Technische Universität München

ELSEVIER

Research Intelligence

SciVal @TUM – Introductory Webinar

Tomasz Asmussen, Consultant Research Intelligence

30.01.2020

Empowering Knowledge

Agenda – SciVal Introduction at TU Munich

- Introduction & Bibliometrics
- SciVal Product Concept
- Content – Scopus + additional linked data (e.g. patents,funding, media)
- Metrics – responsible selection and use
- Live Demo
  - Overview, incl. SciVal Topics
  - Benchmarking
  - Collaboration
  - Trends
  - Reporting + My SciVal
- Q&A

SciVal Introduction

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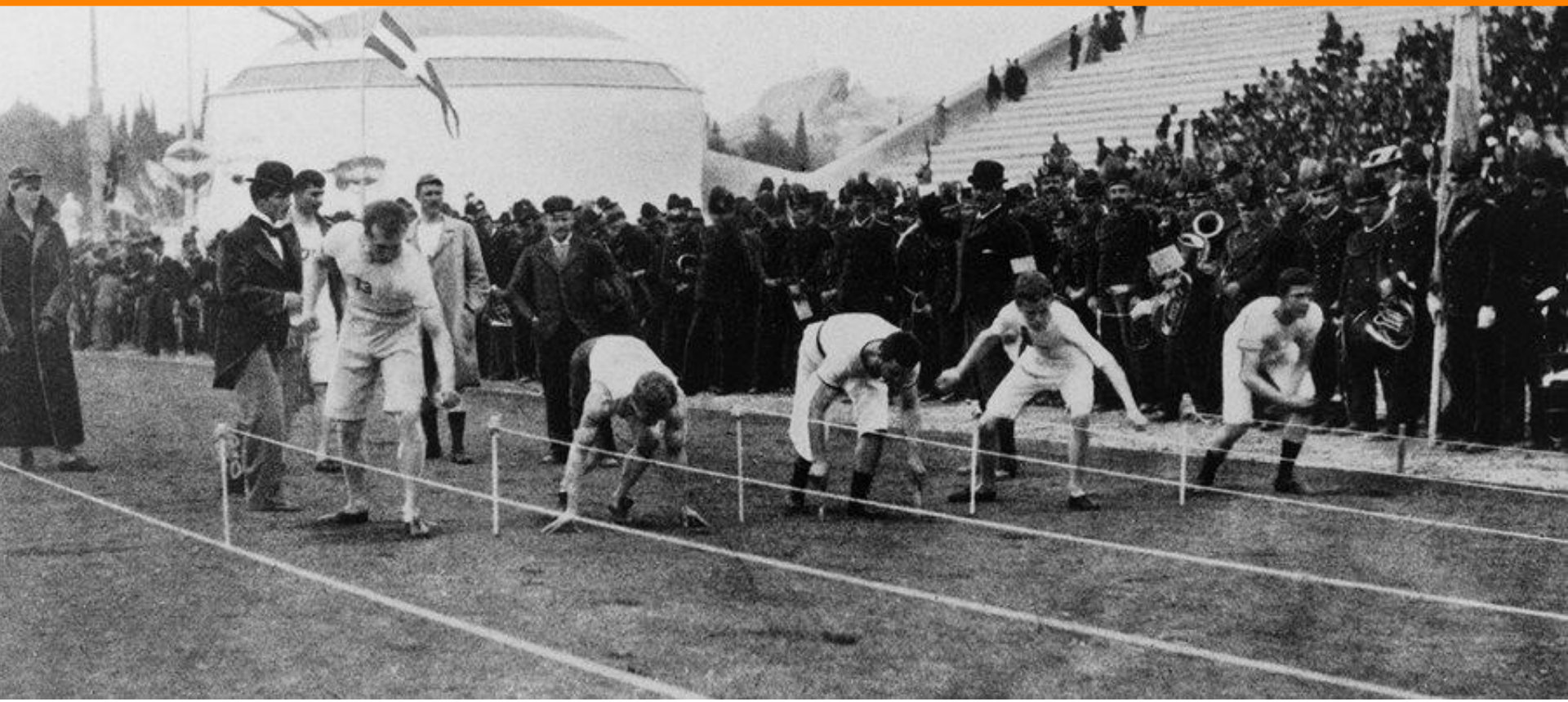
Empowering Knowledge

Gain a competitive edge through SciVal with data + technology + analytics



The variety of stances among runners in the 100-meter sprint at the first modern Olympic Games, held in Athens in 1896, is surprising to the modern viewer. **Thomas Burke** (second from left) is the only runner in the crouched stance - considered best practice today - an advantage that helped him win one of his two gold medals at the Games.

Bibliometrics – expert view

"Mehr Licht"

Was kann die Bibliometrie in der heutigen Zeit?

Von Lutz Bornmann, München

Die Bibliometrie kann als eigenes Forschungsgebiet sehr breit für die Untersuchung Wissenschafts-relevanter Themen eingesetzt werden. Man muss es allerdings sachgemäß tun.

Die Bewertung der Qualität von wissenschaftlicher Leistung ist eng verknüpft mit der Etablierung der modernen Wissenschaft. Mitte des 17. Jahrhunderts begannen die ersten wissenschaftlichen Zeitschriften das Peer-Review-Verfahren einzusetzen, um die Qualität von eingereichten Beiträgen beurteilen zu lassen. Heutzutage wird das Peer-Review-Verfahren sehr breit verwendet; es werden damit nicht nur eingereichte Beiträge beurteilt, sondern auch Bewerber auf wissenschaftliche Stellen oder Stipendien, Anträge bei Forschungsförderern und vieles mehr. Seit etwa den 1990er Jahren wird diese qualitative Form der Bewertung von wissenschaftlicher Leistung in zunehmendem Maße ergänzt (und zuweilen auch ersetzt) durch eine quantitative Form der Bewertung. Es werden Daten, wie zum Beispiel Forschungspreise und eingeworbene Drittmittel, herangezogen, um Auskunft über die Forschungsstärke von einzelnen Wissenschaftlern, Forschungsgruppen, Institutionen und Ländern zu bekommen. Die Daten, die dabei am häufigsten verwendet werden, sind Publikations- und Zitationsdaten – im Rahmen der so genannten Bibliometrie. Während die Anzahl von Publikationen Auskunft über die Produktivität einer Einheit gibt, kann man Zitierungen dazu verwenden, um etwas über die Wirkung von Forschung (beziehungsweise Publikationen) sagen zu können.

