Drawing Room, 15.30-16.00

International collaboration to address impact in broader challenges

Stephane Berghmans

Vice President, Academic Relations for the EU,
Elsevier, Belgium

AESIS

A View on the Impact of (Open) Science in the European Union

Stephane Berghmans, DVM PhD
VP Academic & Research Relations EU
Elsevier
[Governing Board member, EuroScience]

Impact of Science AESIS Conference
Ottawa, 14 June 2018

Elsevier has a unique vantage point on the world of research

Each year

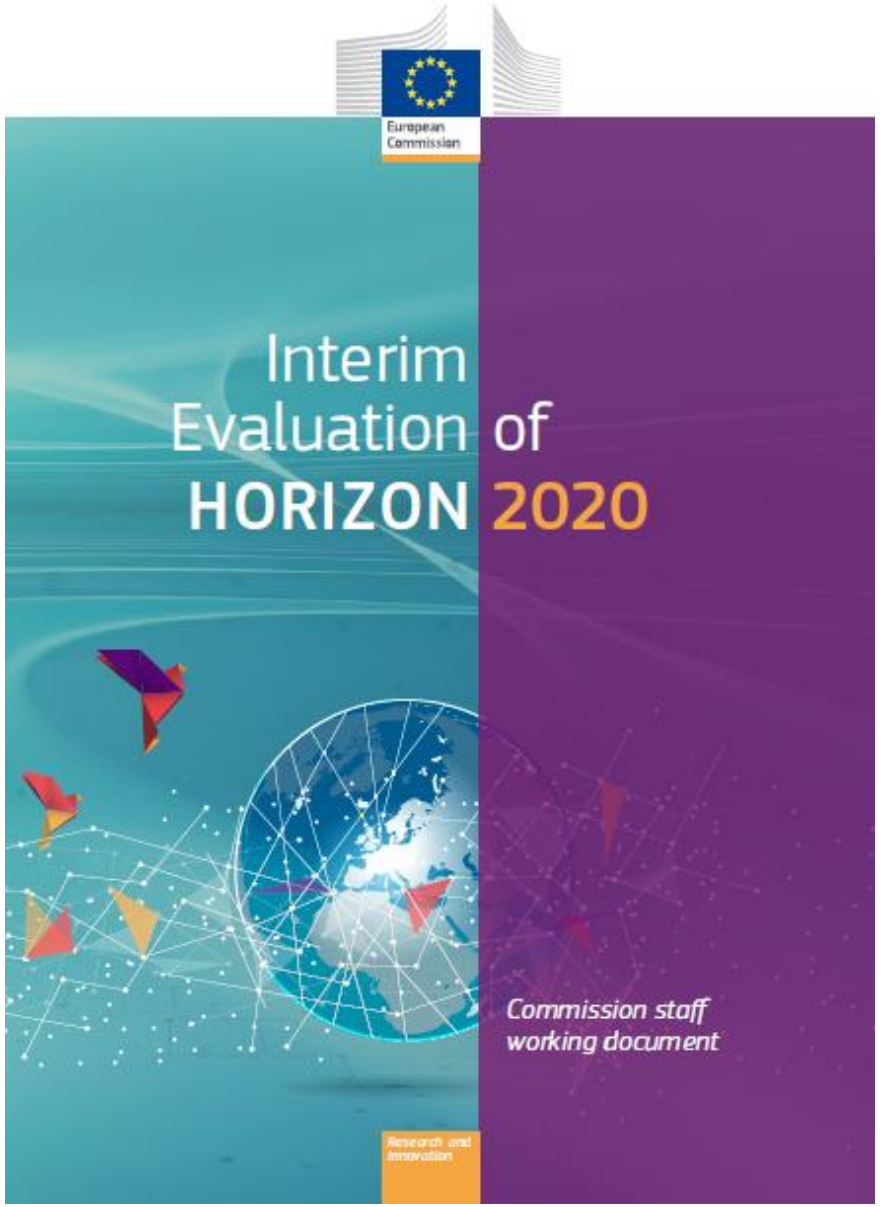
- 1.4 million article manuscripts received by ~2,500 journals (all offer Open Access options)
- 400,000 new articles published, in addition to 14M existing articles
- 2,000 new books published

