insights on the challenges ahead

Published March 2024



Today's institutional leaders face a shifting landscape of challenges. Developed from interviews of over 100 global senior leaders done in partnership with Ipsos, *View from the Top* provides insight into both current priorities and those expected to pose even more significant challenges in the coming years, such as AI governance and climate change.

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the full report





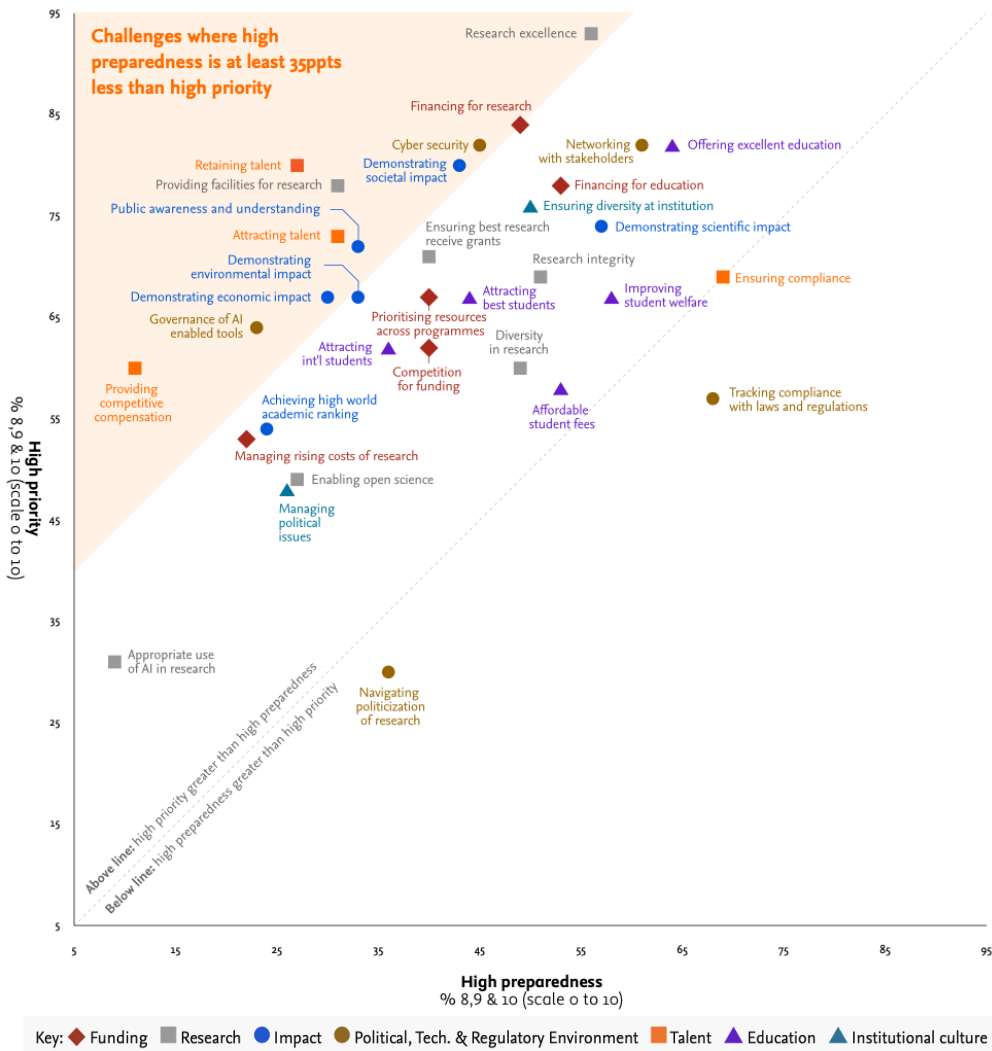
# View from the Top

## Academic leaders' and funders' insights on the challenges ahead

Academic leaders are dealing with many high-priority challenges

There is a gap in readiness to address many of these issues

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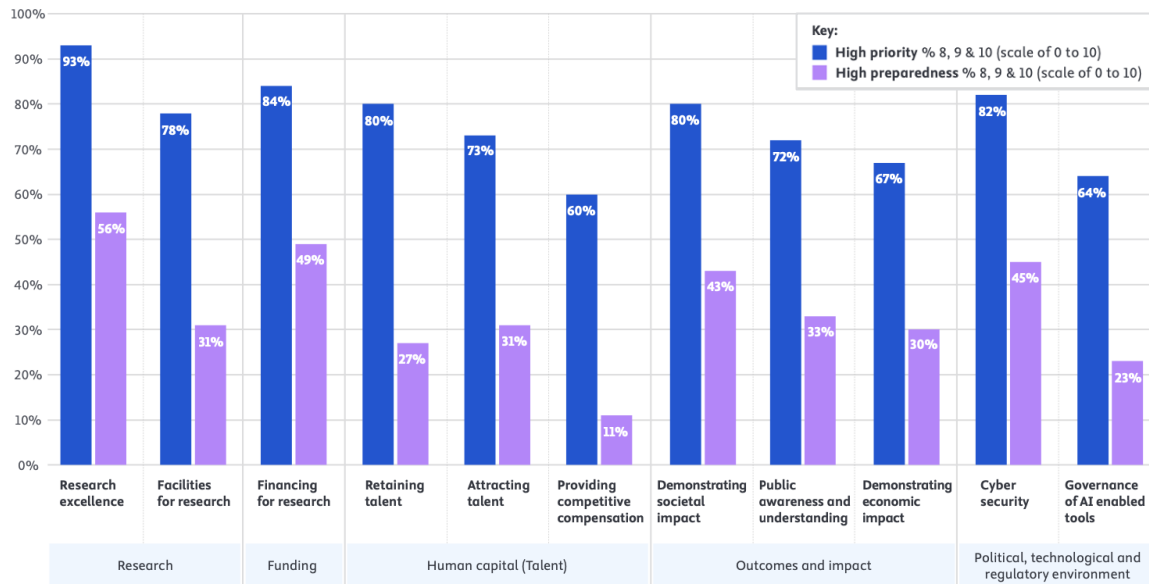


# View from the Top

## Academic leaders' and funders' insights on the challenges ahead

### Priorities versus preparedness

Leaders identified 34 challenges, but there are 11 where the level of preparedness is much less than the level of priority:



**Research is a top concern** — An overwhelming majority (**89%**) view research as a high priority for their institution.