Von den Kritikern der Bibliometrie wird häufig übersehen, dass die Bibliometrie nicht nur in einem evaluativen Kontext eingesetzt werden kann. Bibliometrische Daten sind generell sehr gut dafür geeignet, um wissenschaftliche Aktivitäten oder Phänomene zu untersuchen. Dafür gibt es zwei Gründe: (1) Da Wissenschaftler nahezu aller Fächer ihre Forschungsergebnisse in Publikationen präsentieren, und es zum guten Stil beim Publikationsprozess gehört, alle anderen Arbeiten mit Einfluss auf die eigene Arbeit zu zitieren, sind bibliometrische Daten eng mit dem Forschungsprozess in diesen Fächern verbunden. (2) Darüber hinaus liegen große Datensätze mit bibliometrischen Daten in Literaturdatenbanken für die Auswertung vor. Für die Erstellung einer bibliometrischen Studie müssen demnach die Daten in der Regel nicht aufwendig erzeugt werden.

Illustration: Fotolia / freshideas

Quelle: https://www.laborjournal.de/rubric/essays/essays2016/e16_10.php

Bibliometrics –practioner view

Responsible Metrics - Verantwortlicher Umgang mit Metriken

Dr. Reingis Hauck, Leibniz Universität Hannover

Leibniz Universität Hannover

Der Originalartikel ist im *Handbuch Qualität in Studium, Lehre und Forschung* unter Hauptkapitel E: Methoden und Verfahren des Qualitätsmanagements, Unterkapitel E 7: Qualitätsmessung und Iteration im DUZ Verlags- und Medienhaus GmbH im April 2019 erschienen. Der hier vorliegende Artikel wurde redaktionell überarbeitet.

Zusammenfassung: In der jüngeren Vergangenheit ist ein zunehmendes Engagement von Beschäftigten an Hochschulen und außeruniversitären Forschungseinrichtungen in Richtung eines professionalisierten Forschungsinformationswesens festzustellen. Der Aufbau von Forschungsinformationssystemen (FIS) spielt dabei eine zentrale Rolle. Die Frage, wie sich dort zu erfassende Daten für die Hochschulsteuerung – insbesondere auf der Grundlage bibliometrischer Indikatoren – nutzen lassen, wird in Deutschland (noch) nicht aufgegriffen. International hat die Diskussion zum Umgang mit Metriken eine deutlich größere Dynamik. Der Aufsatz greift diesen Diskussionsprozess auf und erläutert die aktuellen Empfehlungen zu einem verantwortlichen Umgang mit Metriken. Im Bereich der Berichtslegung aus Forschungsinformationssystemen ist eine Sicherstellung bibliometrischer Expertise unbedingt erforderlich, um Fehlanwendungen zu vermeiden und stattdessen einen echten Erkenntnisgewinn durch erweiterte Analysemöglichkeiten zu erhalten. Die Autorin weist auf die erforderliche Professionalisierung im Aufbau bibliometrischer Services als Teil des Forschungsmanagements hin und empfiehlt gezielte Fortbildungen und Beteiligung am internationalen Erfahrungsaustausch. Institutionelle Leitlinien können einen Rahmen für den verantwortungsvollen Umgang mit Metriken darstellen. Ihre Erstellung sollte ein Ausgangspunkt für die Diskussion des Einsatzes bibliometrischer Indikatoren und ihrer Anwendungsszenarien sein

Quelle: https://www.repo.uni-hannover.de/handle/123456789/4949

The world of research is becoming more competitive leading to challenges for research management

- R&D budgets under pressure in difficult economic climate
- 7M researchers increasing at +1% per year; annual output growth of +3%
- **Emerging research nations changing dynamics of research landscape**

- Research drives sustainable economic development
- Faster turnaround and payoffs from science
- **High standards of accountability and transparency**

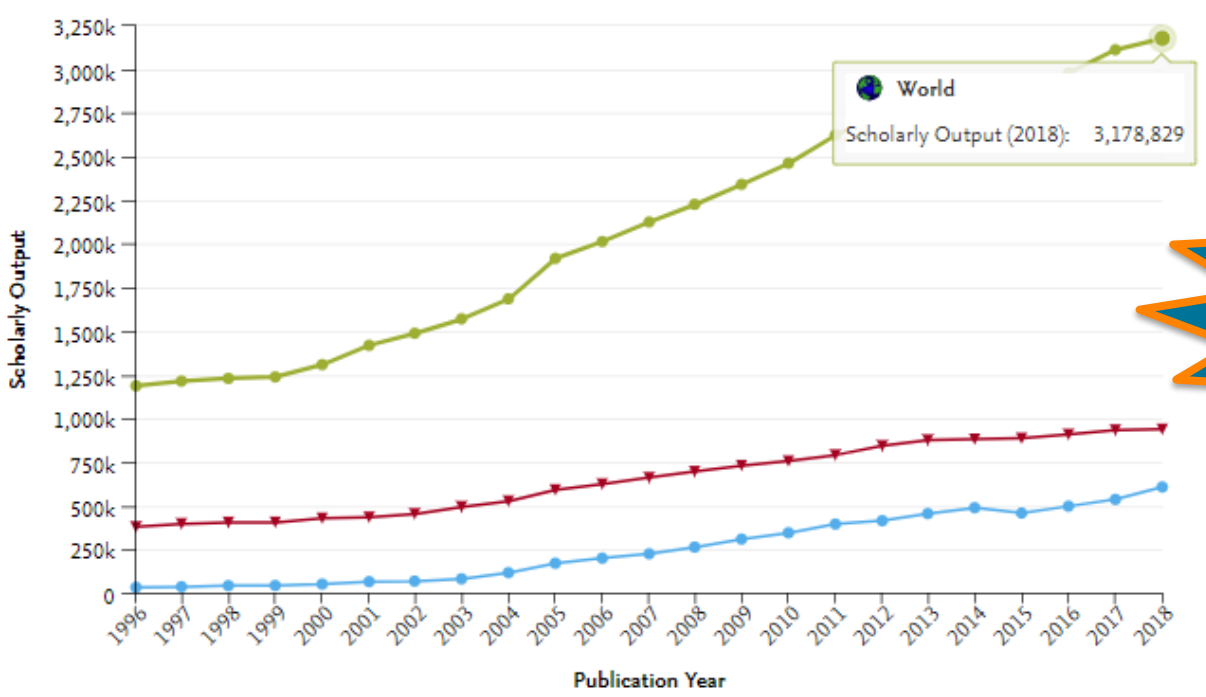
- **Identify strengths and shortcomings** to inform research decisions
- **Accelerate** collaboration, secure more funding
- Retain and hire **best-in-class researchers**

