



The 2018 Publishing Landscape: Technological Horizons

Lyndsey Dixon
Editorial Director, APAC Journals
Taylor & Francis Group





Today

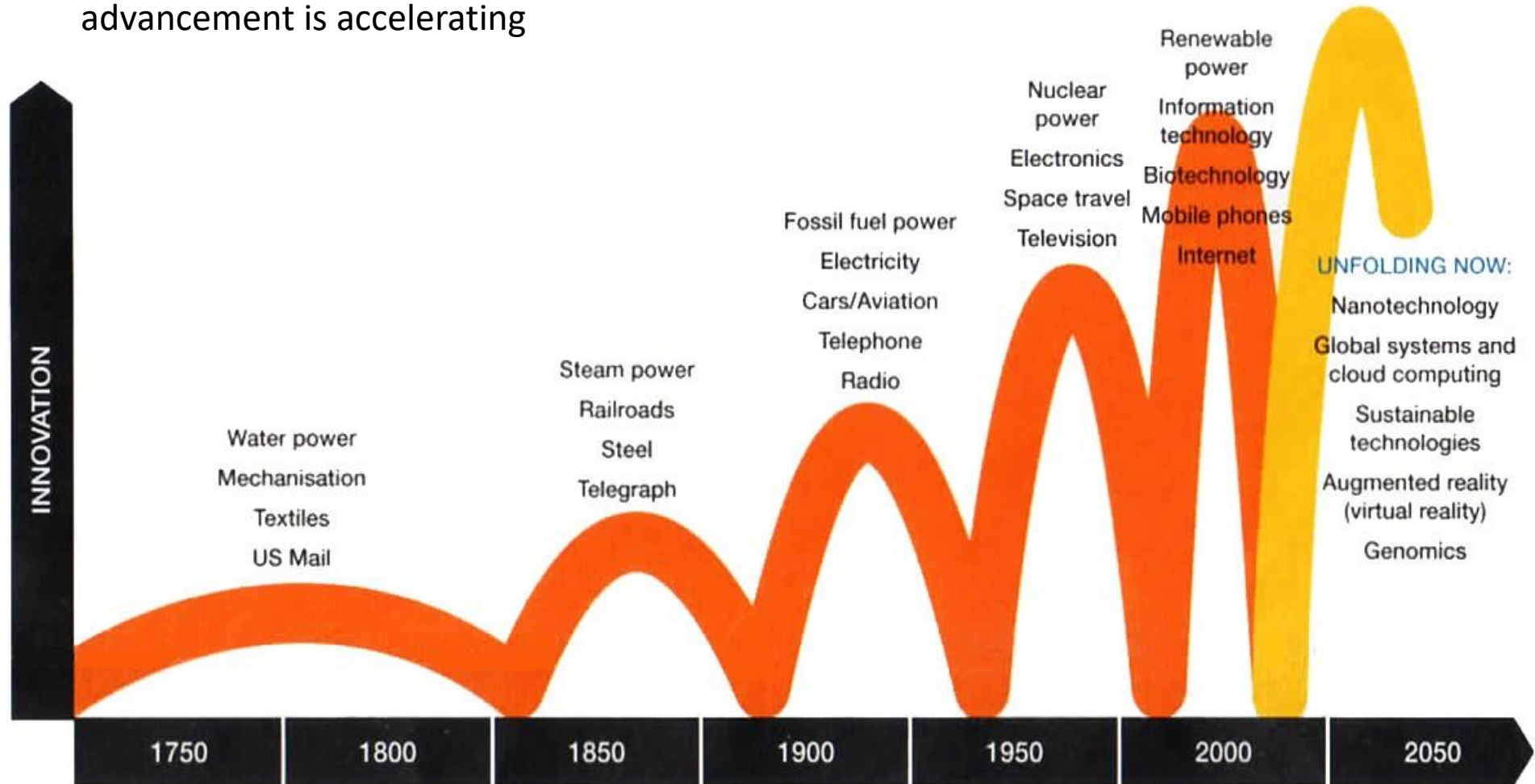
- Waves of innovation
- Publishing advancements through innovation
- Artificial intelligence
 - What exactly is Artificial Intelligence?
 - Artificial Intelligence and the R&D Ecosystem
 - Artificial Intelligence and Taylor & Francis
 - Where we're heading with Artificial Intelligence
- Questions and Answers





Waves of innovation

A historical overview shows how technological advancement is accelerating



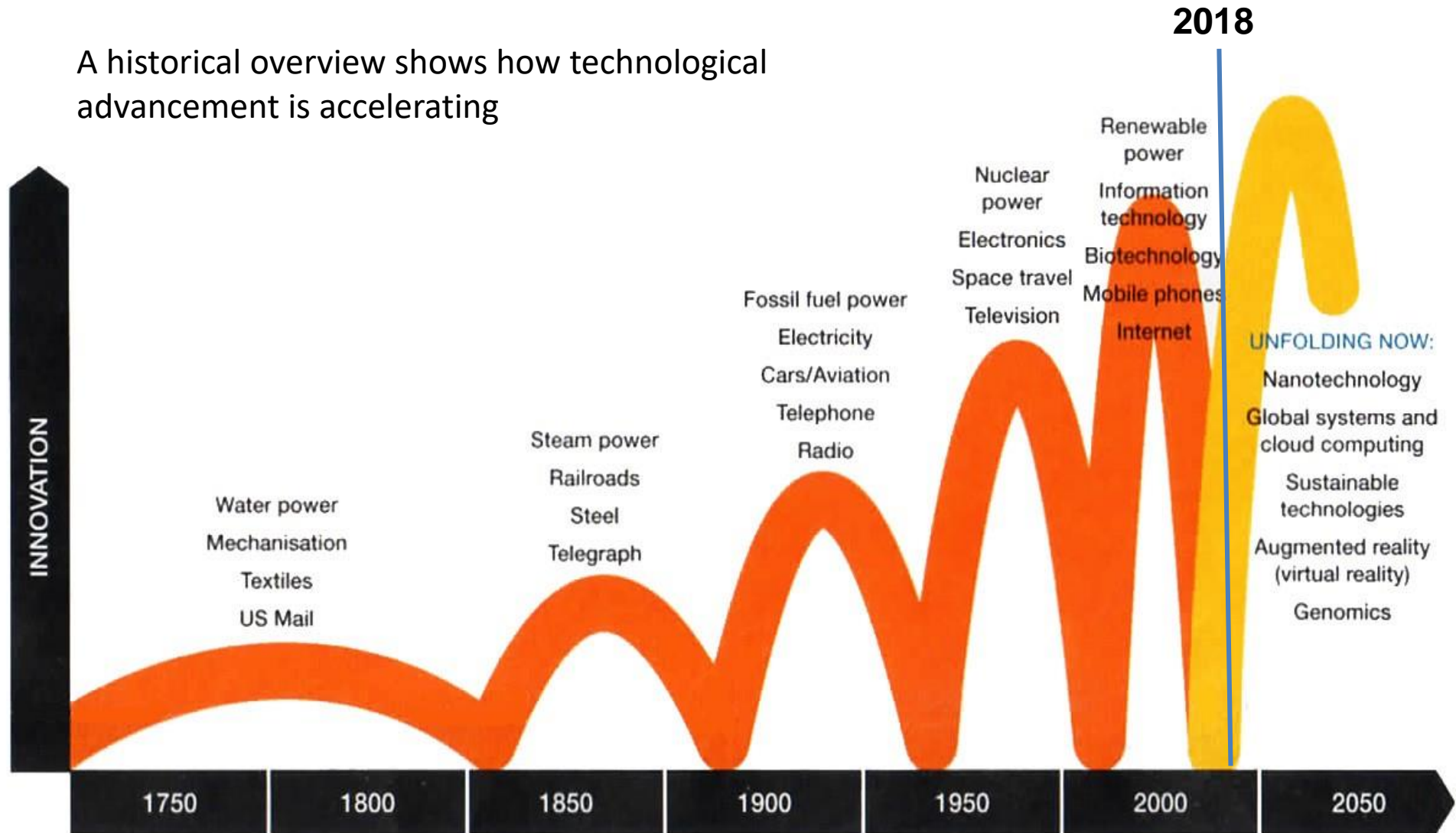
After Hargroves & Smith, *The Natural Advantage of Nations*, Routledge 2006





Waves of innovation

A historical overview shows how technological advancement is accelerating



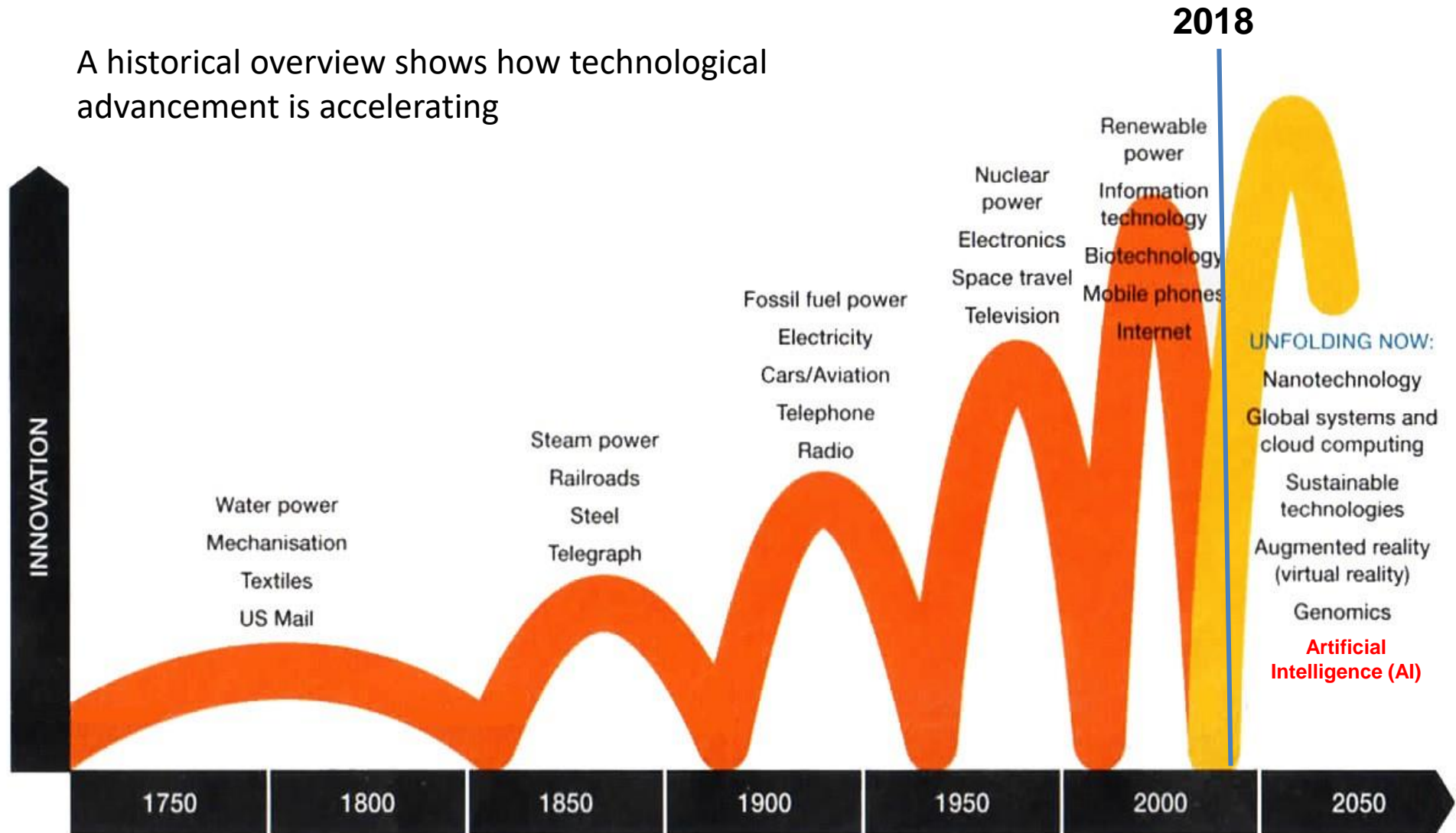
After Hargroves & Smith, *The Natural Advantage of Nations*, Routledge 2006