Primary publishing

- ScienceDirect: 14M articles, ~900M digital article downloads
- Scopus: 60+M records, 22,800 titles, 5,000 publishers, 1.4B citations (back to 1970)
- SciVal: 170+ trillion metrics values
- Pure: current research information system: >200,000 researchers supported
- Mendeley: 5M users globally
- Grants:7,000 sponsors, 20,000+ active opportunities, ~5M awarded grants
- Patents: >93m records, 100 patent offices

Derived and aggregated data

SEVENTH FRAMEWORK PROGRAMME



https://ec.europa.eu/research/evaluations/index.cfm?pg=h2020evaluation

Europe's Scholarly Publications - output

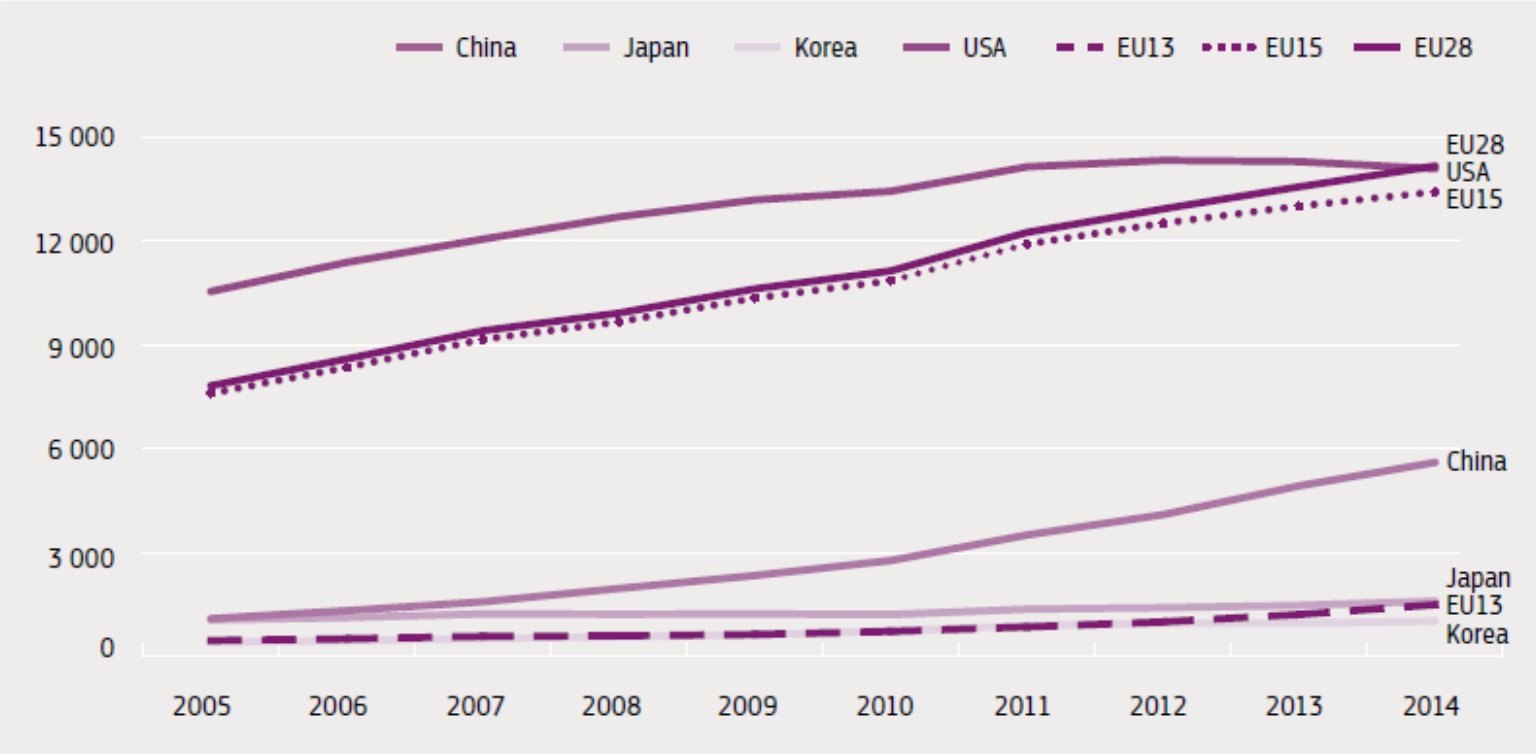
FIGURE 11: Percentage of publications indexed in Elsevier's Scopus database by year (2005-2014) and country/region (based on the institutional affiliation of the authors)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU28	31.1%	31.0%	30.5%	30.6%	30.6%	30.0%	29.5%	29.9%	29.7%	29.9%
USA	27.0%	26.5%	25.5%	24.8%	24.3%	23.9%	23.3%	23.1%	22.4%	22.2%
China	9.5%	10.4%	11.0%	12.2%	13.5%	14.2%	15.3%	15.4%	16.3%	17.5%
Japan	6.7%	6.4%	6.0%	5.7%	5.5%	5.3%	5.1%	4.9%	4.8%	4.6%
Korea	2.0%	2.2%	2.3%	2.3%	2.3%	2.4%	2.5%	2.6%	2.6%	2.8%