Reference: International Comparative Performance of the UK Research Base 2013

Global Trend #1 - Increase in Volume of Publications in Scopus globally

y-axis
Scholarly Output

x-axis
Publication Year

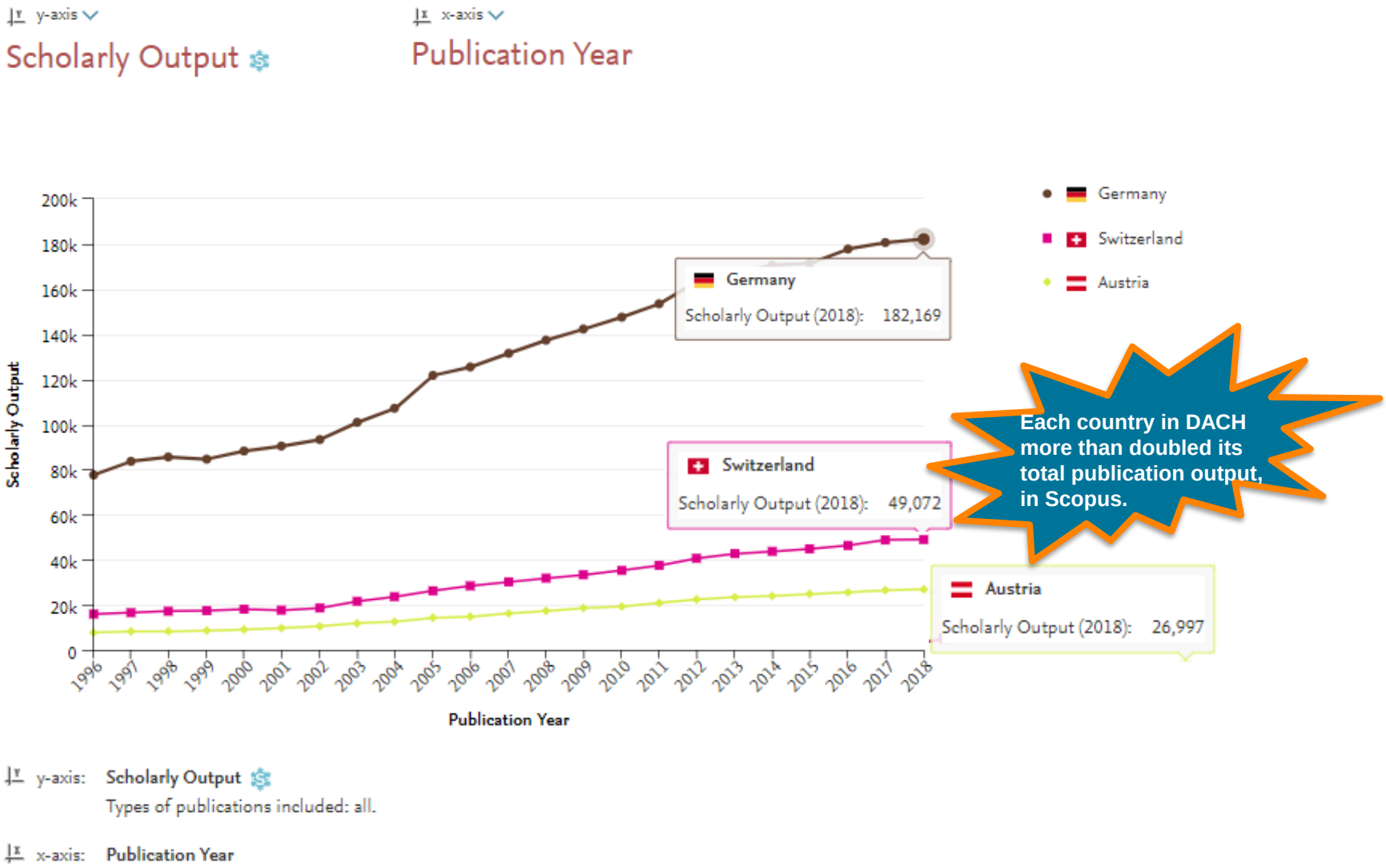


China main driver for growth in volume of peer-reviewed publications in Scopus globally.

y-axis: Scholarly Output
Types of publications included: all.

x-axis: Publication Year

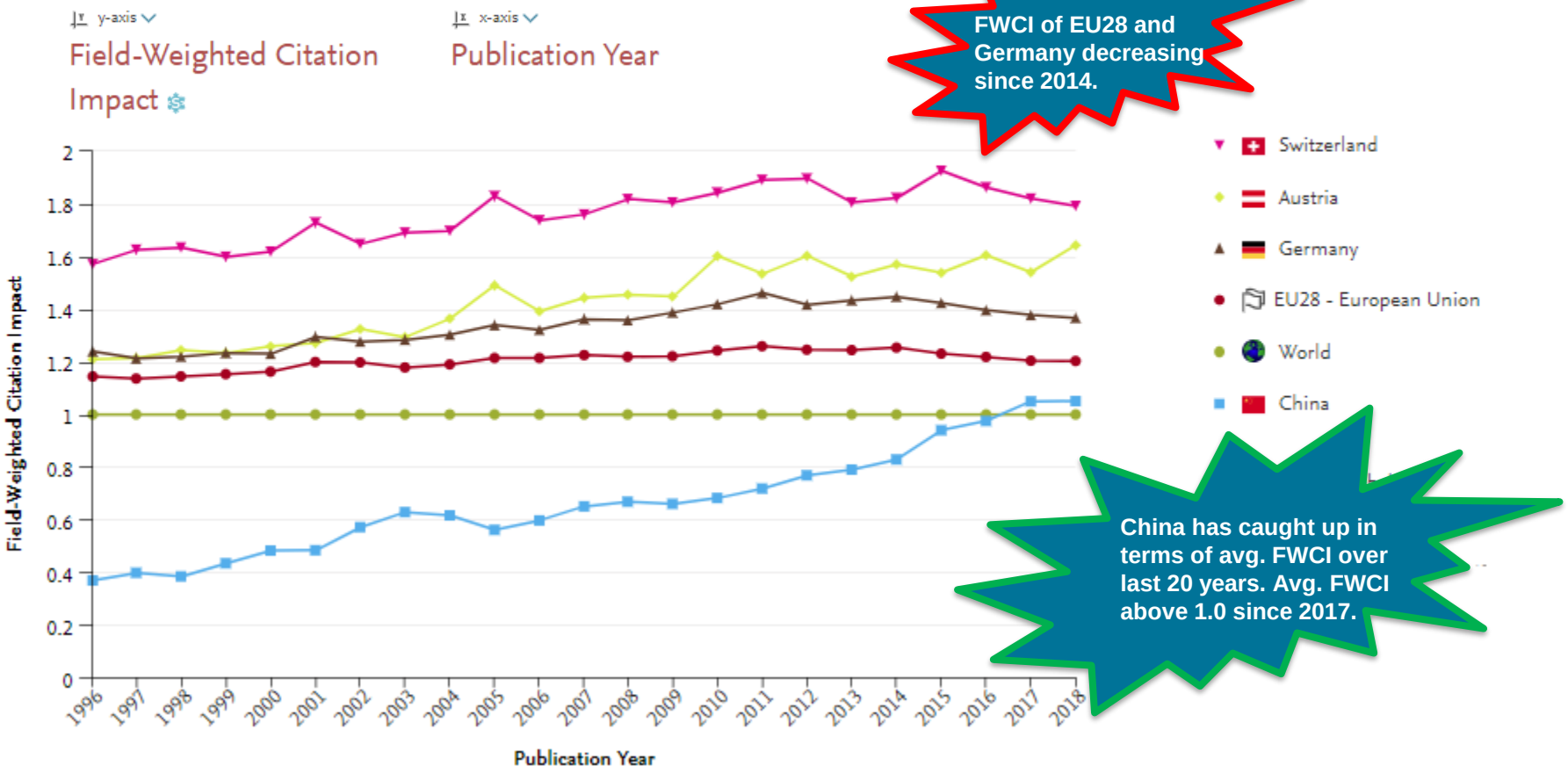
Global Trend #1 - Increase in Volume of Publications in Scopus in DACH region



y-axis: **Scholarly Output**
Types of publications included: all.