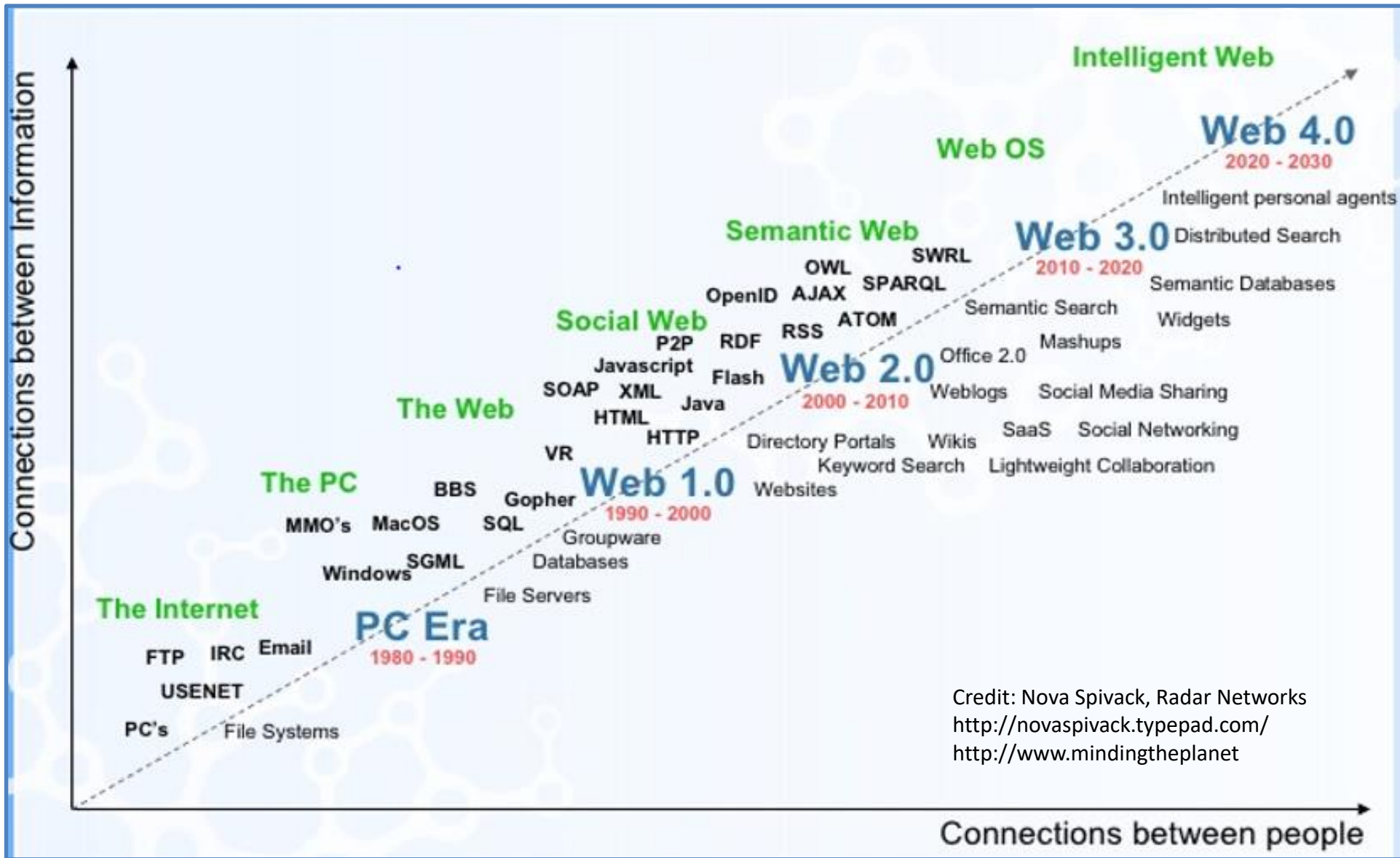


Waves of innovation

A historical overview shows how technological advancement is accelerating



From Web 2.0 to Web 3.0 to Web 4.0



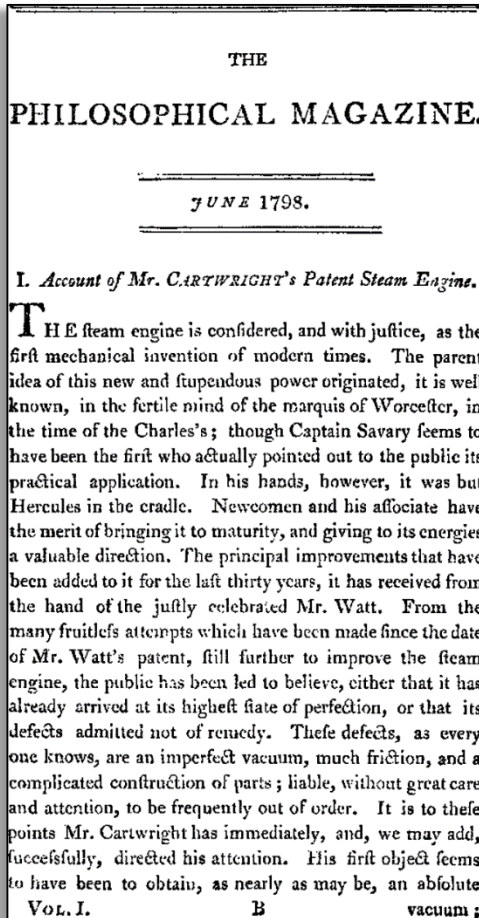
Credit: Nova Spivack, Radar Networks
<http://novaspivack.typepad.com/>
<http://www.mindingtheplanet>



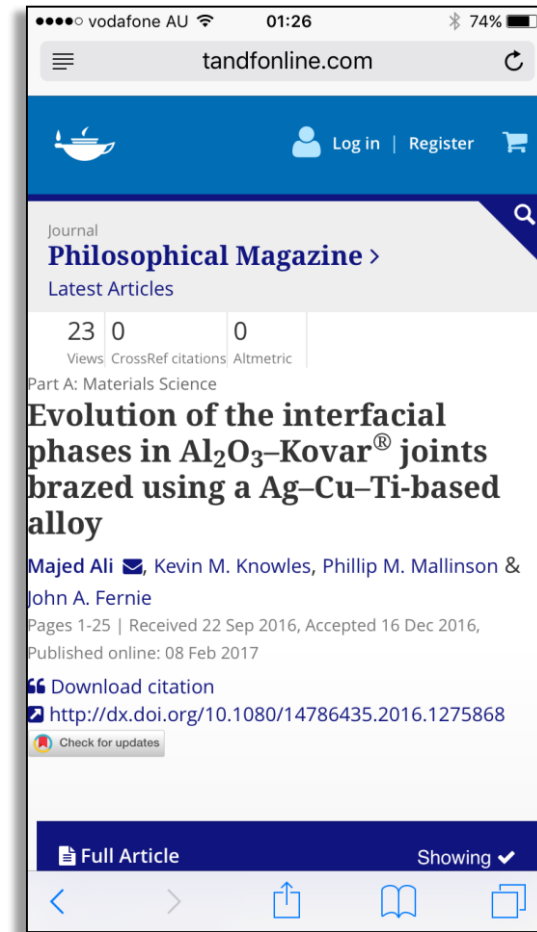


Journals: a developing digital world

- From...
- ...to



- Generalist
- Print
- Online
- Subscription
- Words
- Shelf
- Serendipity
- Europe
- Specialist
- Online
- Digital
- Open
- Research Objects
- Search Engine
- Text/data mining
- Asia





Digital workflow and new players

101 INNOVATIONS IN SCHOLARLY COMMUNICATION



Jeroen Bosman @jeroenbosman
Utrecht University Library

THE CHANGING RESEARCH WORKFLOW

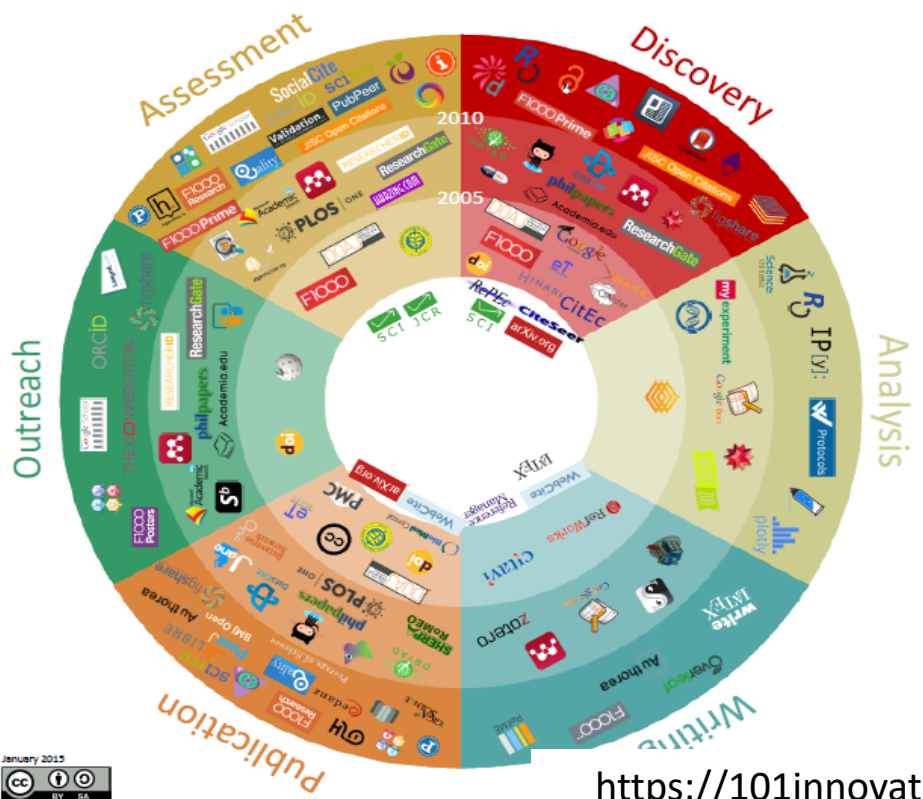


Bianca Kramer @MsPhelps
Utrecht University Library

Science is in transition. This poster gives an impression of the exploratory phase of a project aiming to chart innovation in scholarly information and communication flows from evolutionary and network perspectives.

We intend to address the questions of what drives innovation and how these innovations change research workflows and may contribute to more **open, efficient** and **good** science.