Source: Scopus database, ERCEA elaboration

Europe's Scholarly Publications - top 1% most-cited

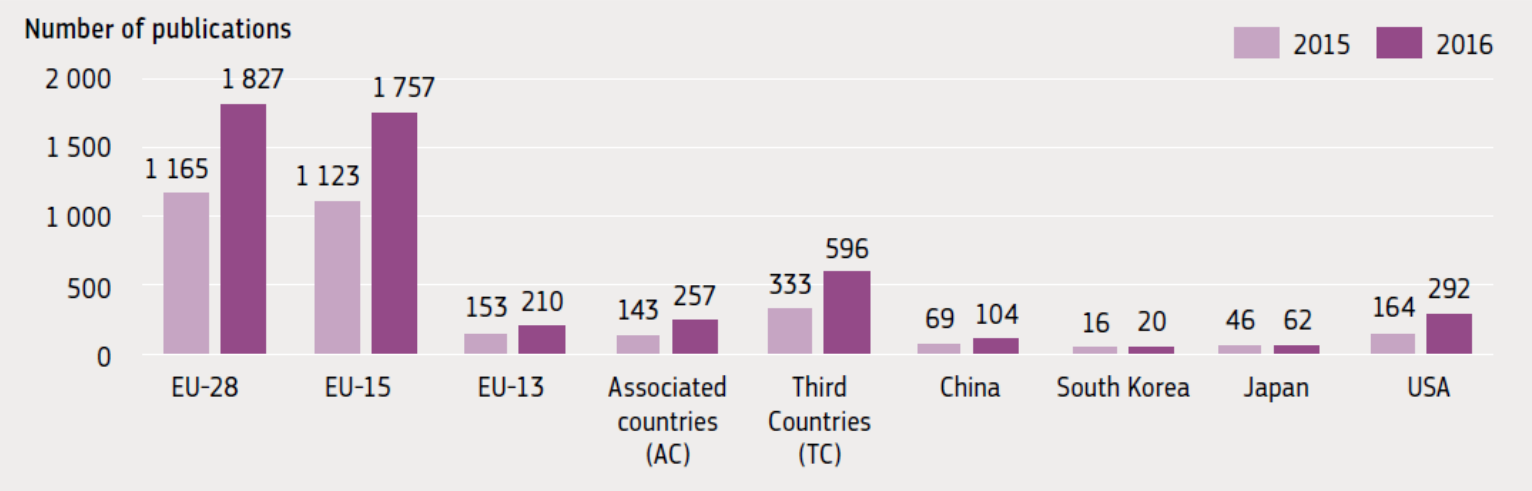
FIGURE 12: Evolution of number of top 1 % most-highly-cited publications, selected countries and regions