x-axis: **Publication Year**

Global Trend #2 – Global trends in impact per country/region (FWCI) – China rising, EU declining



y-axis: Field-Weighted Citation Impact
Types of publications included: all. Self-citations included: yes.

x-axis: Publication Year

Make decisions by “triangulating” information sources

A comprehensive approach to confidently assess and deliver on your strategic research investments






RESEARCH OUTCOMES

SciVal

Informs long term research strategy

Should we invest in research areas?

- Is there white space?
- What is the competitive landscape?
- Do we have the capabilities?
- Do our research areas make impact?

Scopus®

Supports daily research activity

How will we do research?

- Who are the leading experts?
- What is the latest research available?
- Who has done this before?
- How do I solve a research problem?

Relying on trusted Scopus data, but delivering unique insights

Metrics and analytics at unprecedented scale and precision

SciVal – Overview

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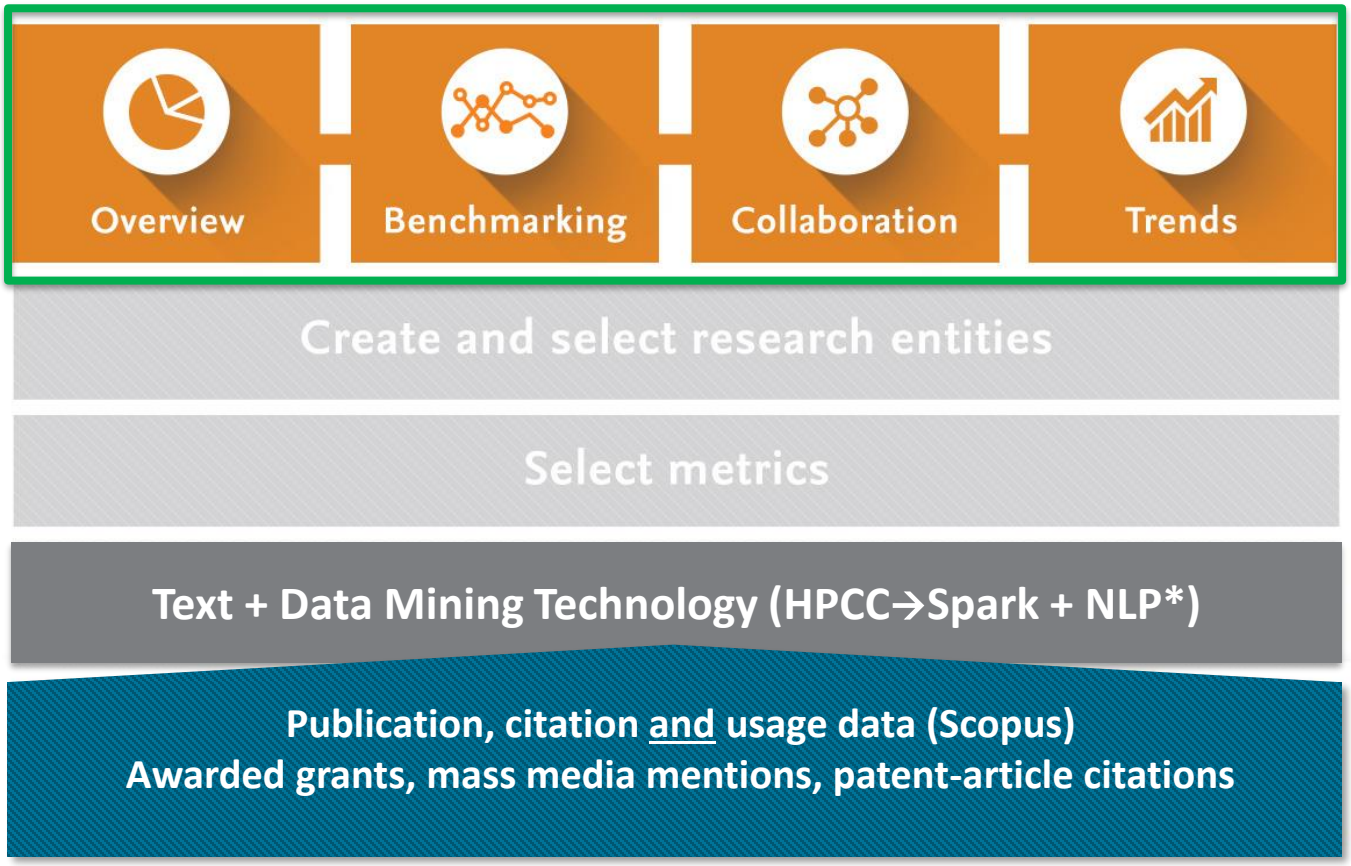
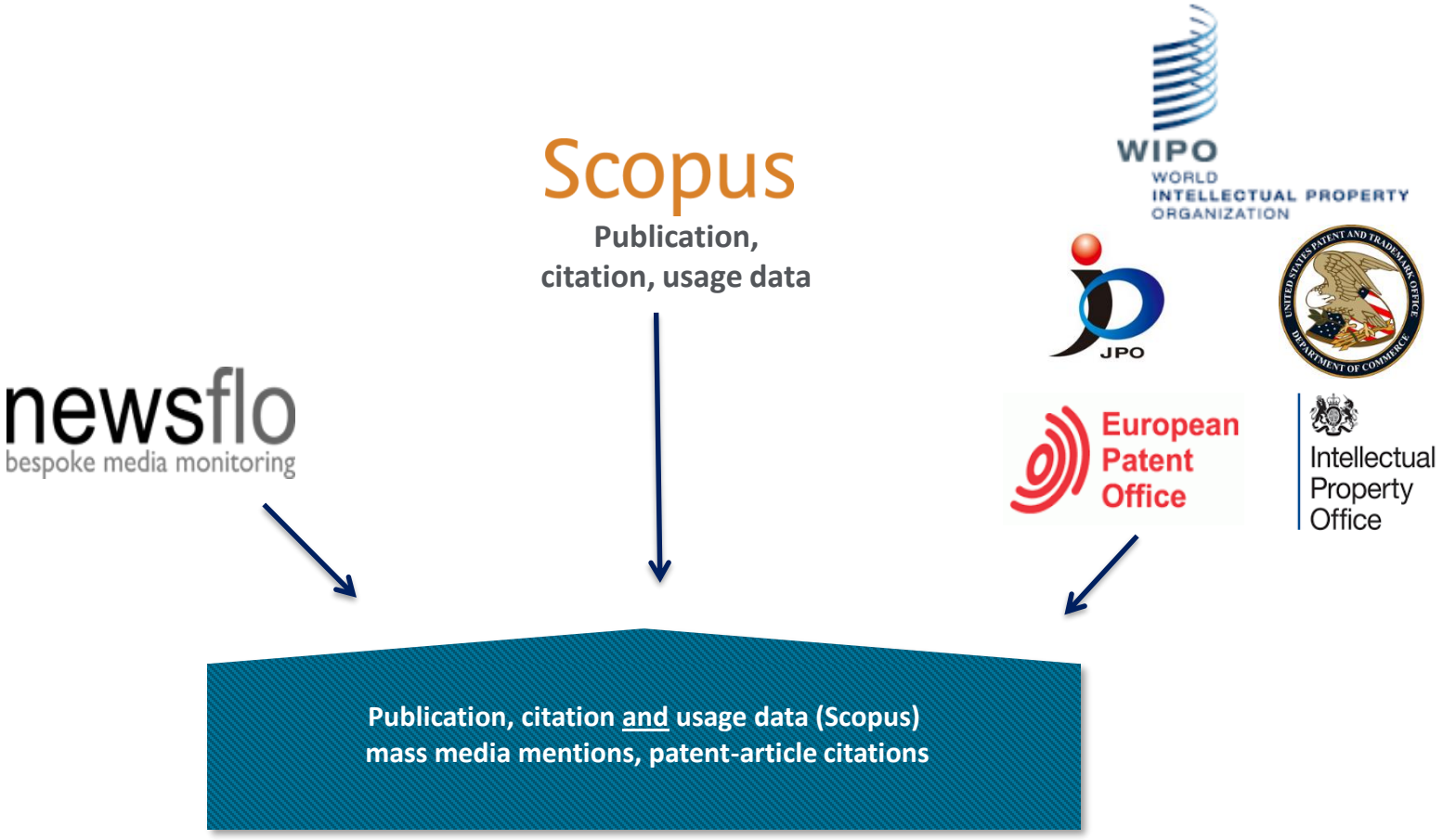
SciVal – product layers (Content, Technology, Analytics)