101 Innovative tools and sites in 6 research workflow phases (< 2000 - 2015)



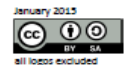
Most important developments in 6 research workflow phases

	Discovery	Analysis	Writing	Publication	Outreach	Assessment
Trends	social discovery tools	data-driven & crowdsourced science	collaborative online writing	Open Access & data publication	scholarly social media	article level (alt)metrics
Expectations	growing importance of data discovery	more online analysis tools	more integration with publication & assessment tools	more use of "publish first, judge later"	use of altmetrics for monitoring outreach	more open and post-publication peer review
Uncertainties	support for full-text search and text mining	willingness to share in analysis phase	acceptance of collaborative online writing	effect of journal/publisher status	requirements of funders & institutions	who pays for costly qualitative assessment?
Opportunities	discovery based on aggregated OA full text	open labnotes	semantic tagging while writing/editing	reader-side paper formatting	using repositories for institutional visibility	using author-publication and affiliation-IDs
Challenges	real semantic search (concepts & relations)	reproducibility	safety/privacy of online writing	globalization of publishing/access standards	making outreach a two-way discussion	quality of measuring tools
Most important long-term development	multidisciplinary + citation-enhanced databases	collaboration + data-driven	online writing platforms	Open Access	more & better connected researcher profiles	importance of societal relevance + non-publication contributions
Potentially most disruptive development	semantic/concept search + contextual/social recommendations	open science	collaborative writing + integration with publishing	circumventing traditional publishers	public access to research findings, also for agenda setting	moving away from simple quantitative indicators

Typical workflow examples



<https://101innovations.wordpress.com/>



The digital world disrupts processes, services and perceptions



- Inertia and embeddedness
 - In academic recognition & reward
- Industry easily adopted www 1.0
 - Short, structured content
- Standards, metadata and “interoperability” form the digital backbone of the network
 - CrossRef DOI
 - Funder Data
 - ORCID
- Ready for www 2.0 – www.4.0?



Digital technology facilitates discoverability & visibility





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WHAT IS ARTIFICIAL INTELLIGENCE?



What is artificial intelligence?

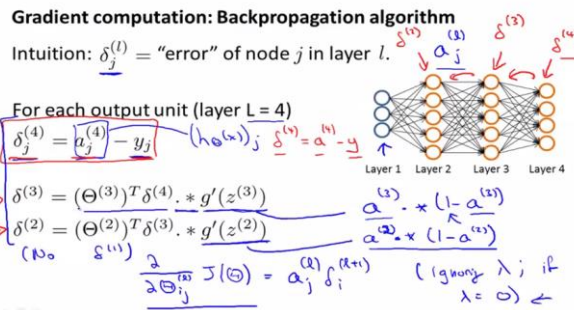
- John McCarthy first coined the term “artificial intelligence” (AI) in 1956 at a conference in Dartmouth. Mirror the functions of the human brain...

Machine Learning: Arthur Samuel (1959) defined it as the field of study that gives computers the ability to learn without being explicitly programmed.



alamy stock photo

- Neural Networks 1980-90s:



Cost function

Logistic regression:

$$J(\theta) = -\frac{1}{m} \left[\sum_{i=1}^m y^{(i)} \log h_{\theta}(x^{(i)}) + (1 - y^{(i)}) \log(1 - h_{\theta}(x^{(i)})) \right] + \frac{\lambda}{2m} \sum_{j=1}^n \theta_j^2$$

Neural network:

$\rightarrow h_{\Theta}(x) \in \mathbb{R}^K$ ($(h_{\Theta}(x))_i = i^{th}$ output)

$$\rightarrow J(\Theta) = -\frac{1}{m} \left[\sum_{i=1}^m \sum_{k=1}^K y_k^{(i)} \log(h_{\Theta}(x^{(i)}))_k + (1 - y_k^{(i)}) \log(1 - (h_{\Theta}(x^{(i)}))_k) \right]$$

$\frac{\lambda}{2m} \sum_{l=1}^{L-1} \sum_{i=1}^{s_l} \sum_{j=1}^{s_{l+1}} (\Theta_{ji}^{(l)})^2$

$\Theta_{ij}^{(l)} x_j^{(l)} + \Theta_{i0}^{(l)} x_0^{(l)} + \dots$

Andrew Ng

- It is not a robot apocalypse, at least not yet...





ARTIFICIAL INTELLIGENCE AND THE R&D ECOSYSTEM

Past

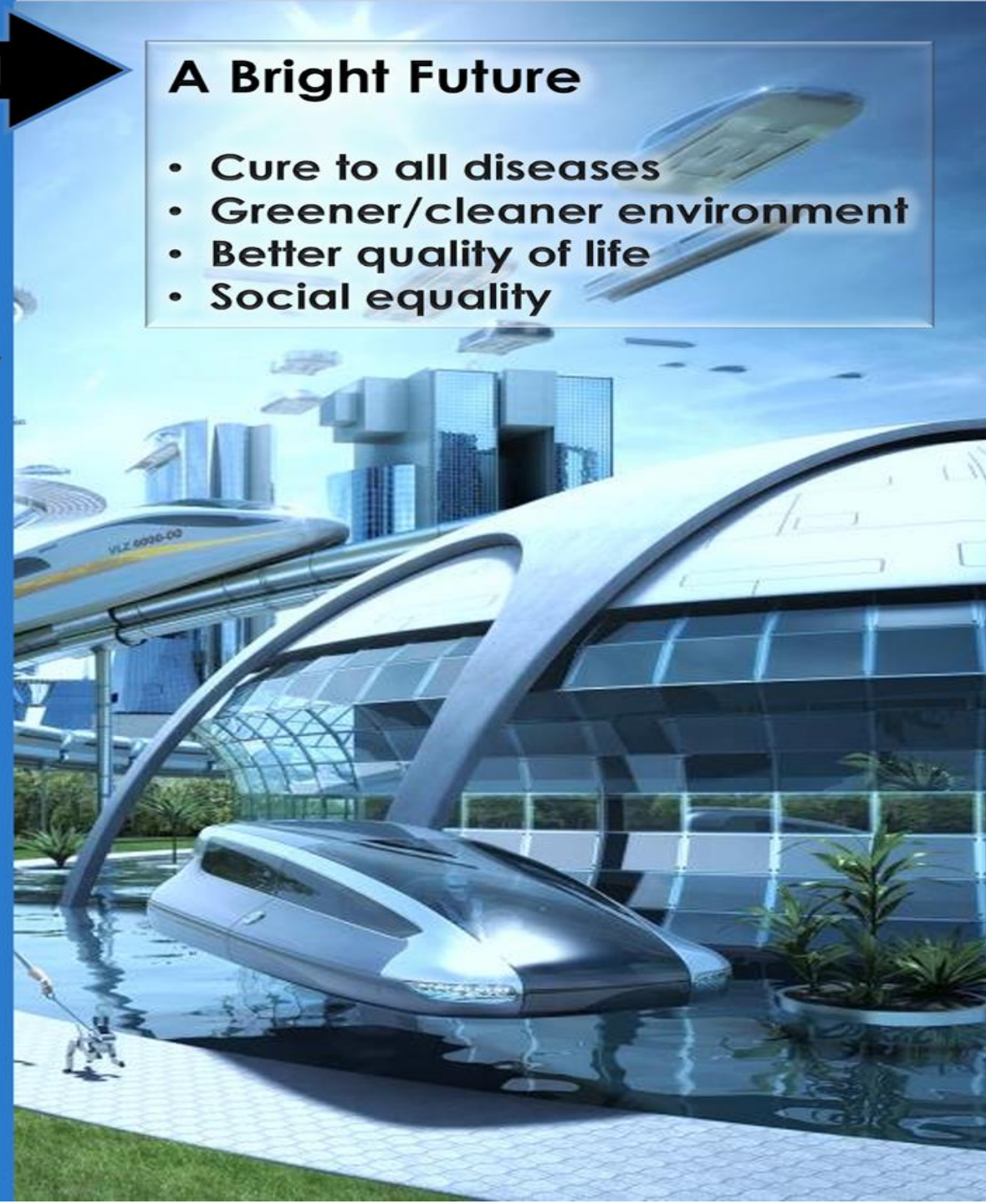
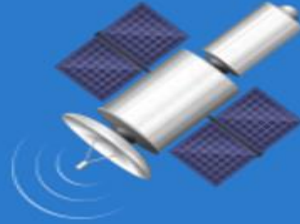
Electricity

Present

AI + HI

A Bright Future

- Cure to all diseases
- Greener/cleaner environment
- Better quality of life
- Social equality





Research trends & AI



Courtesy of Enago Academic



The research cycle



Automated labs: AI doing robust science



LIZZIE BUCHEN SCIENCE 04.02.09 12:15 PM

ROBOT MAKES SCIENTIFIC DISCOVERY ALL BY ITSELF



For the first time, a robotic system has made a novel scientific discovery with virtually no human intellectual input.

Artificial intelligence is helping astronomers discover new planets

AI could help us discover planet nine, dark matter and more gravitational waves

By **ABIGAIL BEALL**

17 Dec 2017



The newly-discovered Kepler-90i – a hot, rocky planet that orbits its star once every 14.4 days – was found using machine learning from Google

Credit **NASA/Wendy Stenzel**

Forget self-driving cars and computers that can beat humans at chess, artificial intelligence is helping astronomers make huge steps towards solving some of the Universe's biggest mysteries.

For the first time, [artificial intelligence](#) has been used to discover two new exoplanets. One of the discoveries, made by Nasa's Kepler mission, brings the Kepler-90 solar system to a total of 8 planets - the first solar system found with the same number as our own.



Automated labs: 70,000 papers on p53 - AI can handle large dataset



AI

EXCLUSIVE

CytoReason uses AI to personalize drugs, opening the door to cancer treatments

STEWART ROGERS @THEREALSJR APRIL 16, 2018 8:30 AM

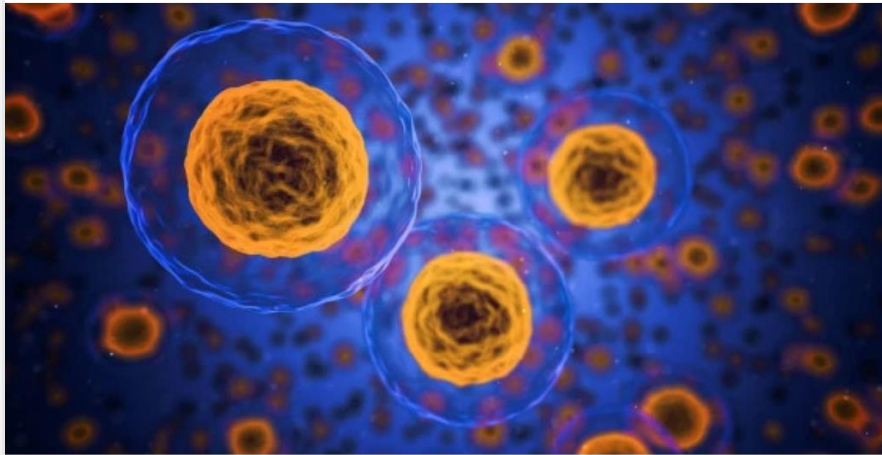


Image Credit: CytoReason

The first question most people have when talking about artificial intelligence is if it will help us or harm us. But in the health industry, the answer to that question is clear. Whether it is being used to identify patients at risk or interrogate X-rays and scans to aid in diagnosis, AI promises to save lives and reduce costs.