Source: Scopus database, ERCEA elaboration

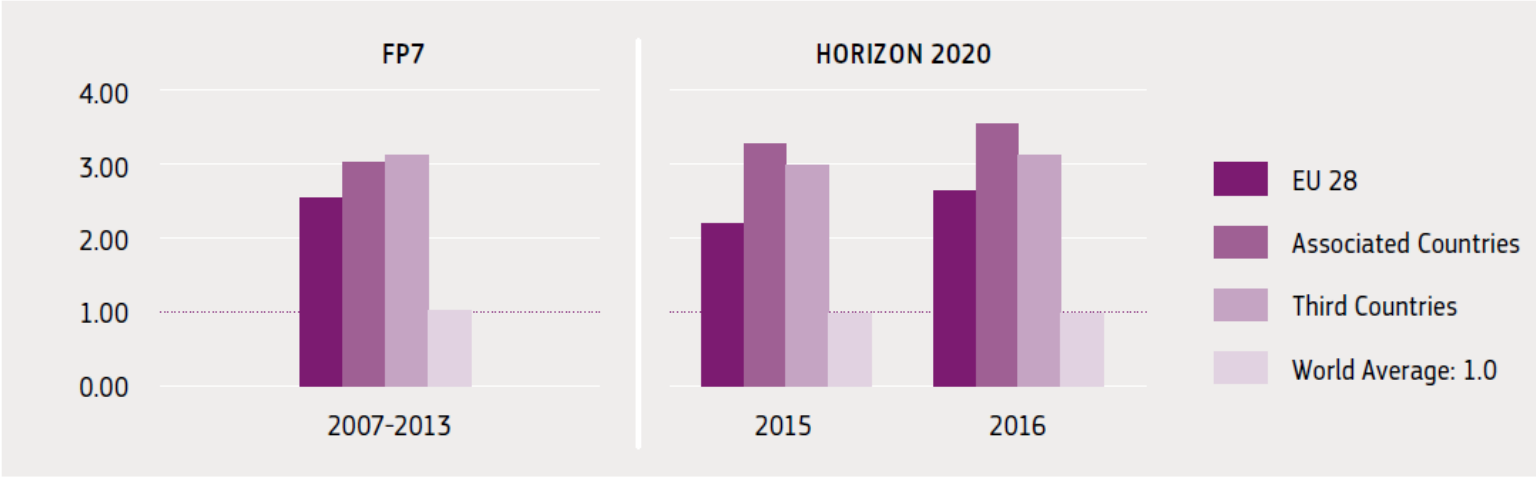
Horizon 2020 Scholarly Publications

FIGURE 54: Total publication output of Horizon 2020-funded research per geographical group, per year 2015-2016



Source: Scopus [study by Elsevier]

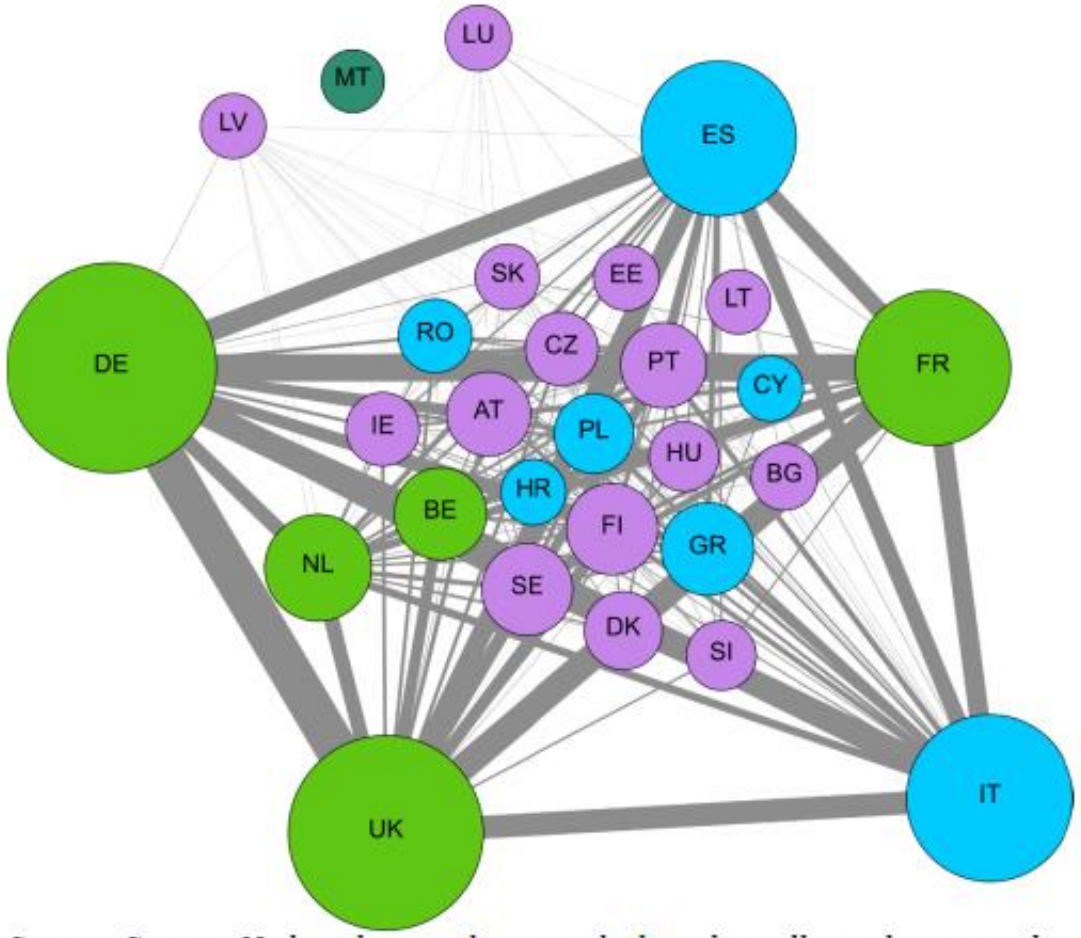
FIGURE 57: Field Weighted Citation Impact for FP7 publications (left side) and Horizon 2020 (right side)