Using advanced data analytics super-computer technology, SciVal allows you to instantly process an enormous amount of data to generate powerful data visualizations on-demand, in seconds.

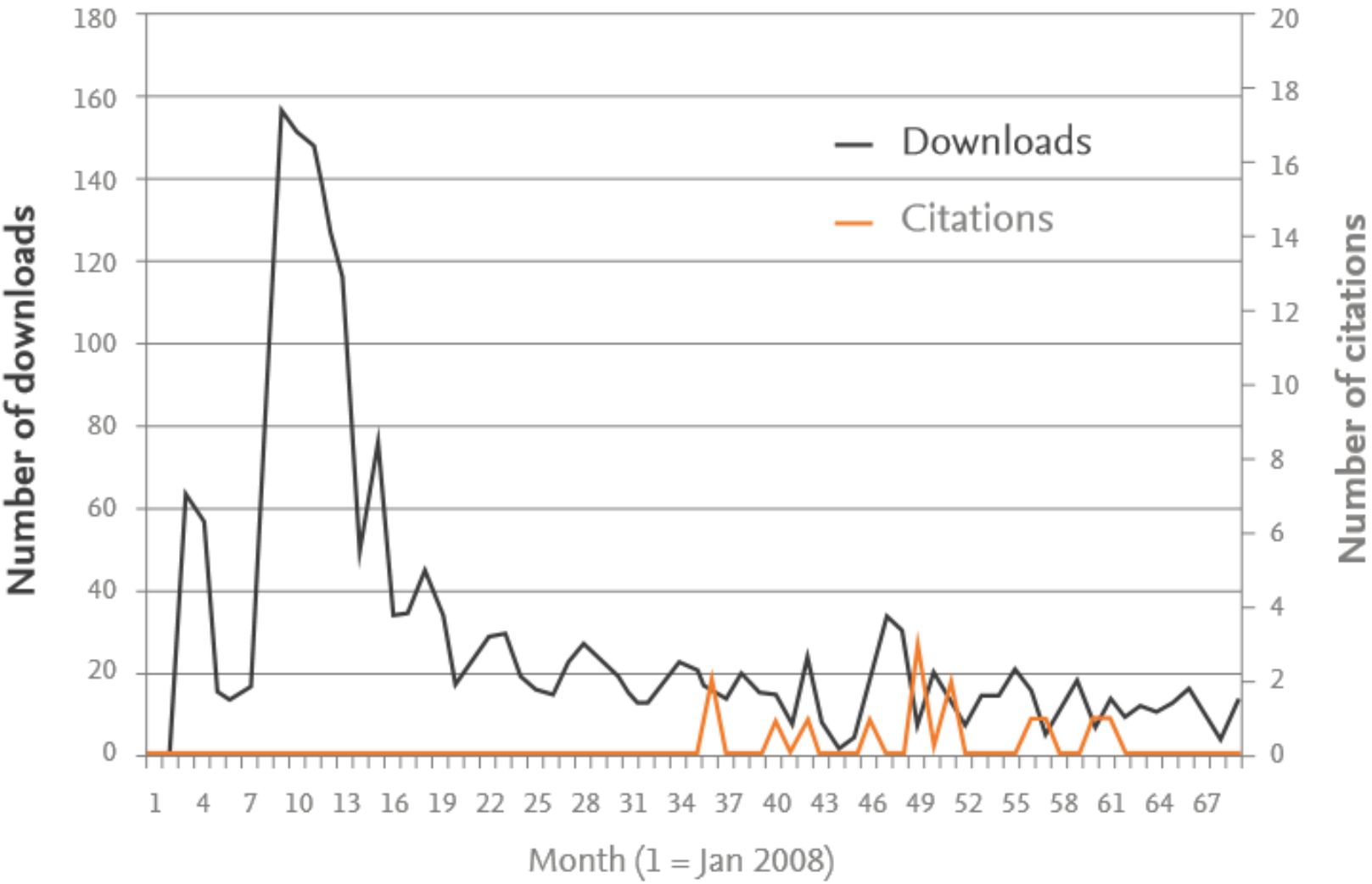


*Natural Language Processing via **Elsevier's Fingerprint Engine**: https://www.elsevier.com/solutions/elsevier-fingerprint-engine