**Funding challenges proliferate** — The continual challenge of funding remains top of mind for leaders, with two-thirds (**66%**) citing that funding will become a greater challenge over the next five years.

**Sourcing talent** — The management and sourcing of talent is an ever-increasing priority, both within the research and administration spheres, with nine in ten (**93%**) leaders seeking more funding to attract the best talent.

**Education** — Similarly, ensuring educational excellence for students is a high priority for more than four in five (**82%**) leaders.

**Attention turns to politics and technology** — While, currently, keeping up with the latest political, technological and regulatory updates is considered a relatively low challenge area for leaders (**35%**), **65%** believe this challenge will grow over the next five years.

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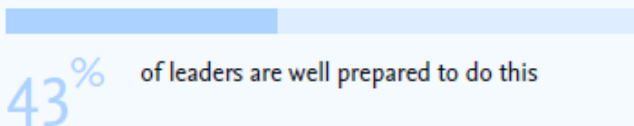
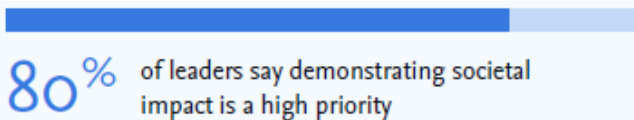


## View from the Top

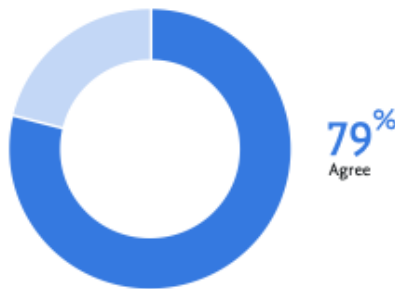
Academic leaders' and funders' insights on the challenges ahead

We asked over 100 university leaders and funders about their greatest challenges and opportunities.

### Demonstrating societal impact



Moving away from a dependency on traditional scientific measures



### Looking to the future



*"How we are running our universities, what we are teaching, how we are approaching issues of climate change, I think that that kind of thought leadership is important for the public to realize, 'Oh, the ones at the university, they're understanding this, they get this!'"*

— Academic leader, the Americas

CLIMATE CHANGE



*"AI is going to change everything about how we work at universities, particularly in the teaching but also in the research. I don't think we have begun to scratch the surface of what that looks like."*

— Academic leader, EMEA

ARTIFICIAL INTELLIGENCE (AI)

Download the full report





## View from the Top

Academic leaders' and funders' insights on the challenges ahead

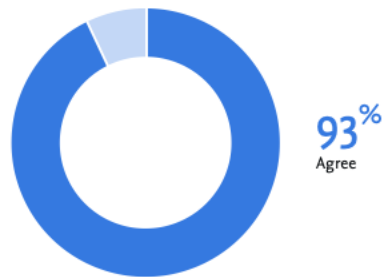
We asked over 100 university leaders and funders about their greatest challenges and opportunities.

## Talent: the key to research and education success

**80%** of leaders identify retaining talent as a high priority

**11%** are well prepared to provide competitive compensation and benefits

Academic leaders need more funding to attract the best talent



## Looking to the future



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## View from the Top

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We asked over 100 university leaders and funders about their greatest challenges and opportunities.

## Preparing for an AI-enabled workforce

**64%** of leaders say AI governance is a high priority

**23%** are well prepared for this challenge

## Looking to the future



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the full report





ScienceDirect® 25

25 years of discovery



# Thank You!

## Celebrating 25 years of discovery

We thank our user community — the librarians, researchers, faculty members and students — for 25 years of support in making ScienceDirect one of the most highly regarded and valued resources in the quest to advance research for the benefit of society. Read on to see how far we have all come...

# 1999

ScienceDirect.com launch

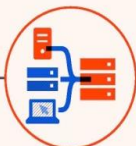


## 2000-2007

**Digital era arrives:** Journal articles, backfiles dating from 1800, Major Reference Works, ebooks and book series. Today, ScienceDirect features:

**21m** articles | **2,900** journals | **46k** books

**3.3m** open-access articles and book chapters | **150k** articles from scholarly publishing partners



## 2012-2014

**Enhanced online usability:** Article of the Future to revolutionize the traditional linear format of the academic paper with a three-panel article user interface with integrated data making it more dynamic and user-friendly, Author Highlights, Reaxys integration, Domain Specific application integrations.

## 2014-2018

**Modernizing technology:** New micro-services back-end, experimentation infrastructure, mobile-first responsive user interface, improved and faster search. **ScienceDirect loads search results in less than three seconds, saving scholars and researchers valuable time.**



## 2020-2021

**Developing the core:** Enhanced remote access during the COVID pandemic, accessibility, SEO innovations, privacy and security enhancements, and the **GetFTR** partnership with ScienceDirect are among the highest priorities for users.



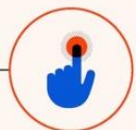
## 2024

**Experimenting with GenAI:** ScienceDirect is working on furthering its capabilities to usher in a new era of personalized user experience.