Source: Scopus (Elsevier study, forthcoming)

Horizon 2020 Scholarly Publications - collaborations

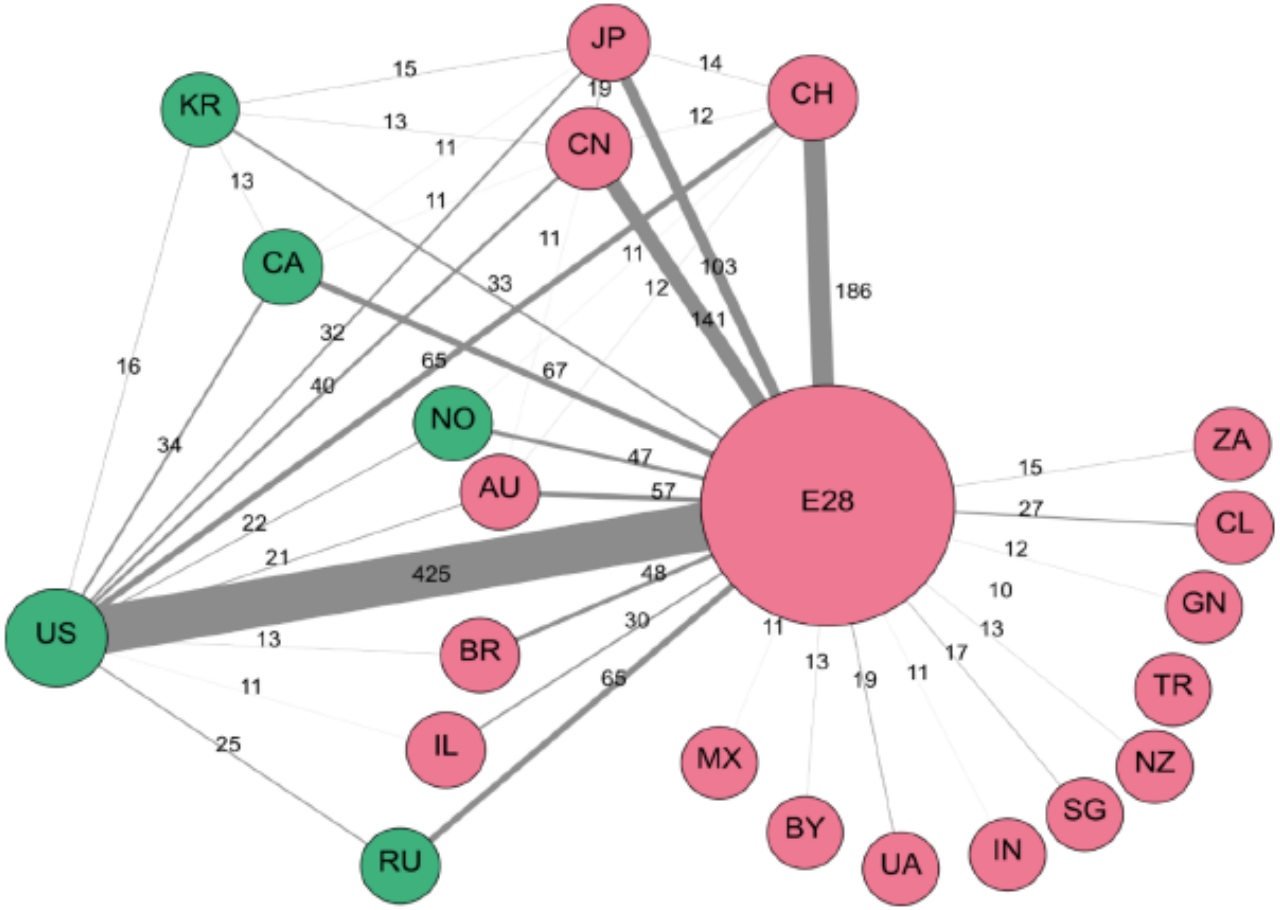
Figure 122 Horizon 2020 intra-EU-28 collaboration, 2015-2016