Can Scientific Discovery Be Automated?

Progress in the sciences can only move as fast as humans can think—outsourcing to A.I. could change that.

AHMED ALKHATEEB AND AEON

APR 25, 2017 | SCIENCE

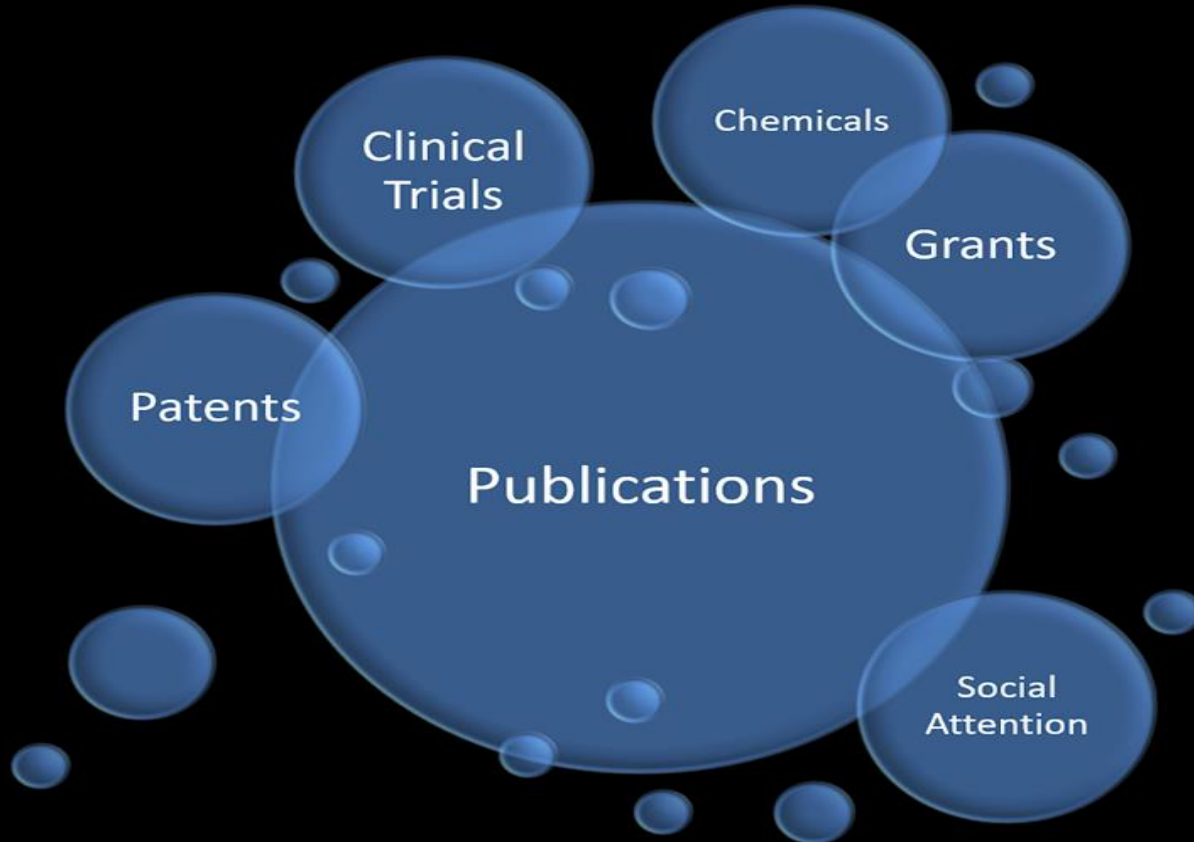
Science is in the midst of a data crisis. Last year, there were more than 1.2 million new papers published in the biomedical sciences alone, bringing the total number of peer-reviewed biomedical papers to over 26 million. However, the average scientist reads only about **250 papers a year**. Meanwhile, the quality of the scientific literature has been in decline. Some recent **studies** found that the majority of biomedical papers were **irreproducible**.

The twin challenges of too much quantity and too little quality are rooted in the finite neurological capacity of the human mind. Scientists are deriving hypotheses from a smaller and

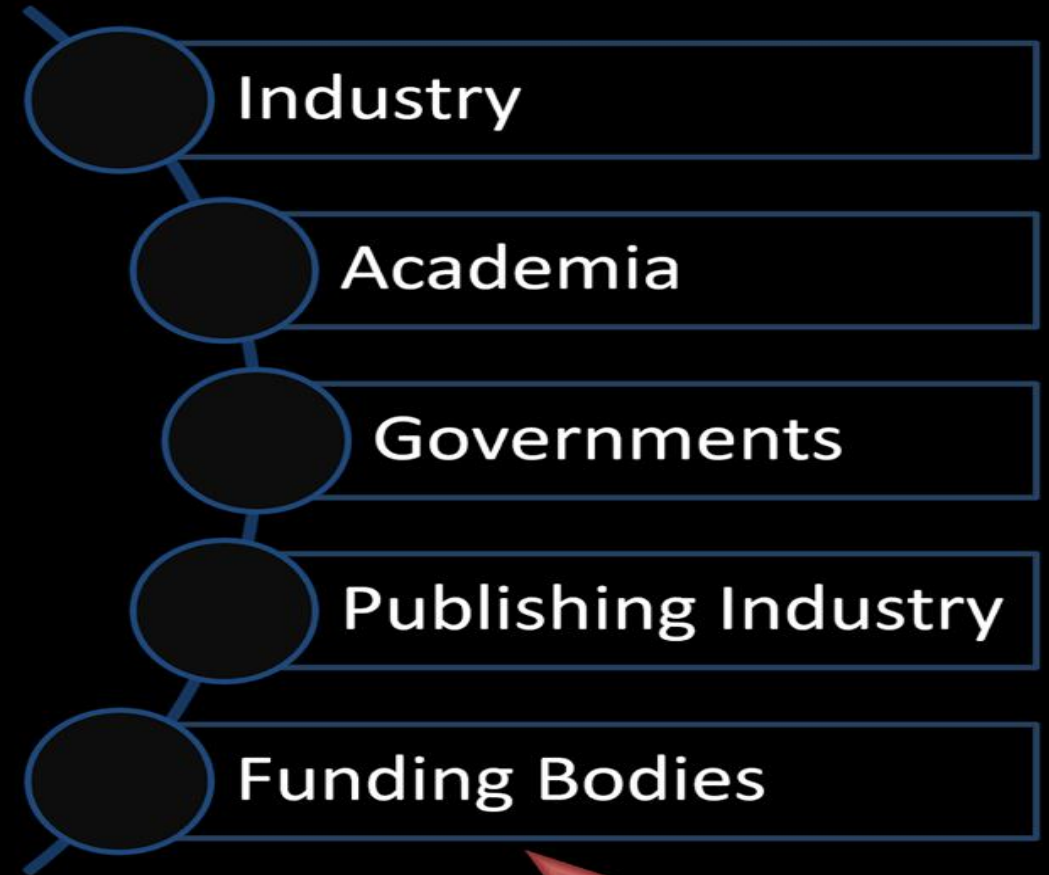


\$2 Trillion R&D Spend / Year

Can we empower researchers and the supporting ecosystem with actionable intelligence, to get to the better future faster - That's what wizdom.ai is all about.



Interconnecting human knowledge to provide actionable intelligence



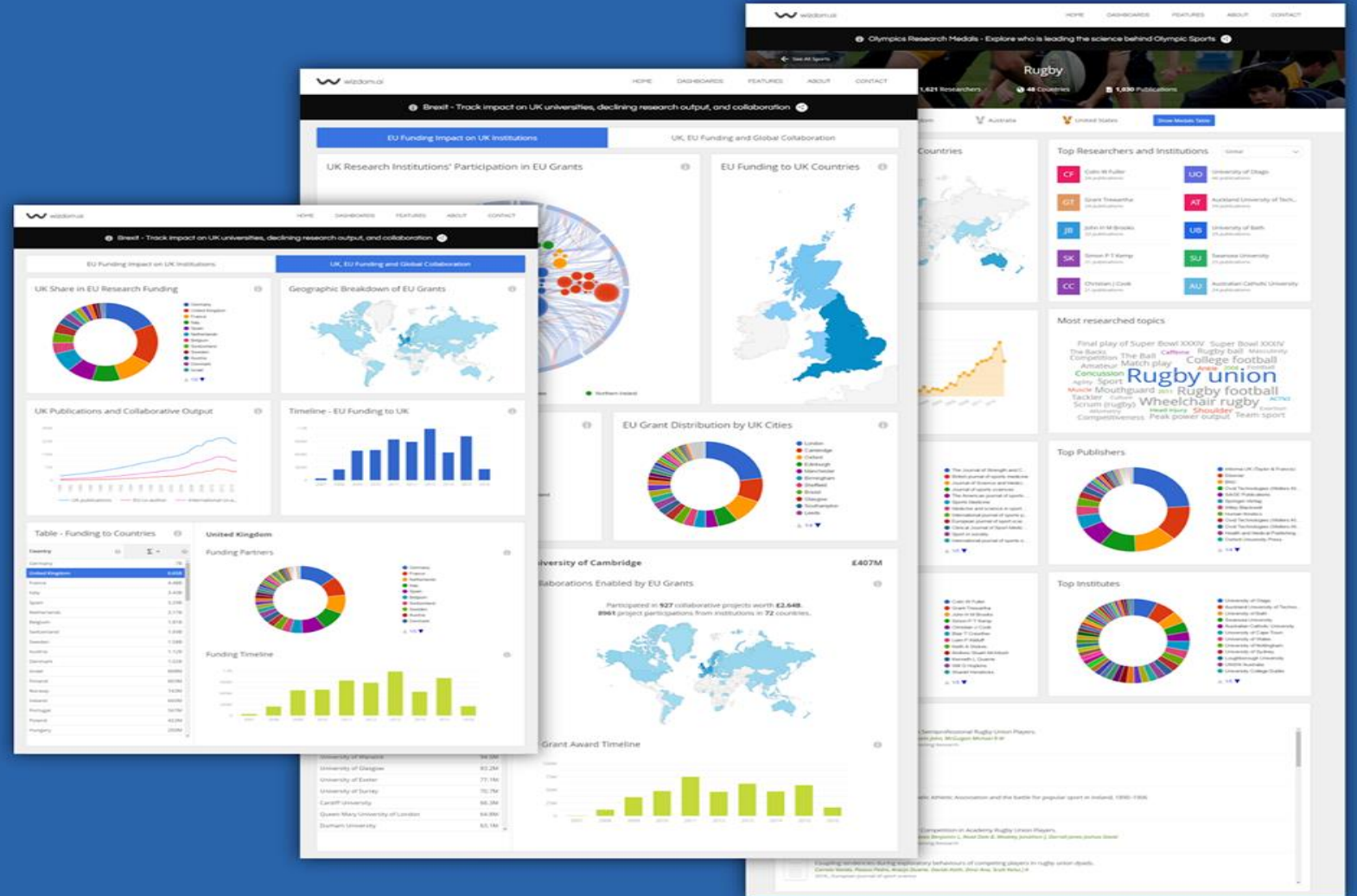
Empowering researchers and the supporting ecosystem