## 2015-2019

**Expanding use cases:** **Topics Pages**, PDF reader, article evaluation through PlumX Metrics, Mendeley integration, ScienceDirect currently features more than

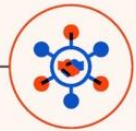
**375k** Topic pages



## 2022-2023

**Expanding value through content partnerships, integrations and features:** 150K articles added from leading scholarly publishing partners, product integrations with Scopus, Reaxys and Clinical Key, integrated 3000 journal homepages, with extended features and info pages meeting author publishing needs: guide for authors, journal recommendation and comparison, journal insights. **ScienceDirect welcomes leading scholarly publishers to the platform through our [Content Syndication Partnerships](#), including Wiley, Taylor & Francis, American Chemical Society, the Royal Society of Chemistry and others.**

**#1** Homepage in WAVE WebAIM Million for accessibility.



## 2008-2012

**Expanding functionality:** Multimedia (audio and video attachments), Bulk PDF Download, Recommended Articles, Citing Articles, RSS feeds, Personalization, FAST Full-text search. **Focusing on the user experience is a hallmark of ScienceDirect's developments.**



# What's behind the content on ScienceDirect?



## Outline

Abstract

Keywords

Glossary

Key Points

Introduction

Digital Transformation

Collections

Space, Hybridity, Sustainability

Artificial Intelligence (AI)

Information Literacy and Digital Skills

Diversity, Inclusion, Decolonization, Equity, and E...

Value, Impact, and Evaluation

Library and Information Professionals

Education for Librarianship and Information Scie...

Conclusion

References

Relevant Website



Reference Module in Social Sciences

2024



## The Future of Libraries, Librarianship, and Information Services

David Baker

Show more ▾

+ Add to Mendeley Share Cite

<https://doi.org/10.1016/B978-0-323-95689-5.00218-2>

[Get rights and content](#)

### Abstract

This entry considers the library of the future, as shaped by the trends, challenges and opportunities, the mission and roles of libraries, librarianship, and information services in the 21st century. It reviews the digital transformation of society in general and libraries in particular, and the way in which collections, space, services, and skills have been – and will continue to be – affected. Artificial intelligence will have a major impact on the future of librarianship and information science, and information literacy and digital skills will be essential prerequisites not only for users but professionals also. The

## Elsevier's investment in the publishing process.

Here are some of the investments we make in the publishing process:



Managing and tracking submissions



Recruiting editors and reviewers (and compensating Level 1 editors)



Establishing infrastructure systems and contracts



Journal launch and registration



Managing the peer review process



Author & reviewer workshops and training



Linking data and software to articles



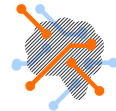
Ensuring compliance with funder & institutional policies



Checking for plagiarism & image manipulation



Substantive editing and proof-reading



Making articles machine-readable



Cascading rejected manuscripts from one journal to another



Offering training for researchers on research data management



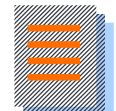
Archiving



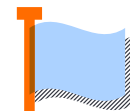
Media relations and marketing



Third-party licensing and negotiation



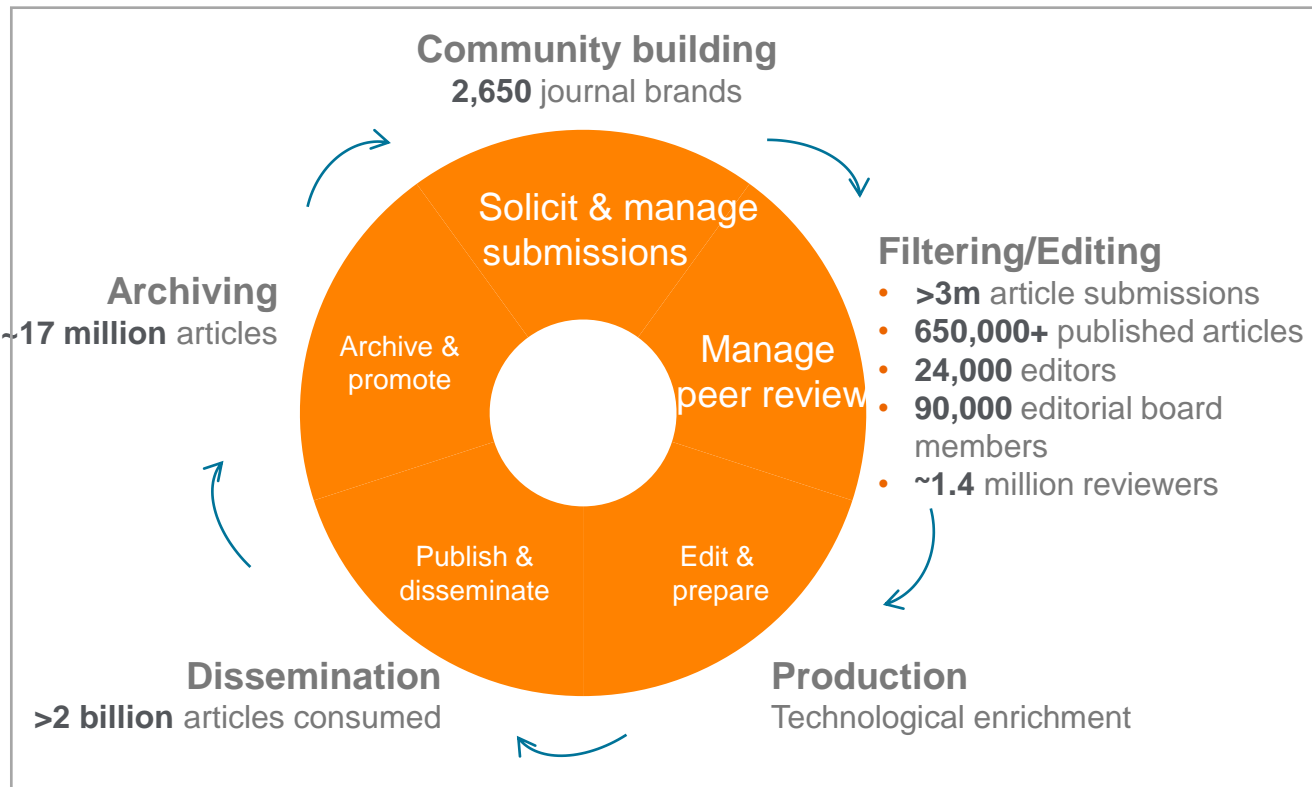
Reporting & keeping scientific record up to date (CROSSREF)