… additional linked data sources



Scopus/SciVal – Usage (Downloads) data vs. Citations



Scopus – SciVal's data foundation (Dec. 2019)

World's largest Abstract and Citations Database

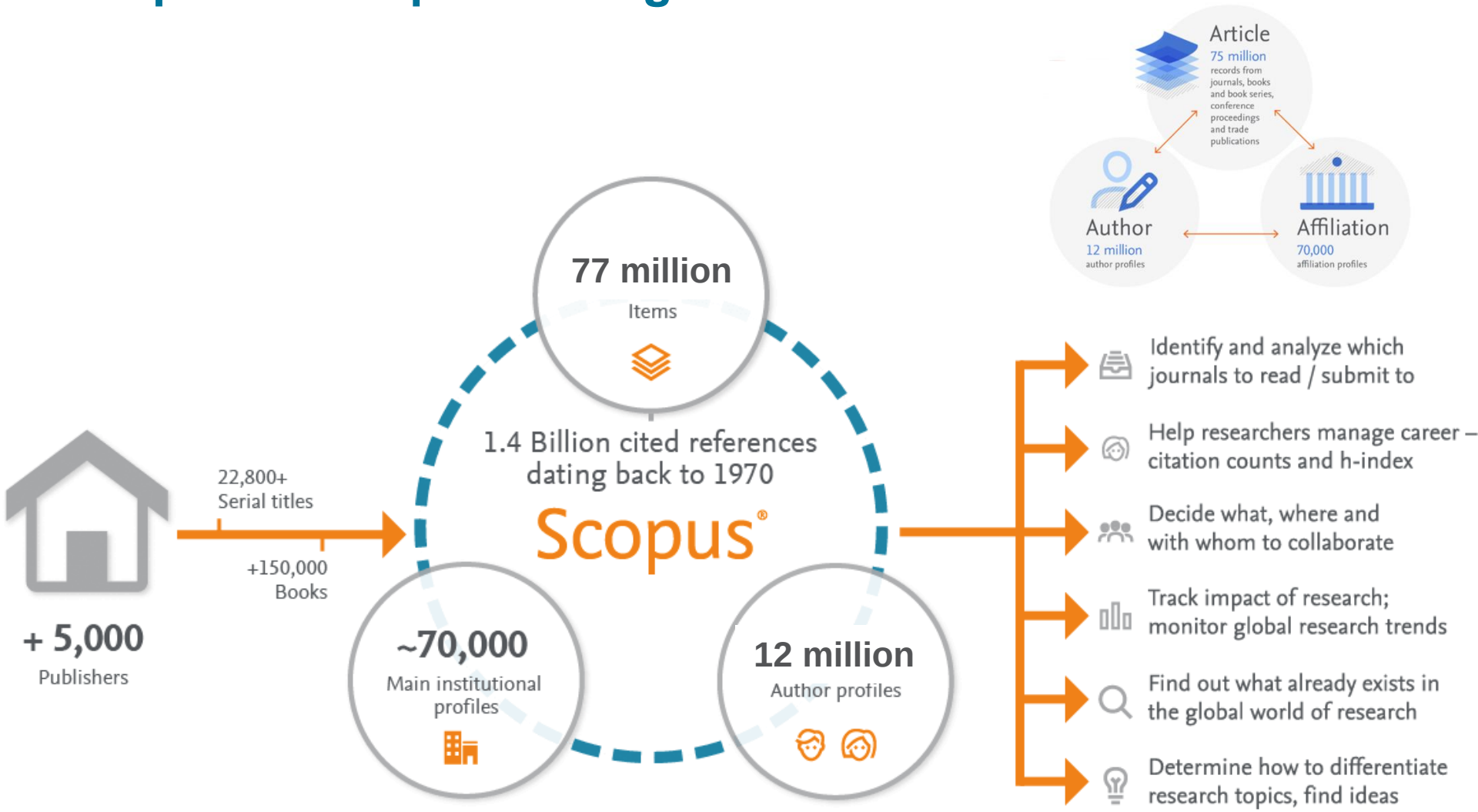
77.3M records from **24.0K** serials, **119K+** conferences and **215K** books from more than **5000** publishers and **105** countries

- Updated daily - approximately **10,000** articles per day indexed
- **8.97M** open access documents
- "Articles in Press" from **>8,075** titles
- **40** different languages covered
- **5,527** active Gold Open Access journals indexed

Number of Journals by subject area*	JOURNALS	CONFERENCES	BOOKS	PATENTS*
Physical Sciences 7,441 Health Sciences 7,133 Social Sciences 8,698 Life Sciences 4,601	24,039** active peer-reviewed journals 294 trade journals 5,527 Gold OA Journals(DOAJ/ROAD) • Full metadata, abstracts and cited references (refs post-1970 only) • Funding data from acknowledgements • Citations back to 1970	100K+ conference events 9.5M conference papers Mainly Engineering and Computer Sciences	852 book series 215K stand-alone books 1.77M items Focus on Social Sciences and A&H	43.7M patents From 5 major patent offices - WIPO - EPO - USPTO - JPO - UK IPO

*Journals may be classified in multiple subject areas: this count includes current actively indexed titles only
**Total number of Scopus journals in database including inactive titles is 39,743
Scopus Sources List: https://www.scopus.com/sources

Scopus – data processing & data model



SciVal in a nutshell

SciVal offers quick, easy access to the research performance of 220 nations and more than 16,000 research institutions worldwide, and groups of institutions

Visualize research performance

Ready-made at a glance snapshots of any selected entity

Benchmark your progress

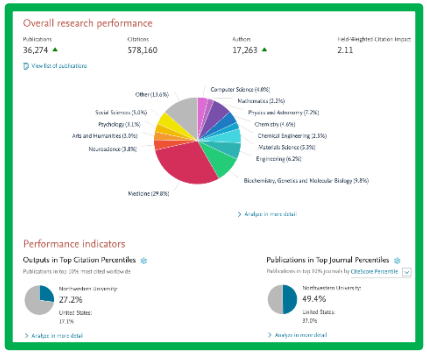
Flexibility to create and compare any research groups

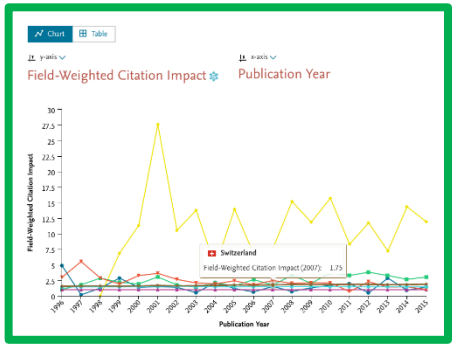
Develop collaborative partnerships

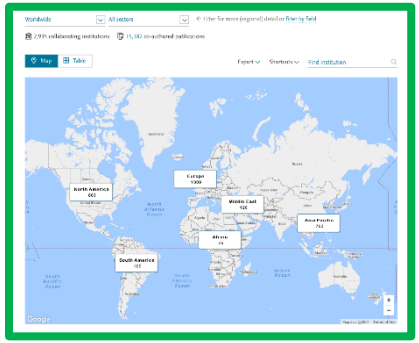
Identify and analyze existing and potential collaboration opportunities