Knowledge about R&D ecosystem

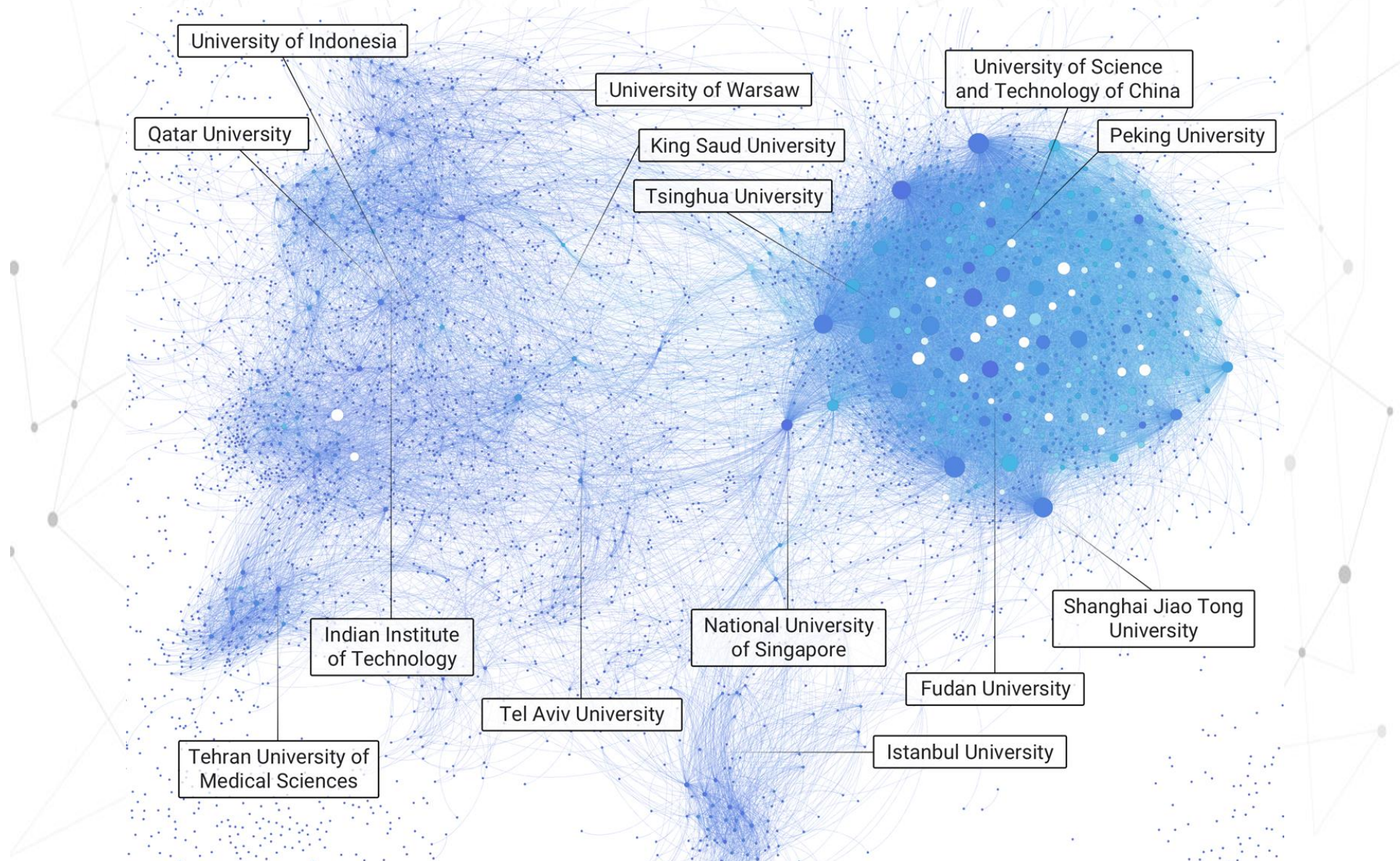


AI, machine learning and natural language processing

actionable insights to accelerate global R&D



Knowledge graphs: Analysis of China's collaboration with Belt & Road Countries





New: see trending papers that were recently mentioned on social networks [here](#)

Cut through the clutter

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Dimensions is a next-generation linked research information system that makes it easier to find and access the most relevant information, analyze the academic and broader outcomes of research, and gather insights to inform future strategy.

Developed in collaboration with over 100 leading research organizations around the world, it brings together over 128 million publications, grants, policy, data and metrics for the first time, enabling users to explore over 4 billion connections between them.

Data and expertise that span the research lifecycle from Digital Science's companies ReadCube, Altmetric, Figshare, Symplectic, Digital Science Consultancy and ÜberResearch make up Dimensions.

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Transforming Information into Knowledge

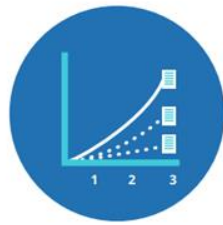
Technology and
products that extract
meaning at the atomic
level, to help you
understand deeper



Meta provides intelligent data services for industries built on the academic literature.



Meta uses world-leading AI to help academics, commercial enterprises, and government organizations solve their science and information challenges. From scholarly publishing to life science and beyond, people use Meta's intelligent capabilities to gain key insights, uncover emerging technologies, and drive their industries forward.



Article Trajectory



Optimal Reviewers



Citation
Enrichment



Intelligent
Cascading



Entity Horizon
Scanning



Technology &
Product Emergence



Researcher &
Institute Emergence



Paper Feeds



Embedded Search



Researcher Profile



Product Profile



Organization/
Institution Profile



Concept Profile



Geospatial Profile



Concept Emergence



Universal
Recommendations
Engine



Data Visualizer



Add to Feed (Beta)



Broadcaster (Beta)



Concept Recognizer



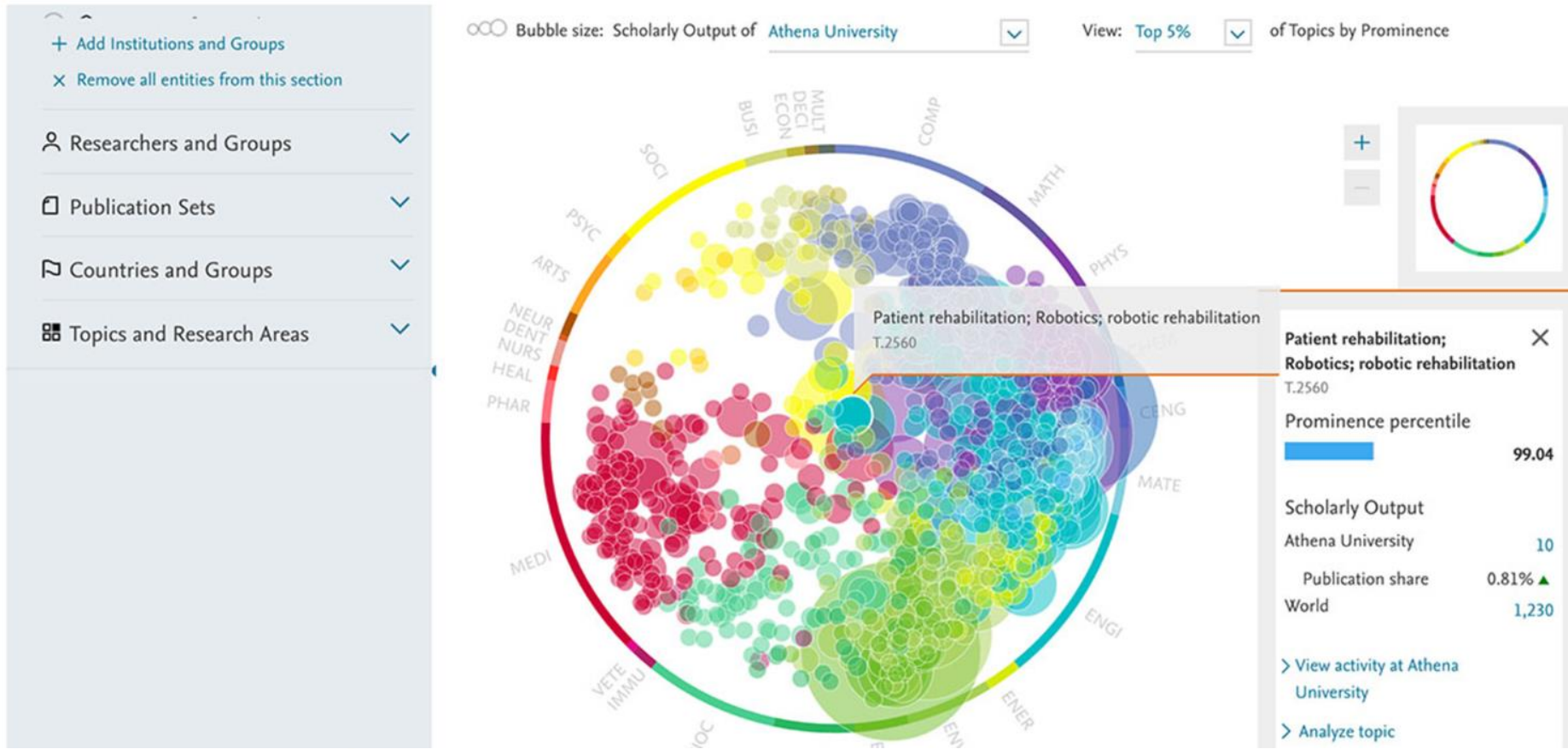


The dawn of predictive analytics to measure research performance: SciVal's Topic Prominence

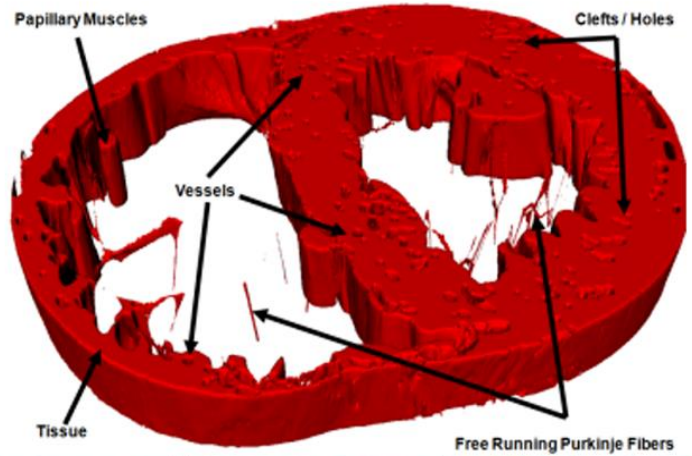
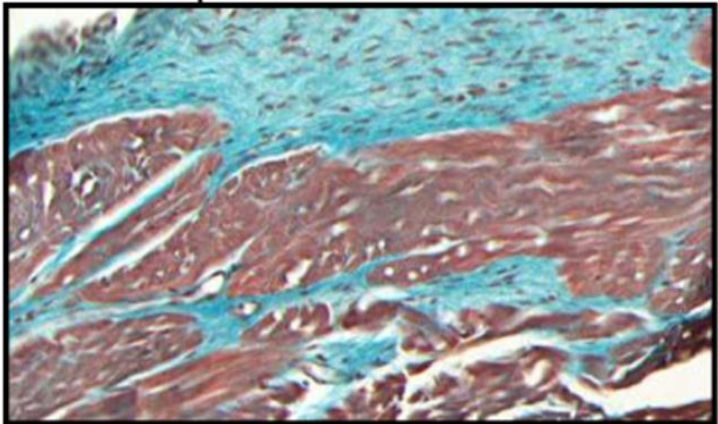
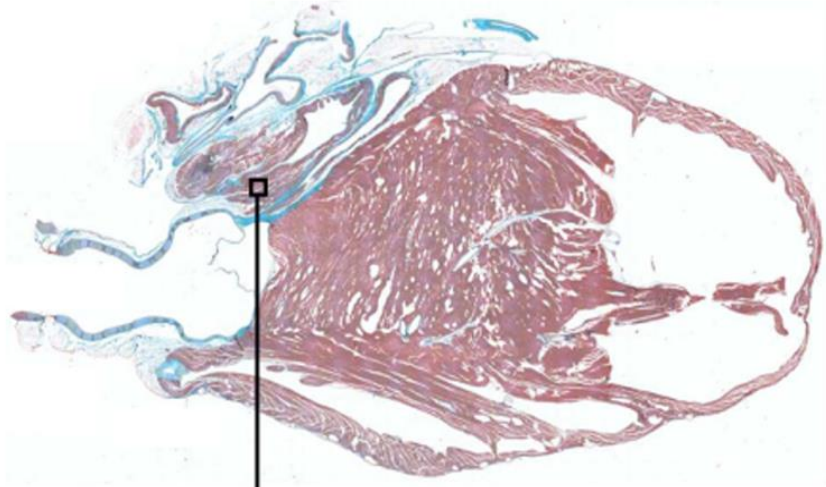
How drilling down into the granularity of 97,000 topics can help institutions and researchers plan, secure funding – and demonstrate their impact