Ethics investigations and developing pre-peer review checks

# Journal and Article Ecosystem

## Elsevier's support to the journal eco-system



<https://www.elsevier.com/about/policies/pricing>



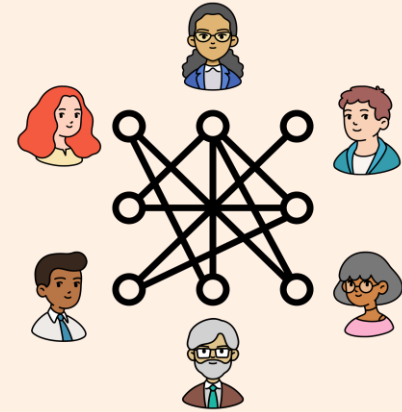


# Research Integrity is Everyone's Concern



# Research integrity and publishing ethics is a shared responsibility

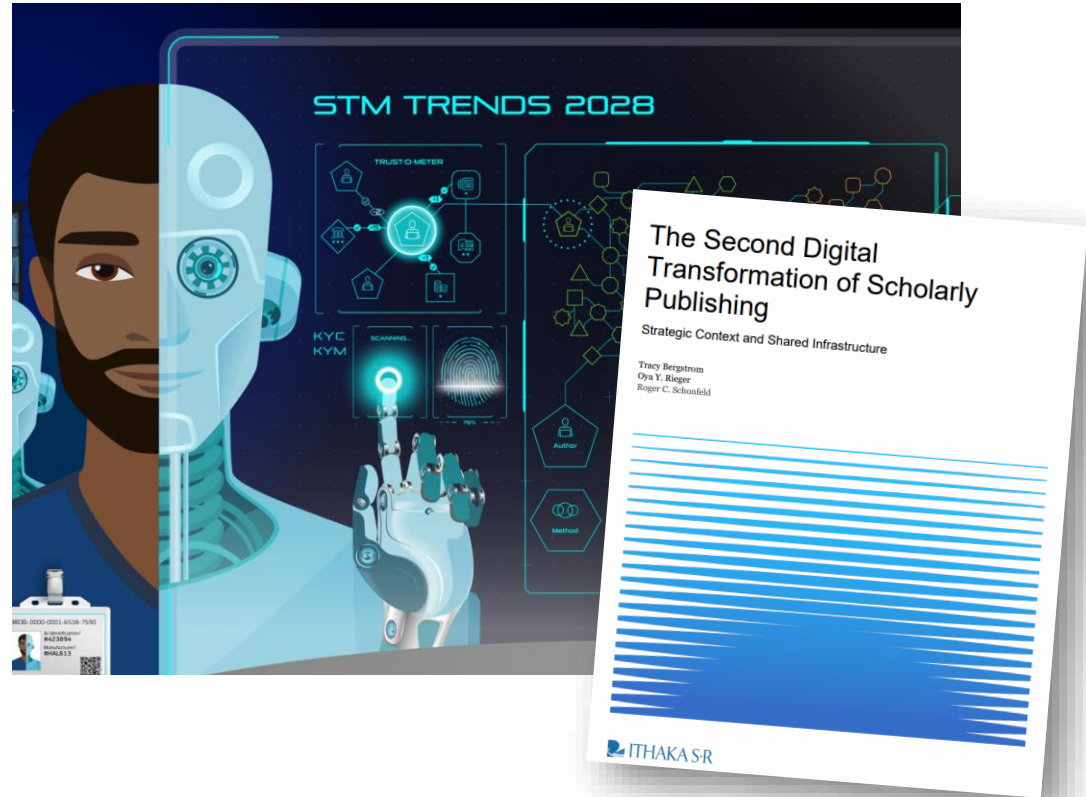
- Research integrity is a **shared responsibility** between authors, reviewers, editors, readers, publishers, institutes, funding bodies, and governments.
- **Unethical research can undermine trust** in an author's research, their institute, the journal, a field of science, scholarly publishing and in science generally.
- Collaborations that are beneficial to the whole community are already underway:
  - **STM Integrity Hub**
  - **United2Act**
  - **Working group on interactions between institutions and journals when allegations of FFP (Falsification, Fabrication, Plagiarism) arise**
  - **CREC Working Group** (Communications of Retractions, Removals and Expressions of Concern)
- **We look forward to working together to meet the challenge of research integrity.**



New advances in science and medicine build upon *a priori* research. For this cycle to continue, it is critical that we **build upon validated and trustworthy work.**