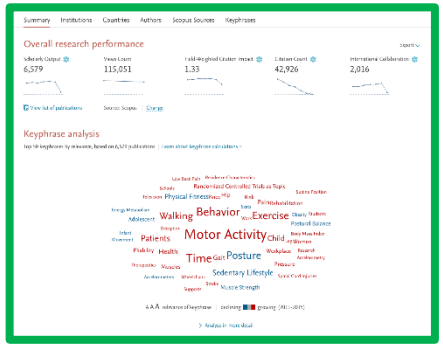
Analyze research trends

Analyze research trends to discover the top performers and rising stars









SciVal – Metrics

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A global movement, being adapted in mature bibliometric markets

San Francisco DORA
Declaration on Research Assessment

Leiden Manifesto

1. Quantitative evaluation should support qualitative, expert assessment
2. Measure performance against the research missions of the institution, group or researcher
3. Protect excellence in locally relevant research
4. Keep data collection and analytical processes open, transparent and simple
5. Allow those evaluated to verify data and analysis

Responsible use and careful selection of metrics

Always use both qualitative and quantitative input into your decisions

Always use more than one research metric as the quantitative input

There are **6 factors**, which can affect the value of a metric:

- Size
- Publication-type
- Manipulation
- Discipline
- Database coverage
- Time

	Size-normalized?	Field-normalized?	Publication-type-normalized?	Resistant to database coverage?	Difficult to manipulate?	Time-independent?
Scholarly Output					■	■
Journal Count					■	■
Journal Category Count					■	■
Citation Count						
Cited Publications	◢					
Citations per Publication	■					
Number of Citing Countries					■	
Field-Weighted Citation Impact	■	■	■	■	■	
Collaboration	◢				■	■
Collaboration Impact	■					
Academic-Corporate Collaboration	◢				■	■
Academic-Corporate Collaboration Impact	■					
Outputs in Top Percentiles	◢					
Publications in Top Journal Percentiles	◢	■			■	■
h-indices						

Research Metrics Guidebook

This comprehensive metrics guidebook is intended to be a straightforward, practical companion for you to find the right metrics to meet your objectives.

- Understanding metrics
  - Scopus as data source
- Selection of appropriate metrics
  - What affects their values, besides performance?
- For each metric
  - Situations in which they are useful
  - Formulas and calculation examples
  - When to take care and how to address short-comings
  - Worked examples

Download here: *Research Metrics Guidebook*

Use Cases for SciVal

SciVal supports the needs of a broad range of institutional users by providing ready-made, at-a-glance snapshots for flexible, institution-specific insight

Vice chancellors of research

- 360 degree Performance Overview to inform strategic planning
- Identify institution's strengths and short-comings

Research administrators

- Create management-level reports
- Accelerate institutional and cross-institutional collaboration
- Support and win large grants

Department heads

- Evaluate researcher and team performance for recruitment and retention decisions
- Model-test scenarios by creating virtual teams

Researchers

- Raise visibility and highlight achievements
- Expand networks
- Locate collaborators and mentors

SciVal - Topics/Topic Clusters

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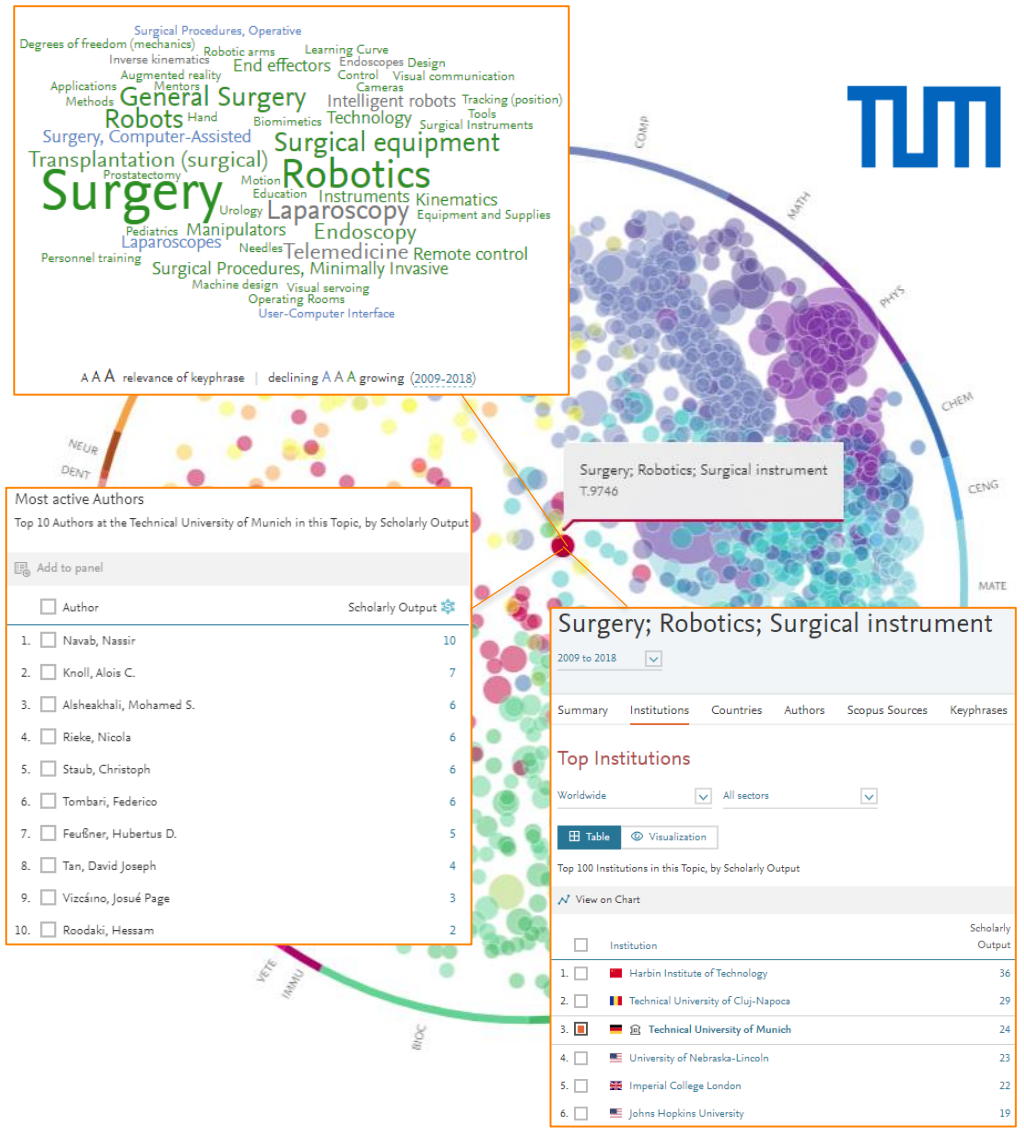
Going beyond evaluation and benchmarking …