By [Martin Edling Andersson](#) October 4, 2017

Elsevier Connect



Research = Big Data, Machine Learning



Can we trust human intelligence alone for the progress of humanity?



Study claims \$28 billion a year spent on irreproducible biomedical research

By Jocelyn Kaiser | Jun. 9, 2015, 1:30 PM

An eye-popping \$28 billion is spent in the United States each year on preclinical research that can't be reproduced by other researchers. That's the conclusion of a provocative analysis published today in part by economists who based it on past studies of error rates in biomedical studies.

Meanwhile, the National Institutes of Health (NIH) today issued new criteria for grant reviews aimed at bolstering the reproducibility of NIH-funded research.

Studies Show Only 10% of Published Science Articles are Reproducible. What is Happening?

BY MOSHE PRITSKER

Studies show a very low reproducibility for articles published in scientific journals, often as low as 10-30%. Here is a partial list:

- The biotech company Amgen had a team of about 100 scientists trying to reproduce the findings of 53 "landmark" articles in cancer research published by reputable labs in top journals. [Only 6 of the 53 studies were reproduced](#) (about 10%).
- Scientists at the pharmaceutical company, Bayer, examined 67 target-validation projects in oncology, women's health, and cardiovascular medicine. Published results were reproduced in only [14 out of 67 projects](#) (about 21%).
- The project, PsychFileDrawer, dedicated to replication of published articles in experimental psychology, shows a [replication rate 3 out of 9](#) (33%) so far.

Why Most Published Research Findings Are False

John P. A. Ioannidis

Published: August 30, 2005 • <https://doi.org/10.1371/journal.pmed.0020124>

- Despite noble intentions, neither publishers nor researchers are able to keep up with the pace of discovery.
- Human intelligence combined with artificial intelligence may be the answer.





Connectivity requires protocols



Connectivity to drive impact and new discovery



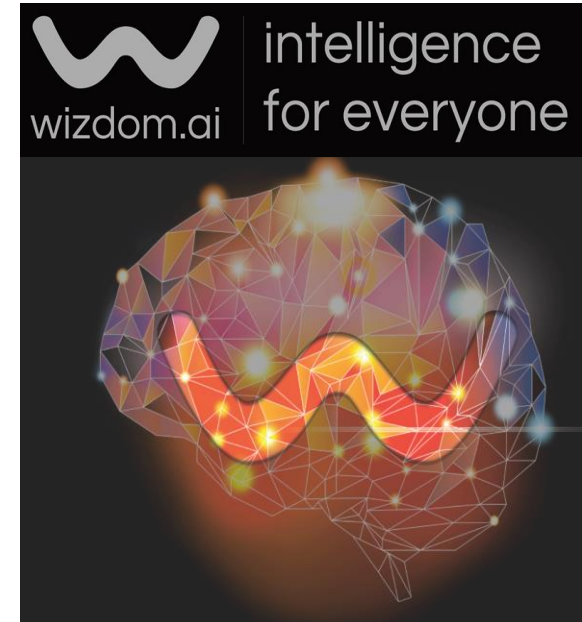


ARTIFICIAL INTELLIGENCE AND TAYLOR & FRANCIS

Artificial Intelligence and Taylor & Francis



- May 2017 - Announced the acquisition of Colwiz.
- Aug 2017 - came to an agreement with UNSILO to use their machine learning technology to extract concepts from our content.
- Jan 2018 - Related book recommendations based on machine learning go live on newly launched eBooks platform.
- May 2018 - ML Concepts to be delivered within Onix feeds to Amazon
- We are really only just getting started!



The researcher cycle

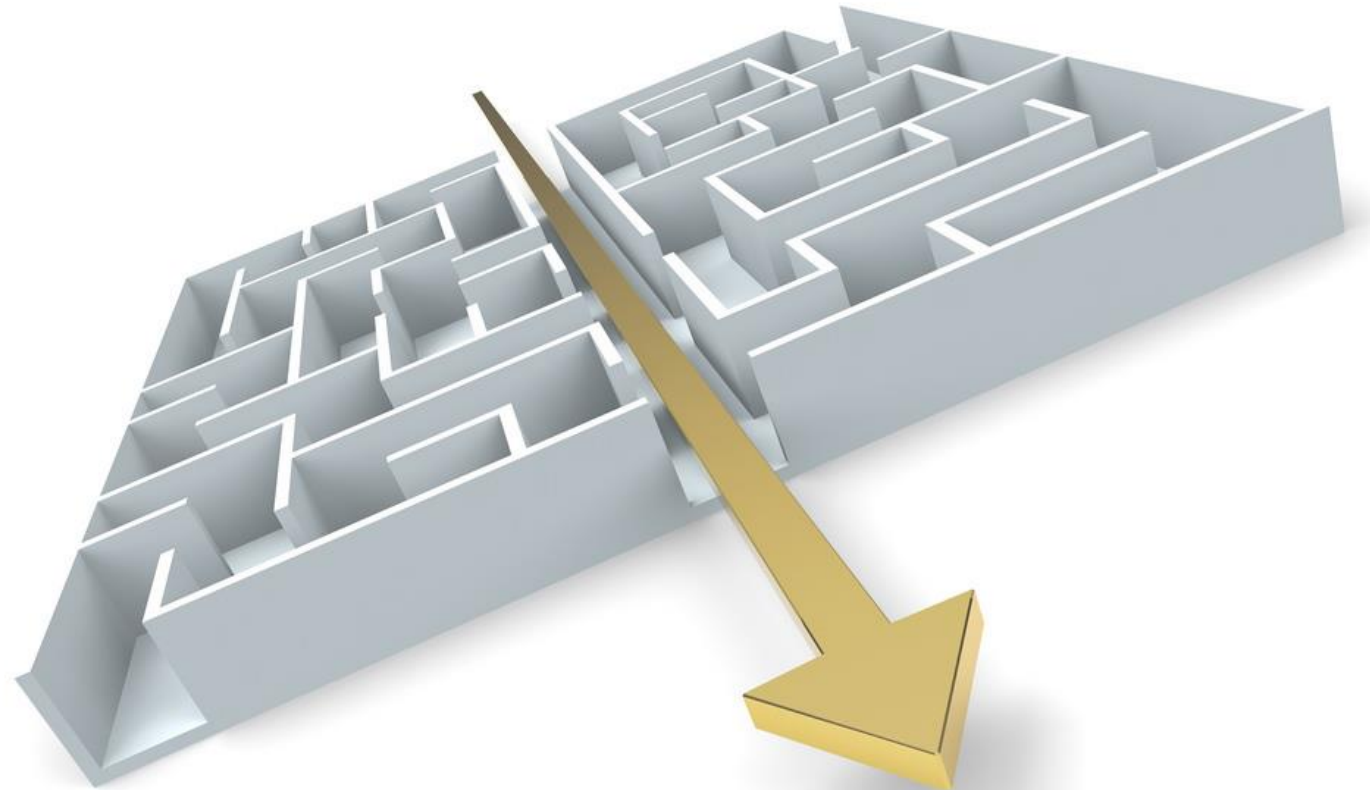
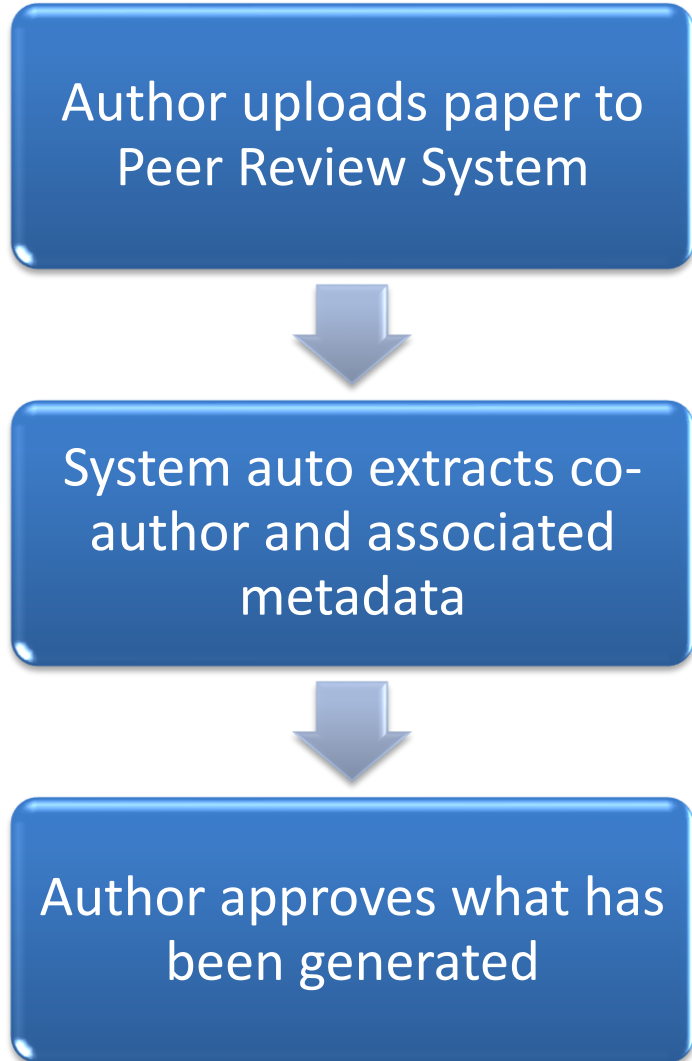