# Drivers of change in scholarly communication and the academy

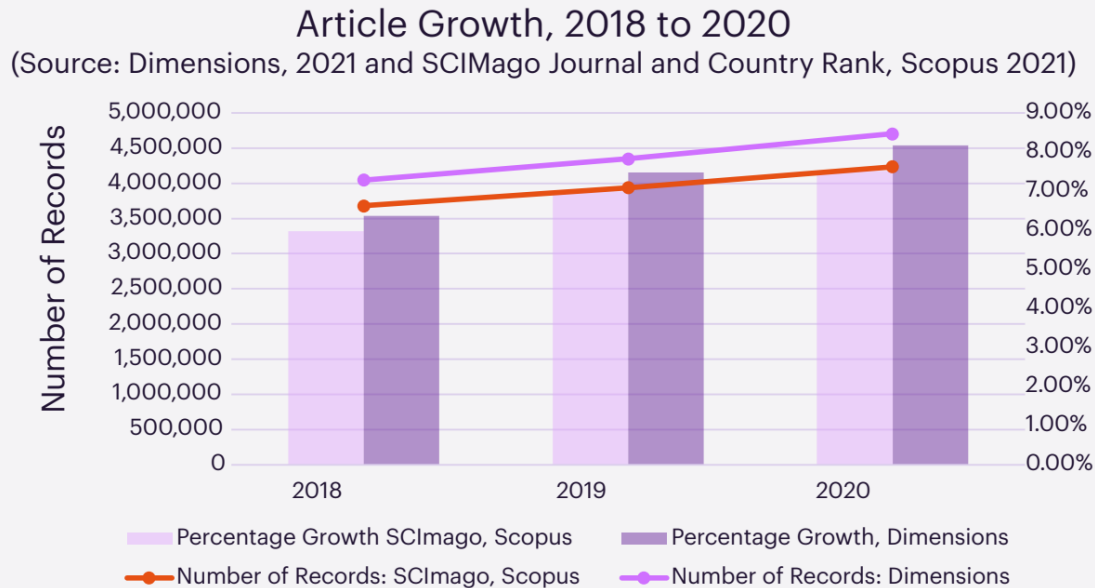
- GROWTH
- IMPACT
- REWARD
- SERVICE
- ACCESS
- TECHNOLOGY





# Growth

Fig.16



The number of STM articles submitted each year is thought to grow by 3% annually<sup>48</sup> but 2020 may have been a record year for article submissions. According to Christos Petrou's analysis in *The Scholarly Kitchen*, the market grew by 200,000 papers or 8.1%. Were it not for COVID-related papers, the growth in 2020 would have been just below 5%, making for a strong but unremarkable performance.<sup>49</sup>



In this new era of technology, information and platforms will continue to increase much faster



- Overall growth rates of scientific literature are expected to rise by **4.10% annually** with a doubling time of **17.3 years**<sup>1</sup>
- With the introduction of AI tools, such as ChatGPT, we expect the doubling time to **reduce from 17.3 years to 12.6 years.**
- Researchers will be further overwhelmed with the sea of scientific information available from multiple sources

<sup>1</sup>[Growth rates of modern science, Nature, 2021](#)

# Impact: Emphasis on Public Impact Research

Policy Patent

University of South Alabama ☆

168

Scholarly Output cited by Policy ⓘ



277

Citing Policy Documents ⓘ

e.g. "The ocean and cryosphere in a changing climate: a special report of the Intergovernmental Panel on Climate Change / Policy Body United Nations"

110

Policy Bodies

**Universities Explore Ways to Better Reward Faculty for Research That Enhances Society**  
New white paper details momentum to recognize academic efforts that could transform research landscape  
ARTICLE | January 10, 2024 | By: Angela Bednarek & Benjamin Olneck-Brown | Read time: 3 min

Research integrity can influence study impact by ensuring that the data collected is accurate and reliable, which can help build trust between the researcher and participants, as well as the public.

# Reward: New Academic Evaluation Frameworks



New Academic Evaluation frameworks look beyond article citation to other metrics, potentially reducing pressures to publish.

# Access: New Business Models

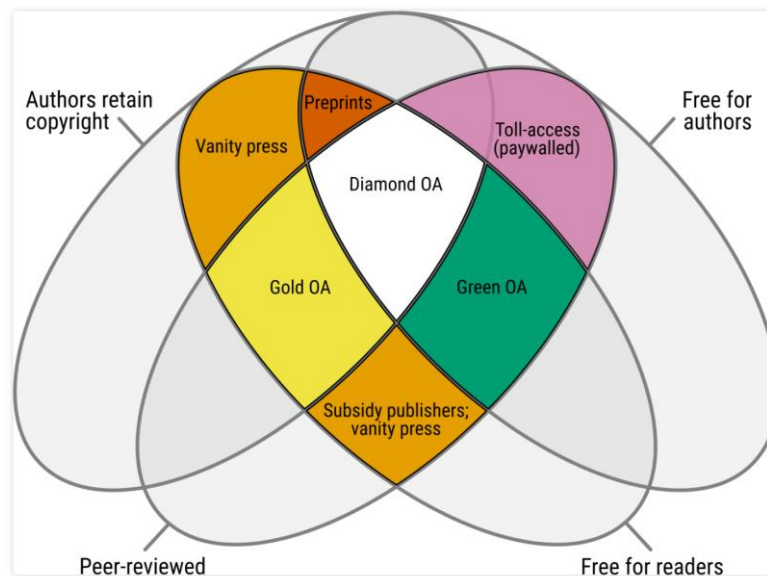
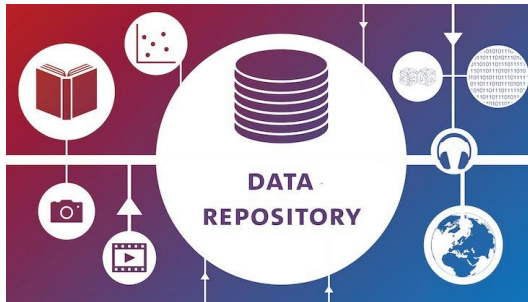


Diagram by Jamie-farquharson - <https://doi.org/10.6084/m9.figshare.21598179>,  
CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=125787281>

Proliferation of access modalities and providers creates equity, but also opens a gateway to predatory publishers.