Source: Scopus. Node colour is determined algorithmically to designate clusters. Nodes that have similar collaborations and volume of collaborations have the same colour. Node size is number of Horizon 2020 publications. Edge thickness is number of collaboration publications between entities. Node position has been preserved between this figure and Figure 4.2 to compare FP7 and Horizon 2020 collaborations. MT has no Horizon 2020 collaborations with any other EU-28 member.

Horizon 2020 Scholarly Publications - collaborations

Figure 120 Horizon 2020-funded collaborations between EU-28 geographical group and non-EU-28 countries, 2015-2016



Source: Scopus. Node colour is determined algorithmically to designate clusters. Nodes that have similar collaborations and volume of collaborations have the same colour. Node size is number of Horizon 2020 publications. Edge thickness is number of collaboration publications between entities. Edge labels are number of collaborations

What's next ?

Trends:

- Unique identifier
- Demonstrating societal impact
- Open Science

Under consideration:

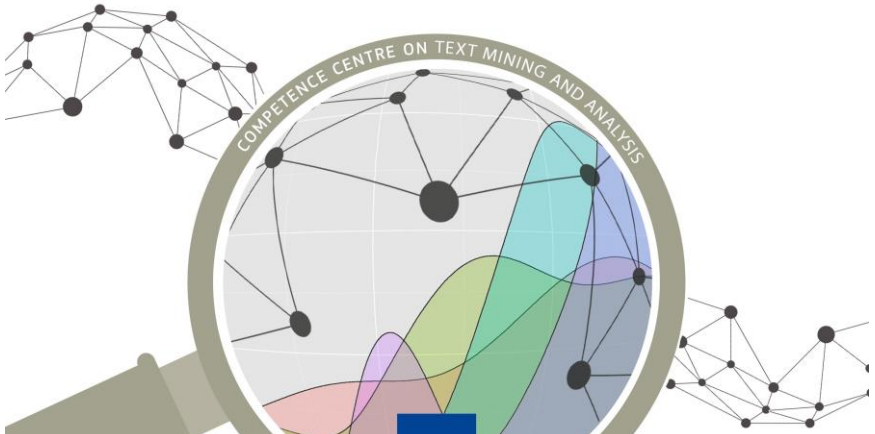
- New indicators
- Combination of indicators
- New sources of data
- Topics of prominence

Societal impact

Empowering Knowledge

TIM Analytics
Tools for Innovation and Monitoring

Olivier Eulaerts
Joint Research Center
European Commission



Joint Research Center (JRC)

is the European Commission's in-house science service.
The JRC's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.
Its work has a direct impact on the lives of citizens by contributing with its research outcomes to a healthy and safe environment, secure energy supplies, sustainable mobility and consumer health and safety.
https://ec.europa.eu/info/sites/info/files/organisation-chart-jrc_en.pdf

Vision

To provide innovative IT solutions and consultancy for extracting knowledge from large and complex datasets relevant for policy and decision making.

To be a reference in technology monitoring and in the detection of scientific trends using quantitative methods.