Journal finder tool





Streamlining the submission process

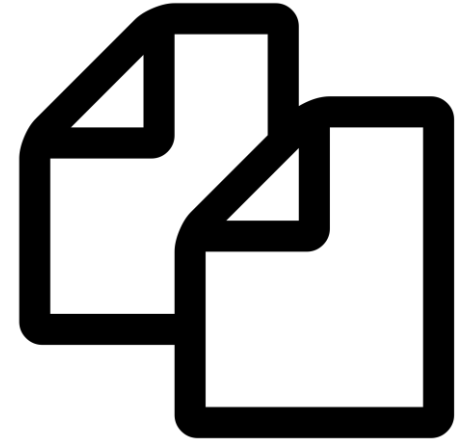


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Duplication and data fabrication checking

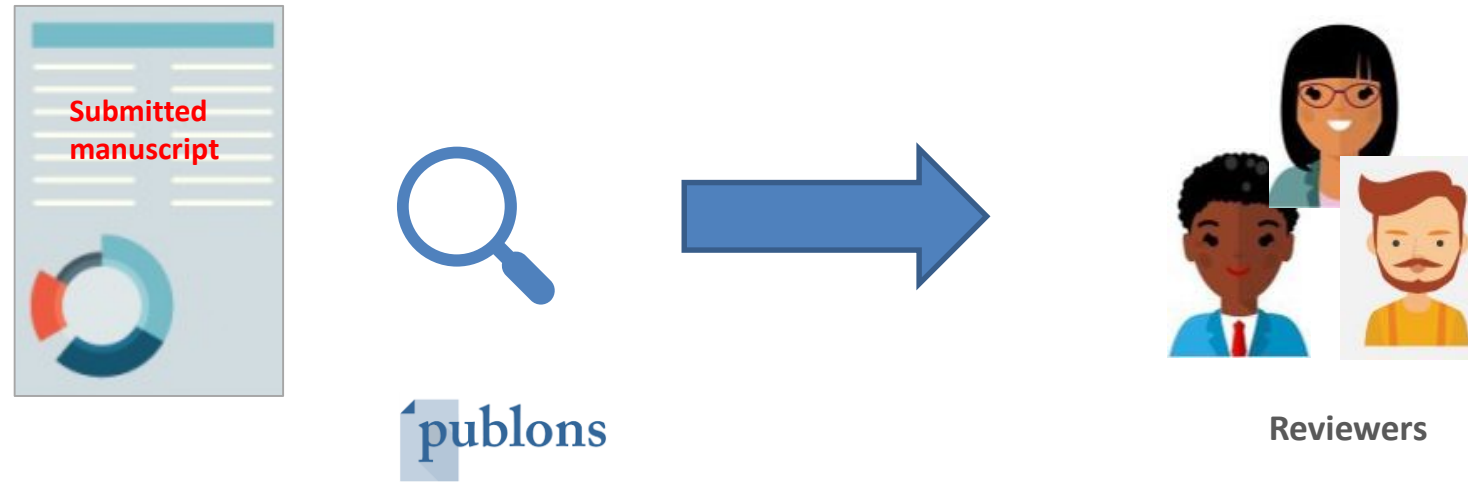
- Identify similar sounding paragraphs or sentences
- Through **Natural Language Processing** we can identify semantically similar outputs
- **Improve reporting**
- Spot **statistical errors**
- Moving to **look at data** for potential fabrication





AI in Peer Review

Automation of Reviewer selection



publons

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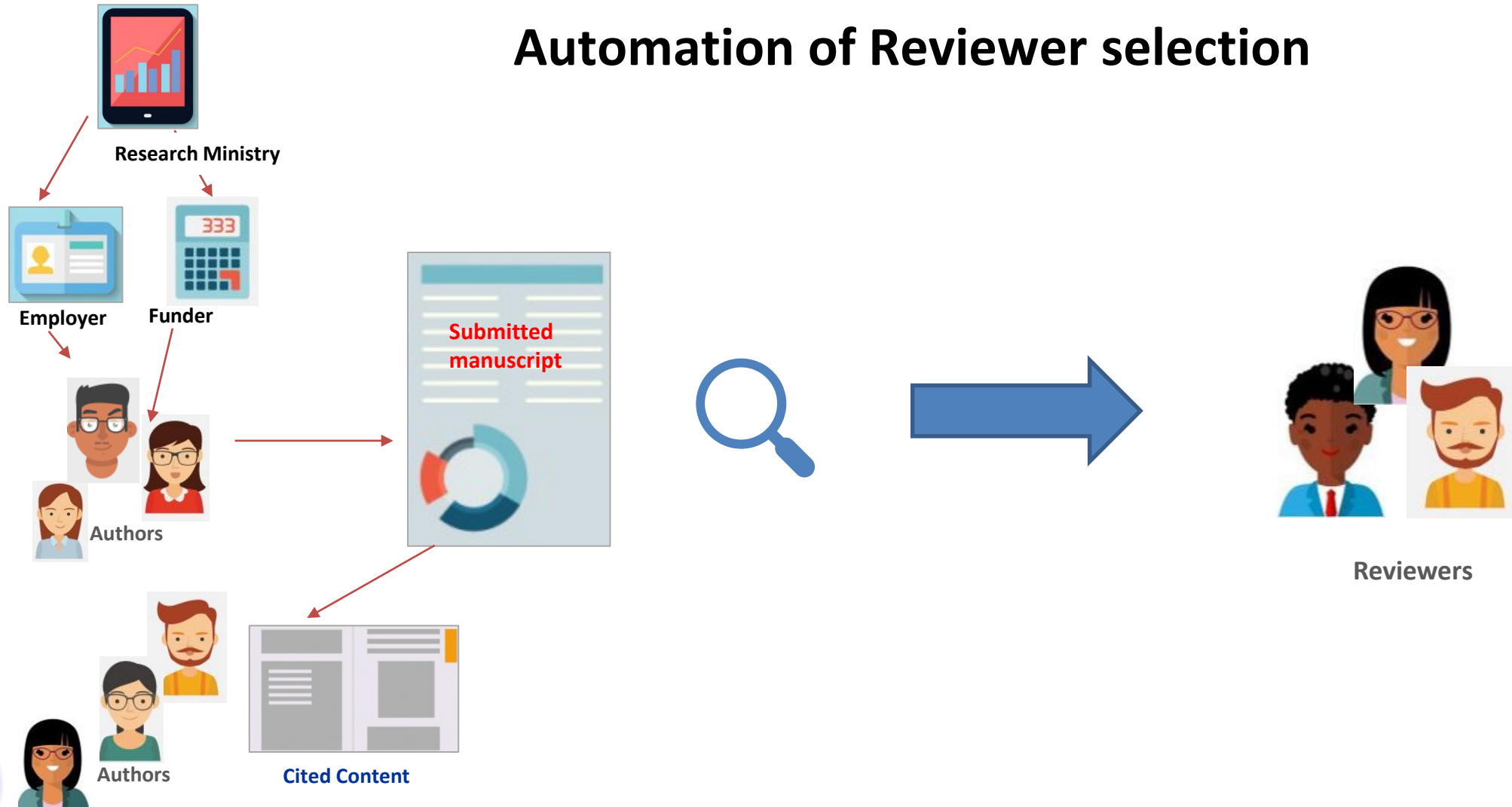
em Editorial Manager®





AI in Peer Review

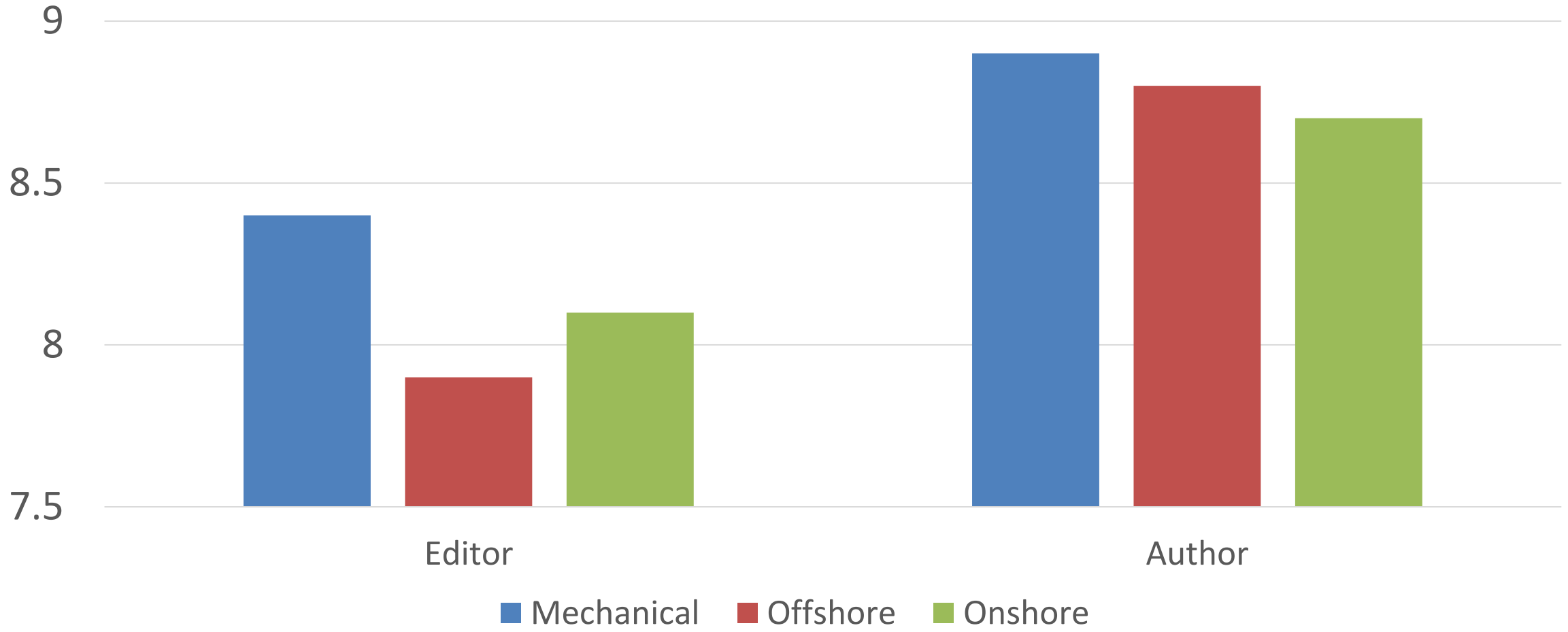
Automation of Reviewer selection



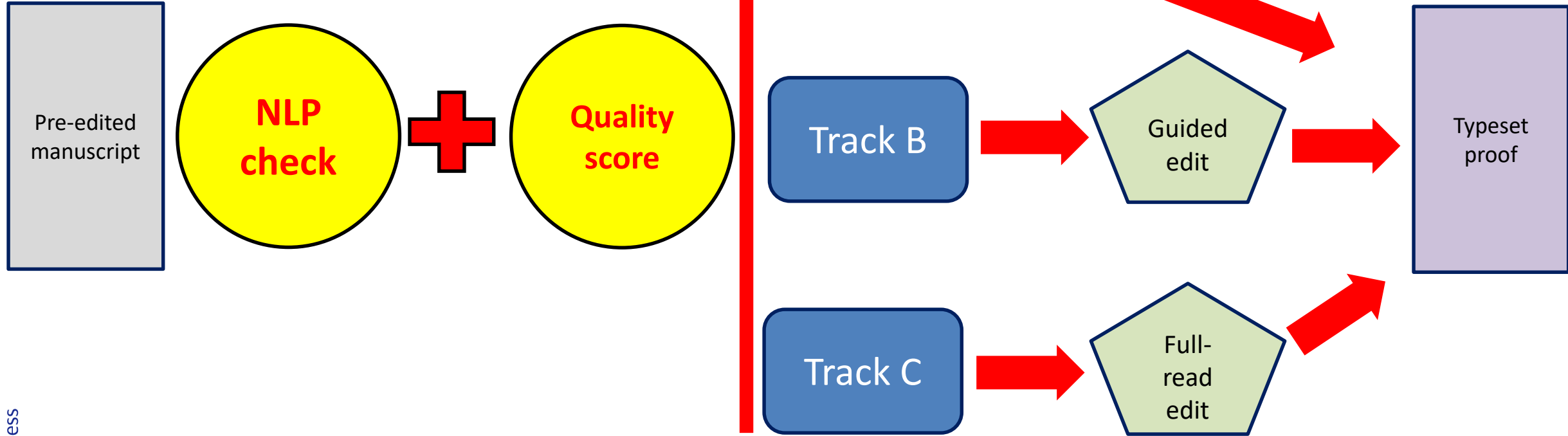


Increasing efficiency (and satisfaction)