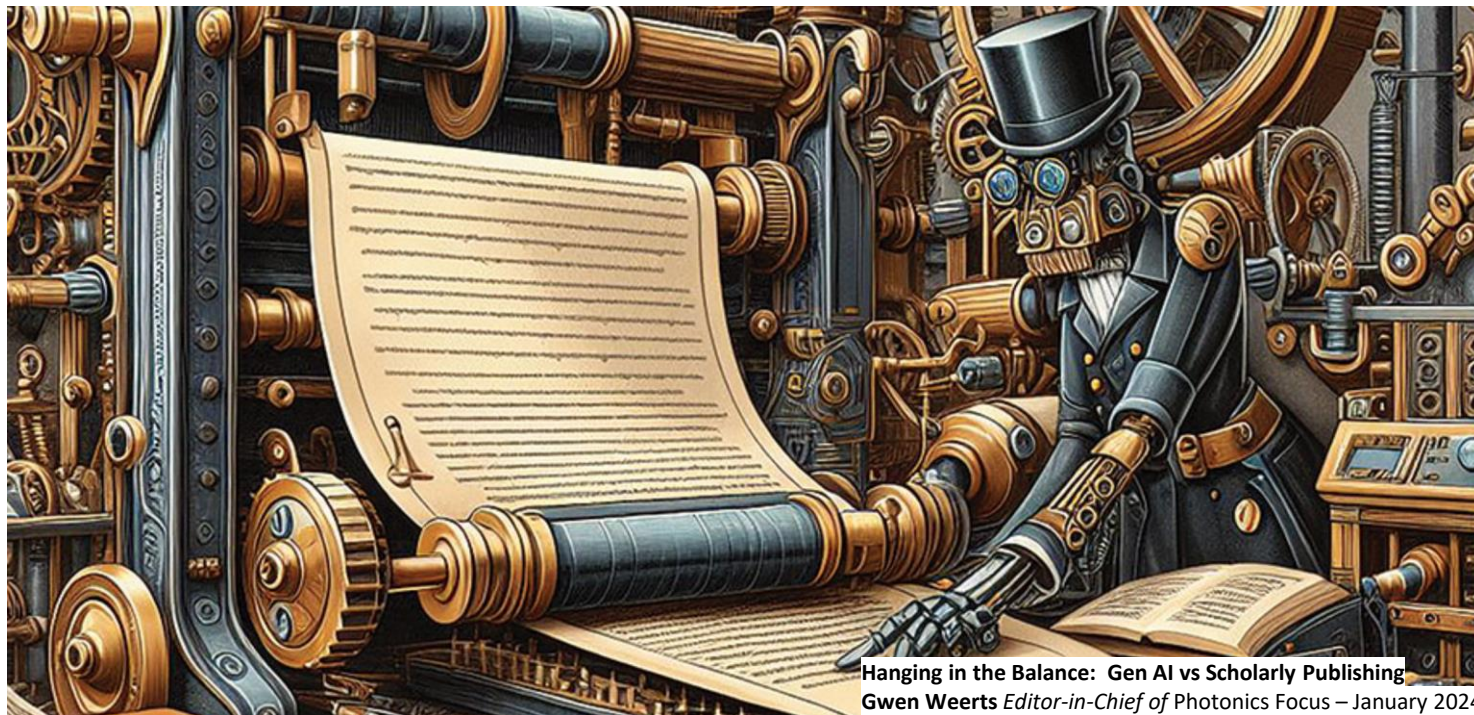
# Technology: Evolving Service Provision and Shared Infrastructure



Shared infrastructures can create efficiencies, but multiplicity of platforms also creates potential for fraudulent behaviors and corruption of the scholarly record.



# Technology: LLMs and Gen AI



LLMs and Gen AI present the biggest challenges to research integrity, but also offer ways forward in detection and mitigation.

# Elsevier has been using ML and Extractive AI for years



**Machine Learning (ML):** statistical techniques that help machines perform tasks without explicit programming by training with data

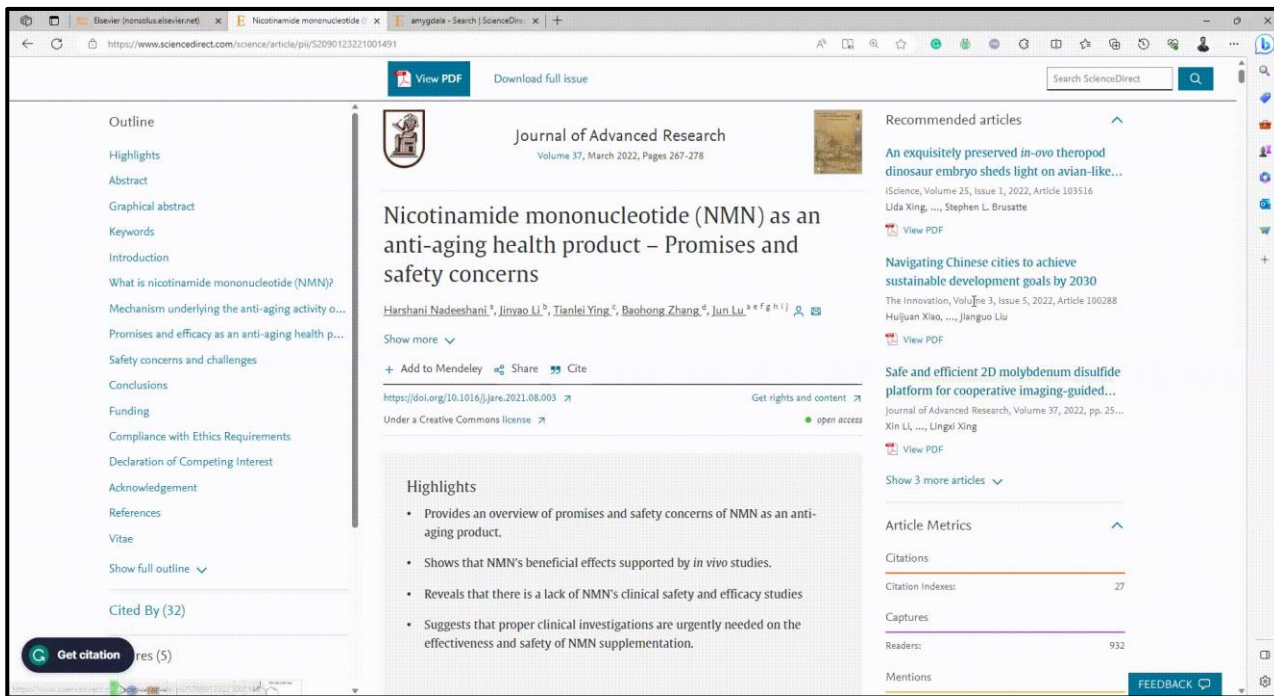
**Extractive AI:** designed to recognize patterns, extract pre-existing data, and make predictions

