



UNDER THE MICROSCOPE

A CLOSE LOOK AT FUTURE TRENDS
IN SCIENTIFIC CONTENT ACCESS



REPRINTS DESK
The Content Workflow Company



Under the Microscope:

A Close Look at Future Trends in Scientific Content Access

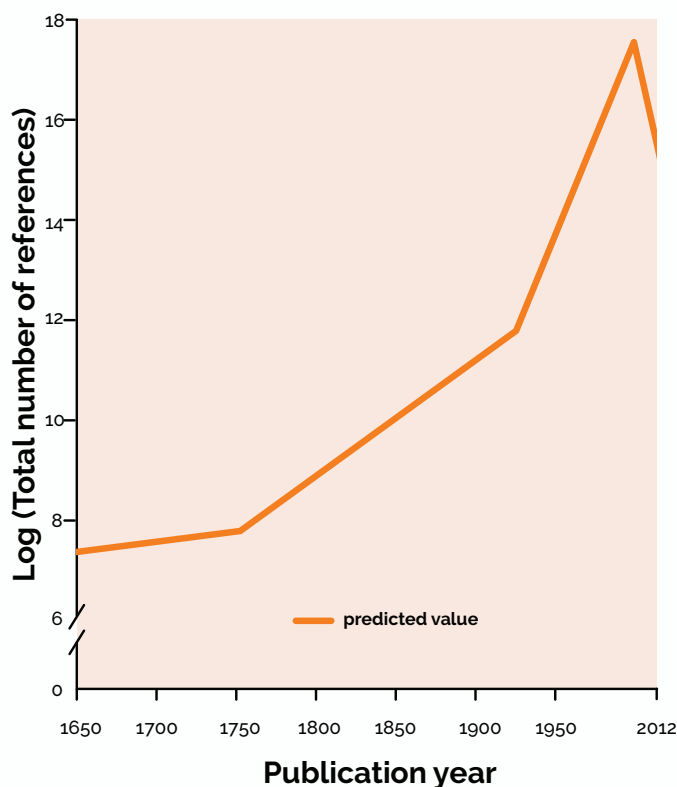
All scientific research is based on the contributions of others. Whether you work at a big pharmaceutical company, a small biotech firm, or an academic institution, you need easy access to the work of other scientists, and you need guidance through the maze of permissions and fees that accompany that access.

You also need ways to narrow your search to find exactly what you need, from specific gene mutations to the action of a single protein in a metabolic cycle; and you need to find information quickly, without having to sift through irrelevant references.

The sheer volume of scientific data is a huge

stumbling block to easy access. There are already at least 50 million scholarly journal articles in existence, and more than 2.5 million more are published each year.

The human mind is easily overwhelmed by this largesse. The only way to make sense of it is to employ technology. Literature access tools that use the newest advances in artificial intelligence and machine learning, such as augmented reality and voice search, increasingly allow for ultra-personalized research workflows and even data analysis on demand. Streamlined search results can help scientists find dynamic answers to their questions rather than a list of possible answers.

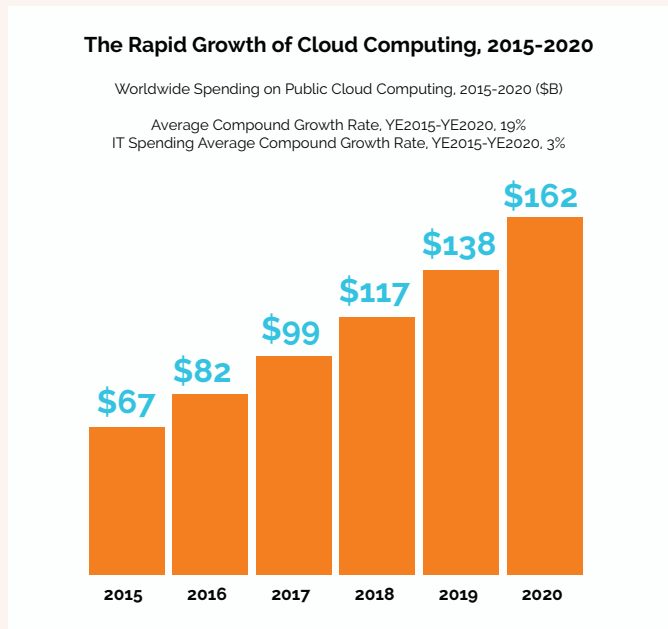


Growth in annual number of cited references. Data from Lutz Bornmann and Ruediger Mutz (2014) Growth rates of modern science: A bibliometric analysis based on the number of publications and cited references, *Journal of the Association for Information Science and Technology*. <https://arxiv.org/abs/1402.4578>

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These results are the children of digital technology stacking, where all the programs that run a computer—operating systems, support programs, runtime environments, and database software—are combined into one software package. They are also the product of easy access to both open content and traditionally presented research data, and advanced computational resources that can synthesize answers to questions in real time, such as “smart articles” that facilitate interactive dialogues between machines and researchers to answer questions.