Editor and author satisfaction with copyediting, 2017



Contextualized Copyediting Workflow



Track	Intervention
Track A	Pre-editing only; no copyediting intervention
Track B	Guided copyedit performed by vendor team
Track C	Full-read copyedit performed by vendor team or freelancer





Curation of content

- Machine learning of text to automatically extract or classify bibliographic info into
 - ontologies
 - taxonomies
 - systems
- Virtual special issues
- Virtual librarian?
- Concept recognition
- Automatic abstracts/Summaries/ Translation



Increasing discoverability



The screenshot shows the Taylor & Francis Online interface for the article "Relation extraction with weakly supervised learning based on process-structure-property-performance reciprocity" by Takeshi Onishi, Takuya Kadohira, and Ikumu Watanabe. The page includes a navigation bar, search bar, article title, authors, abstract, and a table of contents. A diagram illustrates the process of knowledge extraction from natural language texts, showing the flow from "Machine Learning" to "Matrix" and "Strength", then to "Solidification" and "Wildability", and finally to "Grain". The diagram also shows "Learning Knowledge" and "Discovering New Knowledge" leading to a "Grain" icon.

Related articles

The large graph limit of a stochastic epidemic model on a dynamic multilayer network
Karly A. Jacobsen et al., *Journal of Biological Dynamics*

Unsupervised Graph-based Discourse Planning and Generation
Anjali Singh et al., *IETE Technical Review*

Improving text summarization using neuro-fuzzy approach
Muhammad Azhari et al., *Journal of Information and Telecommunication*

Spatial specification and reasoning using grammars: from theory to application
Yufeng Liu et al., *Spatial Cognition & Computation*

Mixed Markov models.
Arthur Fridman, *Proc Natl Acad Sci U S A*

Exponential random simplicial complexes
Konstantin Zuev et al., *J Phys A Math Theor*

Convex skeletons of complex networks
Lovro Šubelj, *Interface*

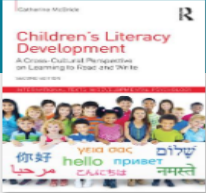
What is the alternative to the Alexander–Orbach relation?
Igor M Sokolov, *J Phys A Math Theor*

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Increasing discoverability



Children's Literacy Development

A Cross-Cultural Perspective on Learning to Read and Write

By Catherine McBride

✓ FULL ACCESS

66

Get Citation

<p>Edition: 2nd Edition</p> <p>First Published: 30 November 2015</p> <p>eBook Published: 14 December 2015</p> <p>Pub. location: London</p> <p>Imprint: Routledge</p> <p>Pages: 250 pages</p> <p>eBook ISBN: 9781317909774</p> <p>Subjects: Behavioral Sciences, Education</p>	<div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="border: 1px solid #28a745; background-color: #28a745; color: white; padding: 5px 15px; text-decoration: none;">DOWNLOAD</div> <div style="border: 1px solid #28a745; padding: 5px 15px; text-decoration: none;">READ ONLINE</div> </div>
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Increasing engagement



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Dear Giso,

What's new for you this week? Have a look at the roundup of the latest articles we think you'll enjoy, or have a [browse](#) to find something you like.

A model for quick thermal prediction of multi-stage depressed collector
A. Mercy Latha; Vishant Gahlaut; S. K. Ghosh - *Journal of Electromagnetic Waves and Applications*
"Multi-stage depressed collectors (MDCs) aid in efficiency enhancement of travelling-wave tubes (TWTs) by recovering the unused energy from the spent e..." | [Read Full Text](#) >

The microwave design of electromagnetic resonators for efficient low-band microwave absorption proceeds by numerical simulation method
Linwen Jiang; Shanshan Yang; Yunus Yu - *Journal of Electromagnetic Waves and Applications*
"Currently, most of microwave-absorption work has focused on the theoretical formulae and design rules of microwave absorber in broadband absorption at low frequencies, especially below 8 GHz. In this w..." | [Read Full Text](#) >

Improvement of radially polarized Lorentz-Gausser beams with the power-conserved phase vortices
Geogun Zhou; Zhiyue Ji; Yimin Zhou - *Journal of Modern Optics*
"Using the vector diffraction theory, the optical field of the focusing radially polarized Lorentz-Gausser beam with the power-conserved phase vortices is derived. The normalized intensity distributions of..." | [Read Full Text](#) >

Effects of wall thickness and material property on inverse heat conduction analysis of a hollow cylindrical tube
Jung-Hun Noh; Dong-Gin Kwak; Se-Jin Yook - *Inverse Problems in Science and Engineering*
"In this study, we examined the effects of a hollow cylindrical tube's thickness and material properties on estimated time delay and waveform distortion in a one-dimensional inverse heat transfer analysis..." | [Read Full Text](#) >

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Want to publish with Taylor & Francis?

Most journals will regularly call for papers. These can be on a particular theme or topic, or a general call for submissions. Want to submit a paper?

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9:15 AM

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Dear Giulia,

What's new for you this week? Have a look at the roundup of the latest articles we think you'll enjoy, or have a [browse](#) to find something you like.

Privacy nudges as policy interventions: comparing US and German media users' evaluation of information privacy nudges
Leyla Dogruel - *Information, Communication & Society*

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Dear Giso,

What's new for you this week? Have a look at the roundup of the latest articles we think you'll enjoy, or have a [browse](#) to find something you like.

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"Multi-stage depressed collectors (MDCs) aid in efficiency enhancement of travelling-wave tubes (TWTs) by recovering the unused energy from the spent e..." | [Read Full Text](#) >



Artificial Intelligence and Taylor & Francis



- Simplify submission
- Improve peer review

- Automatically complete submission forms based on manuscripts
- Recommendation of journals for submission based on manuscripts
- Detect plagiarism
- Detect conflict of interest during peer review

- Improve efficiency
- Improve targeting

- Automatically extract or classify bibliographic info into ontologies, taxonomies and systems
- Concept recognition
- Automatic abstracts/Summaries/ Translation

- Increase discoverability
- Increase engagement

- Auto-correlation of keywords based search patterns
- Suggestions of related content
- Behavioral recommendations
- Review Moderation

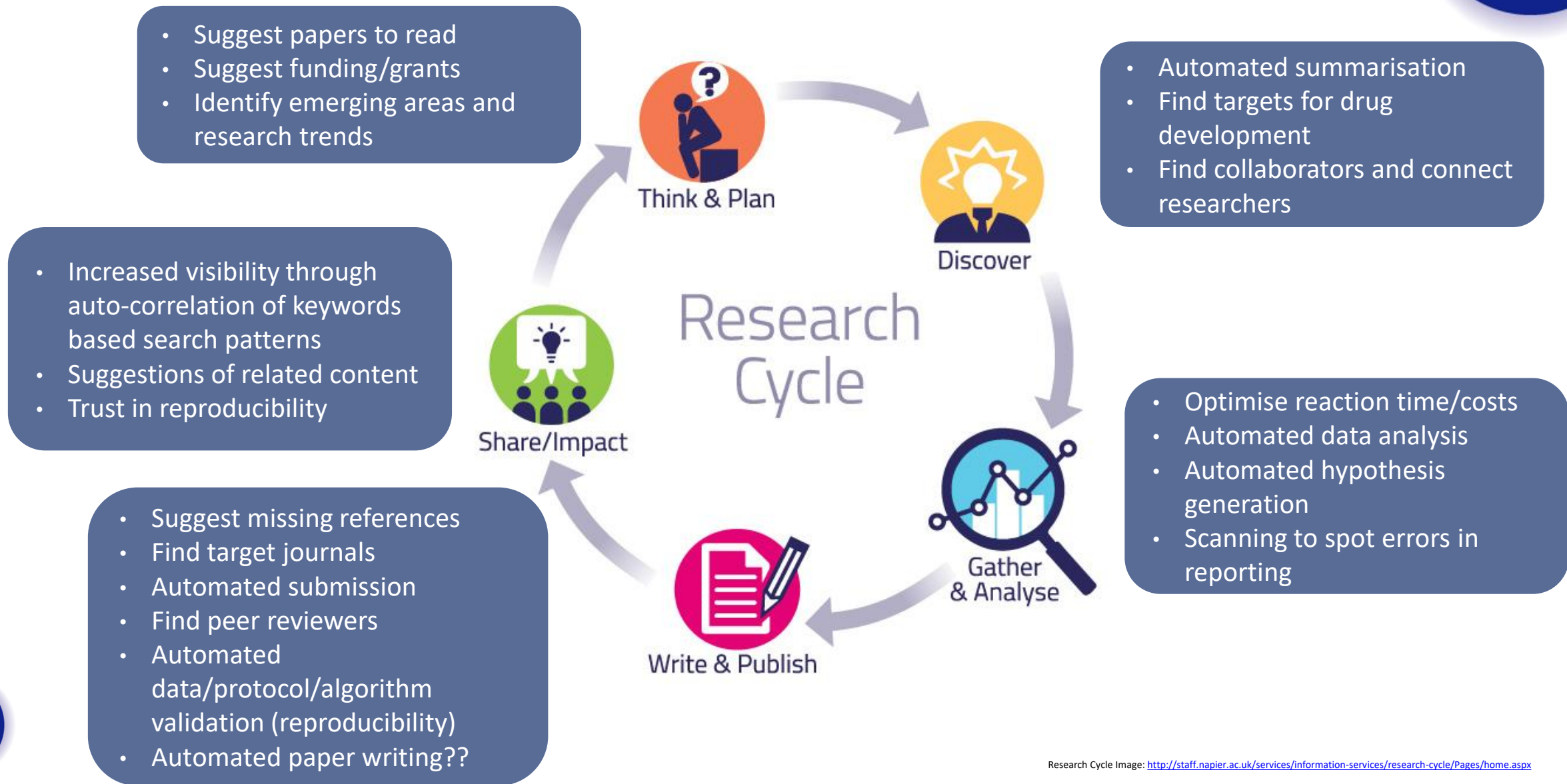




WHERE WE'RE HEADING...



Accelerated research cycle





The 2018 Publishing Landscape: Technological Horizons

Lyndsey Dixon
Editorial Director, APAC Journals
Taylor & Francis Group