*For example, predicting*

<b>...scientific topics of interest</b> By analyzing hundreds & thousands of journal articles <b>Science Direct</b>	<b>...student exam outcomes</b> Using millions of data points from a broad set of student behaviors <b>HESI</b>	<b>...relationship in text</b> Understanding complex patterns in scientific content <b>SciVal</b>
<b>...chemical reactions</b> Using reagents, solvents, and other conditions required to carry out chemical reactions <b>Reaxys</b>	<b>...search intent</b> By deeply analyzing the user's search query <b>Clinical Key</b>	<b>...predicting experts</b> Using historic scientific contributions <b>Submissions</b>



# AI: Understand unfamiliar terms and concepts in an article with a single click from AI-generated topic pages on ScienceDirect



The screenshot shows a web browser displaying a ScienceDirect article. The article title is "Nicotinamide mononucleotide (NMN) as an anti-aging health product – Promises and safety concerns" from the Journal of Advanced Research, Volume 37, March 2022, Pages 267–278. The authors listed are Harshani Nadeeshani, Jinyao Li, Tianlei Ying, Baohong Zhang, Jun Lu, and others. The page includes a table of contents on the left, a main text area with a "Highlights" section, and a "Recommended articles" section on the right. The "Highlights" section contains three bullet points: "Provides an overview of promises and safety concerns of NMN as an anti-aging product.", "Shows that NMN's beneficial effects supported by *in vivo* studies.", and "Reveals that there is a lack of NMN's clinical safety and efficacy studies". The "Recommended articles" section lists three related articles with "View PDF" links. At the bottom left, there is a "Get citation" button and a "Cited By (32)" link. A "FEEDBACK" button is located at the bottom right of the article content area.



## Enhancing Fundamental Knowledge

- Automatically-added links in an article take users directly to topic pages
- Giving the contextual information and foundational knowledge of a topic at the time of need

# The Use of Generative AI in Discovery and Research:

## Some Key Concerns:

Inaccurate information, unreliable sources:

- Not trained on scientific content
- Not up to date
- Homogeneous content

Ethical concerns and biases:

- Fake papers, nonethical publications
- Promoted/shared for wrong reasons
- Bias towards content, authors, editors

Environmental impact

## Some Key Opportunities:

Improve quality and creativity in scholarship:

- Allow better links to data, software, workflows
- Speed up and streamline writing, reviewing, editing
- Enable connections between disparate topics

Improve public trust in science:

- Different “levels” of explanation – appropriate for different audiences
- Enable tracing of claims: “Ask for Evidence!”
- Supporting researchers in communication
- Enabling explanation of any concept, equation






Improve equity and inclusion:

- Identify and combat sources of bias
- Enable access to broader range of communities
- Enable translation into other languages, styles

# What Are We Doing to Address These Concerns?

## RELX Responsible AI Principles

### AS PART OF OUR RESPONSIBLE AI APPROACH...

-  1. We consider the real-world impact of our solutions on people
-  2. We take action to prevent the creation or reinforcement of unfair bias
-  3. We can explain how our solutions work
-  4. We create accountability through human oversight
-  5. We respect privacy and champion robust data governance

## Working with the AI community to find fake papers



**DAGPAP24: DETECTING AUTOMATICALLY GENERATED SCIENTIFIC PAPERS (ACL 2024)**

1st place – \$3000; 2nd place – \$1200; 3rd place – \$800

Edit Participants Submissions Dumps Migrate

ORGANIZED BY: Yoriko (dagpap2024@googlegroups.com)  
CURRENT PHASE ENDS: Never  
CURRENT SERVER TIME: May 13, 2024 At 10:37 AM GMT+2

docker image: festline/codalab-dokkers:codalab\_extender  
Secret url: [https://www.codabench.org/competitions/2431/?secret\\_key=80f28886-471d-4816-b62e-6606c88bebd9](https://www.codabench.org/competitions/2431/?secret_key=80f28886-471d-4816-b62e-6606c88bebd9)  
Competition Report: <https://tinyurl.com/example-dagpap24-report>

## Guidance for Authors, Editors and Reviewers:

Elsevier's AI author policy states that *authors* are allowed to use generative AI and AI-assisted technologies in the writing process before submission, but only to improve the language and readability of their paper and with the appropriate disclosure, as per our instructions in Elsevier's Guide for Authors.

Generative AI or AI-assisted technologies should not be used by editors to assist in the evaluation or decision-making process of a manuscript as the critical thinking and original assessment needed for this work is outside of the scope of this technology and there is a risk that the technology will generate incorrect, incomplete or biased conclusions about the manuscript.