Strategy

R&D

In-house IT developments

Product-, service-, and user-oriented

Policy relevance

Reactivity and flexibility

TIM Incubator

Incubates projects that apply TIM methodology to various data/fields

Detection Communities of practice (DG HR)
Visualisation of trade flows (SITAF)
Mapping and tracking of JRC Alumni
Fusion contracts Database (F4E)
…

TIM Technology

All applications related to technology monitoring

TIM Compared

Semantic platform for evaluation of research proposals

TIM Trends

Detection of technological changes (with I.2)

TIM Omics

Visualisation system for genome wide associations (with F.7)

TIM Tools for Innovation Monitoring

TIM Tools for Innovation Monitoring

Applications

TIM Technology Editor

TIM Big – Large computation

TIM Edge –TIM Energy - TIM Cybersecurity

TIM Custom (for user datasets)

TIM Open Access (soon)

TIM EU calls – prior art EU calls (tbc)

TIM Fuel Cell & H2 (FCH JU)

TIM Defence (EDA)

TIM Fusion (DG RTD)

TIM Science Parks

TIM European Science Media Hub (EPRS - European Parliament)

Data

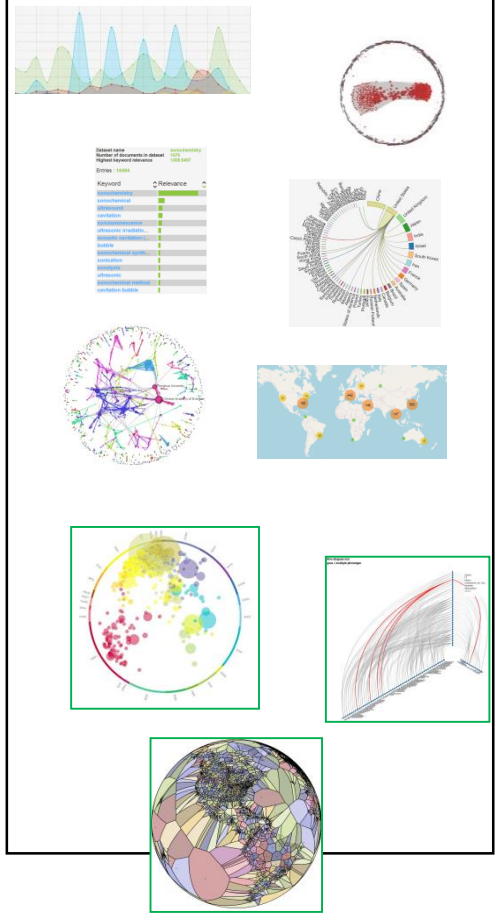
Scientific Publications

Patents

R&I funding

Scopus Custom Data, Patstat, Cordis

Visualisations



+ Technology benchmarking module

TIM Tools for Innovation Monitoring

Specific Analysis

On request

Recent:

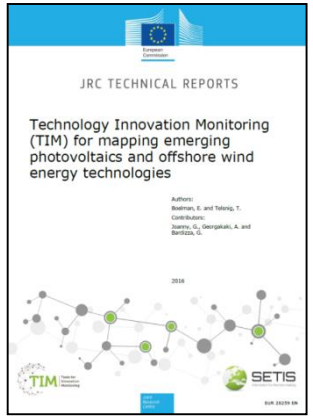
Evaluation H2020 (RTD)

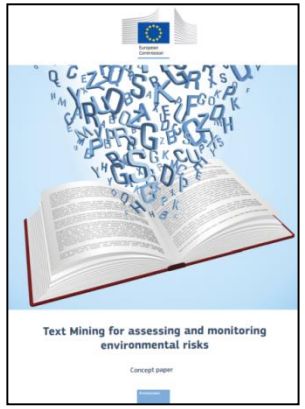
Megatrends (JRC)

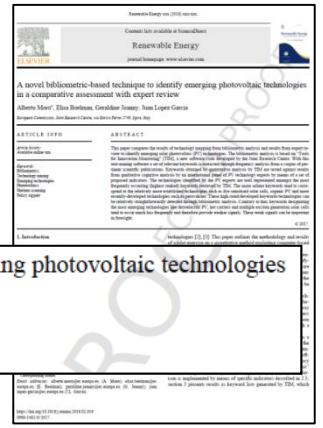
Impact on innovation (JRC)

Tech risk assessment (DG ENV, EFSA)

Use of TIM







A novel bibliometric-based technique to identify emerging photovoltaic technologies in a comparative assessment with expert review

Alberto Moro*, Elisa Boelman, Geraldine Joanny, Juan Lopez Garcia

European Commission, Joint Research Centre, via Enrico Fermi 2749, Ispra, Italy

The Five Categories of Metrics

9.4 BILLION

Total number of interactions with research in PlumX

USAGE

MOST IMPORTANT METRIC AFTER CITATION*

(clicks, views, downloads, library holdings, video plays)