- The **Trends Module** was launched in 2015 for **in-depth analysis of any research area**
  - created by the user
  - using a predefined Scopus Journal category.
- But what if we could **help the user find research areas to analyze**?
- Working together with SciTech Strategies on a **groundbreaking new concept** for **research planning and analysis**…



So that we could …

… Help Researchers

- **Identify topics with high momentum** and most likely **high funding success rates.**
- **Showcase** that they are active in topics with high momentum.
- **Find the best potential co-authors** in those topics.
- **Identify emerging & related topics** with high momentum they should be aware of.

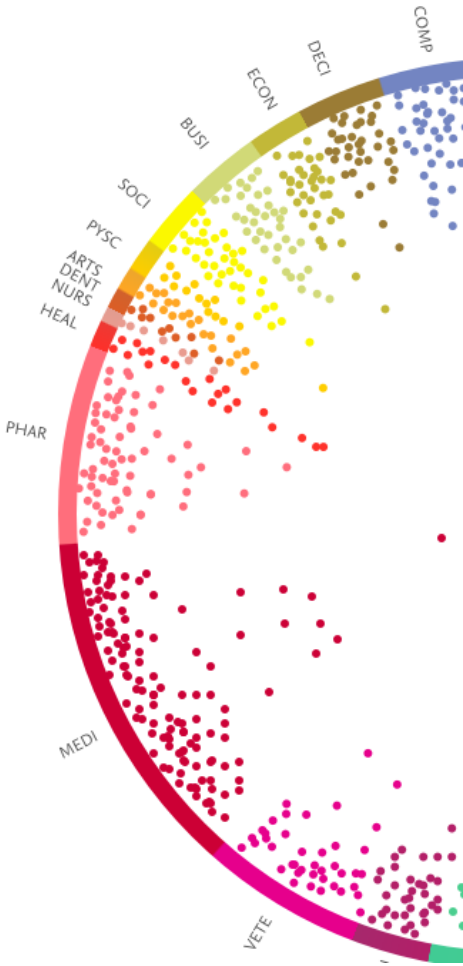
… Help Research managers

- Identify pockets of well funded research topics in research portfolio.
- Find the **top performers** and **rising stars** in those areas for recruitment, tenure and collaboration.
- **Showcase** that their institution is active in topics with high momentum
- **Identify which topics other universities** are active in that have high momentum.

Solution

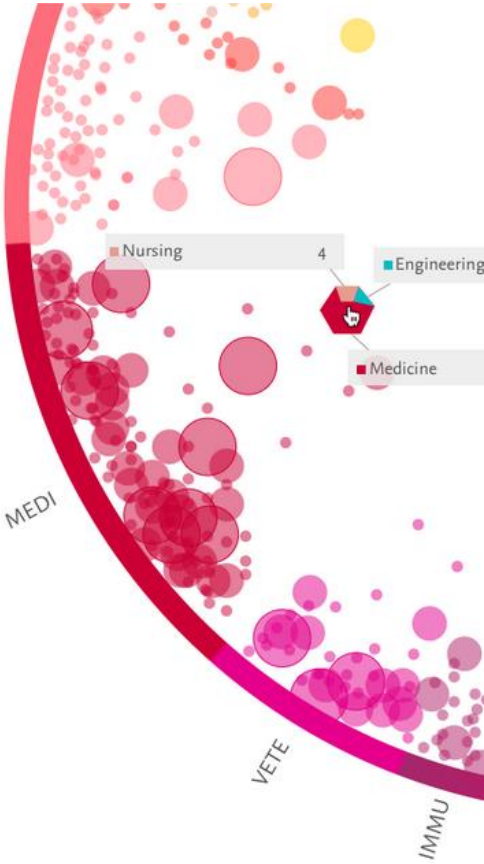
- We have identified **~96.000 global research topics by clustering all of Scopus** and ranked them by **Prominence.**
- **Prominence is a new indicator** that shows the **current momentum** of a topic by looking at **very recent citations***, **views*** and **CiteScore*** values.
- **Prominence = momentum** (not the same as importance!).
- **Prominence correlates w. funding** – helps researchers and research managers identify topics in which funding will increase.

*Weighting: citations 50%; views 40%; CiteScore 10%)

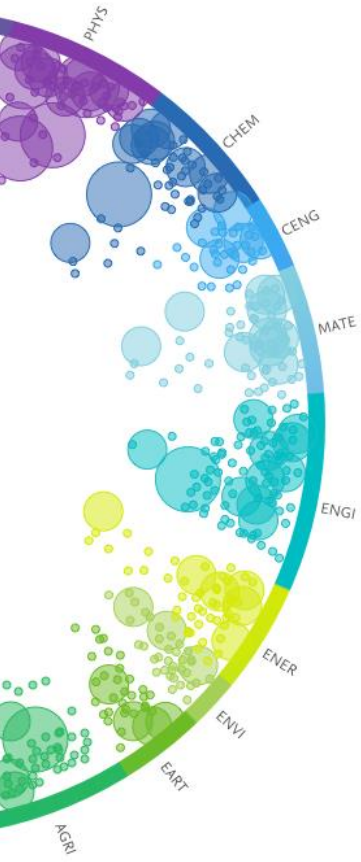


A groundbreaking concept

- **Researchers in topics with high prominence receive more funding on average** – We have evidence that researchers in prominent topics receive more funding (per researcher) than their peers in other topics.
- **Help improve grant applications** – we can truly help researchers to increase their grant success rate by focusing on high prominence topics.
- **Topics resonate with researchers** – researchers recognize them intuitively and agree with the level of granularity.



Further background information on Topics



- **Research Portfolio Analysis and Topic Prominence**
  Richard Klavans and Kevin W. Boyack
- **Identifying Emerging Topics in Science and Technology**
  Henry Small, Kevin W. Boyack and Richard Klavans
- **The dawn of predictive analytics to measure research performance: SciVal's Topic Prominence**
  Elsevier Connect by Martin Edling Andersson
- WEBINAR: Introduction to Topic Prominence in Science
- WEBINAR: Advanced applications of Topic Prominence in Science
- WEBINAR: Where am I a Key Contributor & other Topic Prominence in Science developments

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Thank you for your attention!