Elsevier owns identity protected AI-assisted technologies which conform to the RELX Responsible AI Principles, such as those used during the screening process to conduct completeness and plagiarism checks and identify suitable reviewers.

# Leveraging GenAI in a **scholarly database**

- Scopus AI launched in January 2024
- Natural language searching
- Immediate summary generation
- Linking out to Scopus source documents
- Built with LLM, vector search, and custom prompt engineering
- RAG Fusion Technology – Retrieval-Augmented Generation

Documents Authors Researcher Discovery Organizations Scopus AI **New**

Explore new topics and discover relevant references from 2013 [How it works](#)

What would you like to learn more about?  
what is a retrieval augmented generation model?

### what is a retrieval augmented generation model?

Summary

A retrieval-augmented generation model is a blend of retrieval-based and generative models that actively involve large language models in retrieval to guide generation, addressing limitations such as outdated knowledge and hallucinations [1](#) [2](#) . Here's a breakdown of the key points:

- **Definition:** A retrieval-augmented generation model synergizes retrieval and generation in an iterative manner, using a model's response to a task input as context for retrieving more relevant knowledge, ultimately improving the generated response [1](#) .
- **Applications:** The model has been successfully implemented in educational settings to enhance student learning by providing contextually relevant answers, transforming the educational process into an efficient and interactive learning experience [3](#) .
- **Challenges and Solutions:** The model addresses challenges faced by large language models, such as hallucinations and factually inaccurate output, by actively deciding when and what to retrieve throughout the generation process, leading to superior or competitive performance across various tasks [4](#) [5](#) .
- **Training and Performance:** Research has shown that the quantity and quality of context during model training significantly affect the model's performance, with overfitting to specific context quality being a

References

- 1 Enhancing Retrieval-Augmented Large Language Models with Iterative Retrieval-Generation Synergy  
Shao Z., Gong Y., Shen Y., (...), Chen W.  
*Findings of the Association for Computational Linguistics: EMNLP 2023* [↗](#)  
2023
- 2 Context Quality Matters in Training Fusion-in-Decoder for Extractive Open-Domain Question Answering  
Akimoto K., Takeoka K., Oyamada M.  
*Findings of the Association for Computational Linguistics: EMNLP 2023* [↗](#)  
2023
- 3 BUILDING A RETRIEVAL-AUGMENTED GENERATION SYSTEM FOR ENHANCED STUDENT LEARNING: CASE STUDY AT PRIVATE UNIVERSITY  
Triwicaksana S M.B., Oktavia T.  
*Journal of Theoretical and Applied Information Technology* [↗](#)  
2023

# 2024

## **Experimenting with GenAI:**

ScienceDirect is working on furthering its capabilities to usher in a new era of personalized user experience.



2024 marks a milestone in ScienceDirect's distinguished history: the celebration of 25 years of scholarship, research and discovery.

# Aligning the Research Library to Organizational Strategy



- Based on these common strategic directions and key trends in research practice and support, these are some of the opportunities that ITHAKA identified for research libraries:
- An accelerated pivot to STEM;
- Double down on humanities and distinctive collections;
- Focus on student needs and student success;
- Serve the needs of the political entity that funds or controls the institution; and/or
- Make scientific communication fit for purpose.

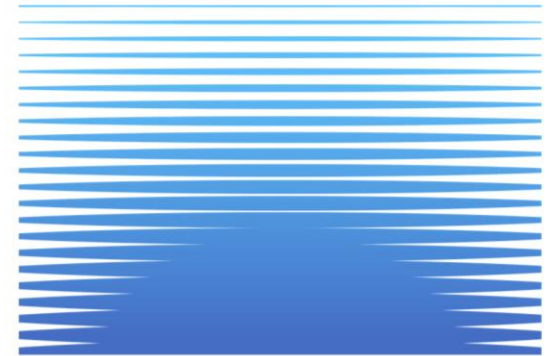
Cooper, Danielle M., Catharine B. Hill, and Roger C. Schonfel.  
"Aligning the Research Library to Organizational Strategy." Ithaka  
S+R. Last Modified 12 April 2022. <https://doi.org/10.18665/sr.316656>.

RESEARCH REPORT

April 12, 2022

## Aligning the Research Library to Organizational Strategy

Danielle Cooper  
Catharine Bond Hill  
Roger C. Schonfeld



# Future Scenarios

“The article will differ from what we mostly see today in that it will be integrated into a broad suite of services, from discovery to analytics, as the act of publication will be the equivalent of plugging into a network; the principal audience will be machines.”

“From digital and robotic labs of the future, through AI tools that will assist in analysis and report generation. Tools and people will coexist, working together to register, validate, disseminate and archive knowledge. There will be new forms of expression, such as through augmented or virtual reality, which will need to gain acceptance in the scholarly content ecosystem.”

“The real question is what form(s) of scholarly communications will be legitimized by reward systems and find a primary place in discovery systems.”

“Informal modes are proliferating and suggest some interesting new directions, that could potentially reinvent publishing orthodoxy.”

“the work to align the research library to the parent institution is ongoing. University strategies evolve over time, as do research and teaching practices, so libraries wishing to adopt the approaches we recommend here should be positioning themselves not for a one-time shift but rather for a process of continual realignment. Such processes may sometimes need to be more grounded in university strategy than certain forms of library strategic planning traditionally have been. The key is a permanent process of ongoing realignment.”

Cooper, Danielle M., Catharine B. Hill, and Roger C. Schonfeld. "Aligning the Research Library to Organizational Strategy."

# How Can Elsevier Help You?





ELSEVIER

# Thank You

Gwen Evans

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LinkedIn: <https://www.linkedin.com/in/gwenevans/>