Data acquisition methods based on older



Growth of cloud computing. Adapted from Louis Columbus, Round up of cloud computing forecasts, 2017, For (29 April 2017) <https://www.forbes.com/sites/louiscolumbus/2017/04/29/roundup-of-cloud-computing-forecasts-2017/#641aa64e31e8> and Salesforce.

technology cannot do the job because they can't capture the vital business or scientific information needed to link focused data searches with large-scale business needs or practical scientific advances. Only data acquisition solutions that use the cloud to obtain and synthesize information will work.

Of course, the goal of these efforts is not just to acquire large warehouses of data. It is to transform that data into knowledge that can produce new drugs and new ways to deliver them, a new understanding of how the human body maintains wellness, and increased knowledge of the pathogens and environmental factors that create disease.



Unmediated Access Is Key

Many institutions employ librarians to help scientists find the information they need. These professionals find the articles, book chapters, and conference papers their researchers need and keep the institutions for which they work compliant with publisher fees and permissions. They also store scientific literature in easily accessible databases that suit individual researchers or work groups but can be shared company-wide should the need arise. Without librarians, scientific institutions could not function. Yet librarians are human and cannot be available 24/7 to meet the information needs of companies with workers around the globe.

“Intelligent and automated filters determine how an article can be legally obtained at the lowest cost”



The crucial role of the librarian is transforming to meet the changing terrain of information and education, and that means using unmediated scientific literature access tools that can respond to the requests of researchers at any time of day, anywhere in the world.

But unmediated access systems must have the same level of control as human-mediated systems. Reusing a document internally, whether you share it or store it, requires publisher permissions. The document order must list the ways the company will use the information to determine the copyright fee. To be relevant now and in the future, an on-demand content access platform should be flexible enough to accommodate an organization's copyright licensing needs and find the most economical acquisition options.

Intelligent and automated filters determine how an article can be legally obtained at the lowest cost and let end users know what they must do to be in compliance. The filters make use of Open Access content and help to avoid duplicate orders complementing existing publisher subscriptions. "The right kind of system will provide on-demand access within minutes or no more than several hours

for older or difficult-to-find research materials" Pat Alderson, Enterprise Sales Director at Reprints Desk said. Insights into article and standard journal subscription usage, access to article supplements by default, and the ability to obtain ETOC (electronic table of contents) feeds are also part of the equation.

Unmediated access needs to be intuitive and user-friendly. It should take new users no more than fifteen minutes to become proficient enough to buy articles using a name, password, DOI number, or PubMed search. Highly personalized dashboards and scalability will allow scientists to meet their specific research needs and make on-demand content access affordable for institutions of all sizes and all budgets.

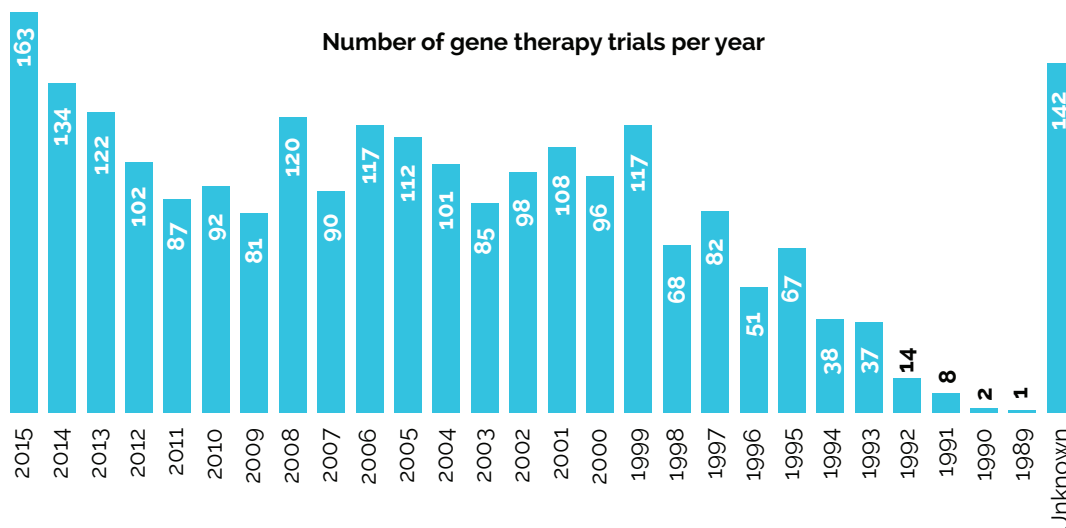
'Big Data' puts an abundance of data from papers, databases and other sources at the researcher's fingertips. Yet it cannot easily be accessed in a central location, enhanced or visualized. Increasingly, automated workflows will generate personalized data insights on-demand wherever and whenever it matters most, putting the researcher in control of a 360 degree virtual workbench.



"The right kind of system will provide on-demand access within minutes or no more than several hours for older or difficult-to-find research materials"

- Pat Alderson, Enterprise Sales Director at Reprints Desk

The Shape of the Future



Number of gene therapy trials per year. Data from Eve Hanna, Cécile Rémuzat, Pascal Auquier, and Mondher Toumi (2017) Gene therapies development: slow progress and promising prospect, Journal of Market Access and Health Policy. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5328344/>

The arrival of the information age means that all fields of science are moving forward more rapidly than anyone could imagine. Digital tools have increased our computational abilities exponentially and revolutionized mathematics, engineering, and the physical sciences. The sequencing of the human genome in 2003 transformed, and will continue to transform, biomedicine into a precise, individually tailored science that produces breakthrough after breakthrough in human health.

“Real-time scientific literature access evolves with technological advances”

We are already exploring how to regenerate severed spinal cords and limbs, modulate the immune system to eliminate autoimmune diseases such as multiple sclerosis, turn stem cells into organs that have been damaged or have worn out with age and, most exciting of

all, correct genetic defects by replacing bad genes with good ones. Only 25 years ago, this was the product of fantasy, but it is now an accepted part of our world.

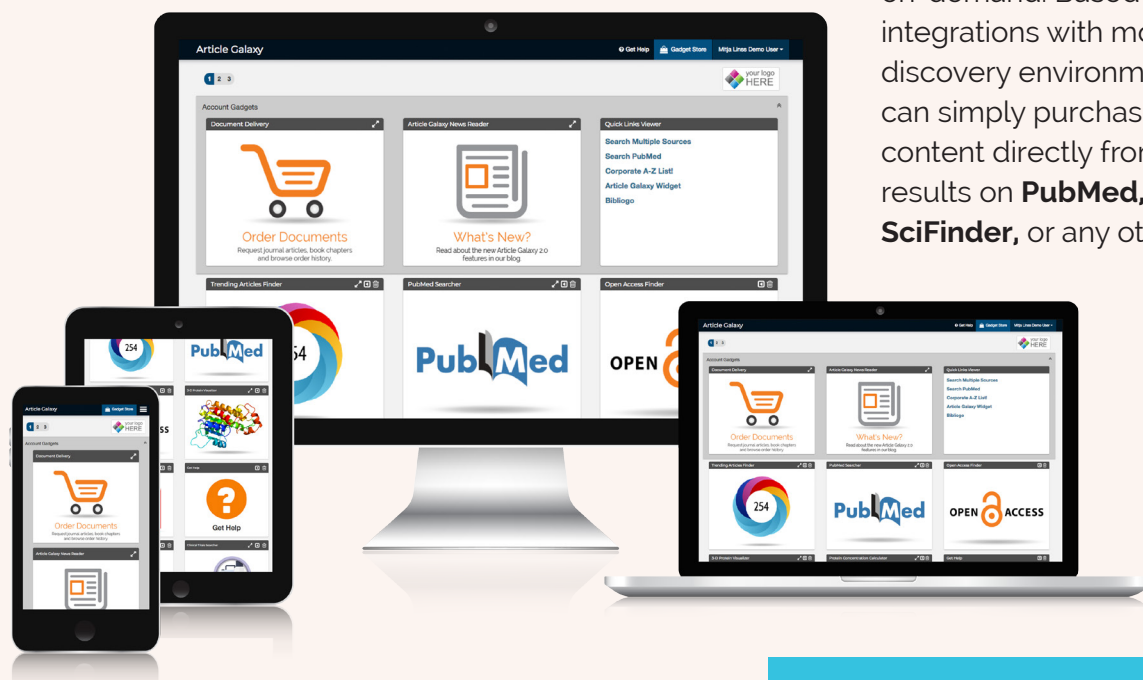
Real-time scientific literature access evolves with technological advances. Tomorrow’s research platforms will be fully automated and employ machine learning to provide dynamic responses with personalized content and data tailored precisely to the research question at hand. Nothing less will work for us as we move into the most exciting and productive era of scientific exploration we have ever known.



Article Galaxy 2.0 is the newest, cloud-based research retrieval and intelligence platform created by Reprints Desk, the developers of on-demand article delivery for scientists and researchers.

It features an ecosystem of app-like gadgets that allow researchers to personalize their user experience based on their research needs — much like apps on a mobile phone. Users can search and browse gadgets in a Gadget Store and easily add them to their dashboard. Article Galaxy 2.0 provides one-click access to full-text content of the world's largest publishers and scientific data extracted from many sources.

Users do not have to log in to the Article Galaxy dashboard to access content on-demand. Based on seamless integrations with more than 70 popular discovery environments, researchers can simply purchase, rent or access content directly from their search results on **PubMed**, **Google Scholar**, **SciFinder**, or any other website.



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Reprints Desk, Inc., a wholly owned subsidiary of Research Solutions, simplifies how organizations procure, access, manage, use, and legally share scholarly journal articles, clinical reprints, patents, and other content in medical affairs and scientific, technical, and medical (STM) research. Organizations fueled by intellectual property choose Reprints Desk because of its collaborative business approach, efficient article supply system and services, and commitment to quality post-sales support. Reprints Desk has ranked #1 in every Document Delivery Vendor Scorecard from industry analyst and advisory firm Outsell, Inc. since 2008.

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