CAPTURES

LEADING INDICATOR OF CITATIONS

(bookmarks, favorites, reference manager saves)

MENTIONS

WHERE THE STORIES OF RESEARCH ARE FOUND

(blog posts, news mentions, comments, reviews, Wikipedia mentions)

SOCIAL MEDIA

INDICATES HOW RESEARCH IS PROMOTED

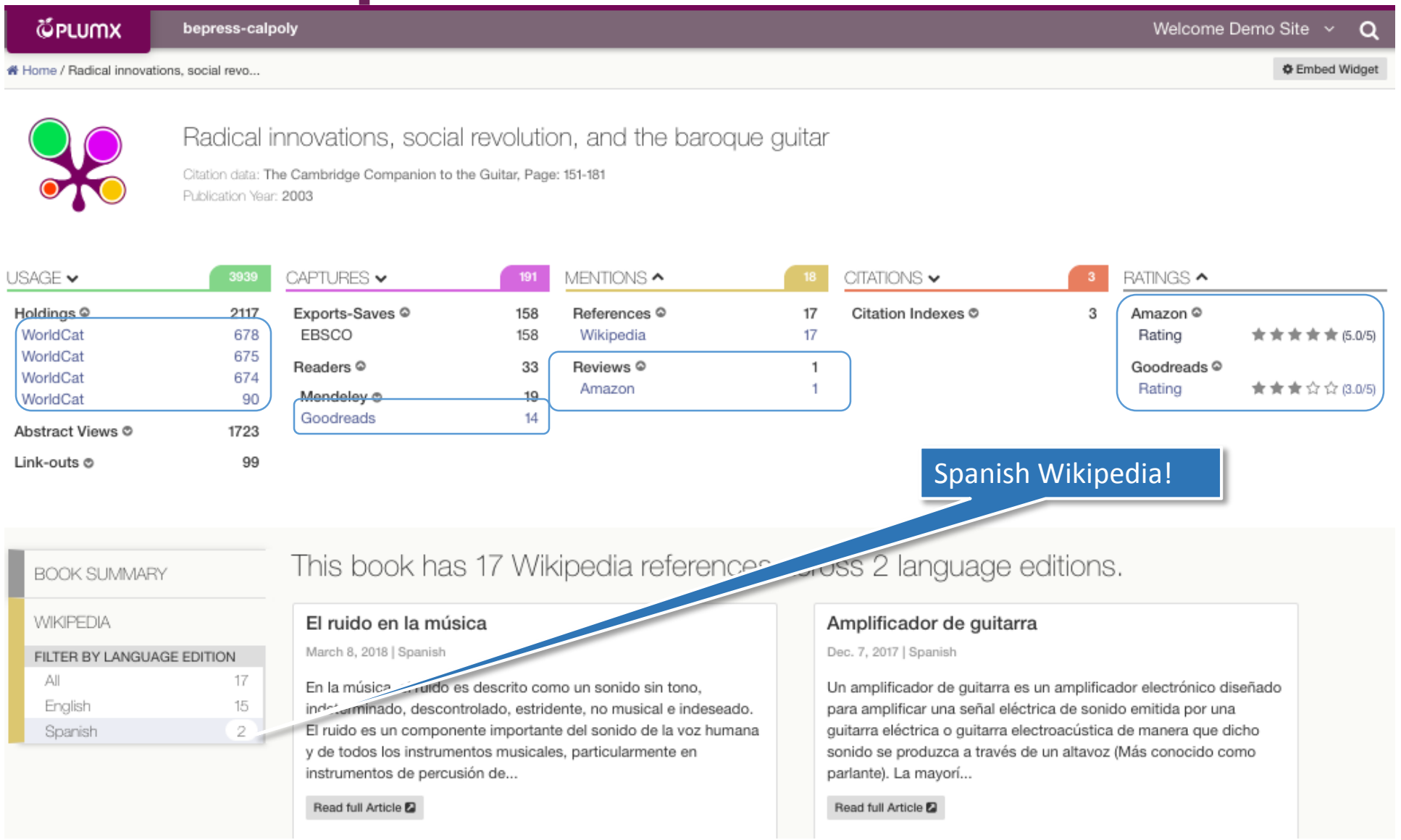
(tweets, +1s, likes, shares)

CITATIONS

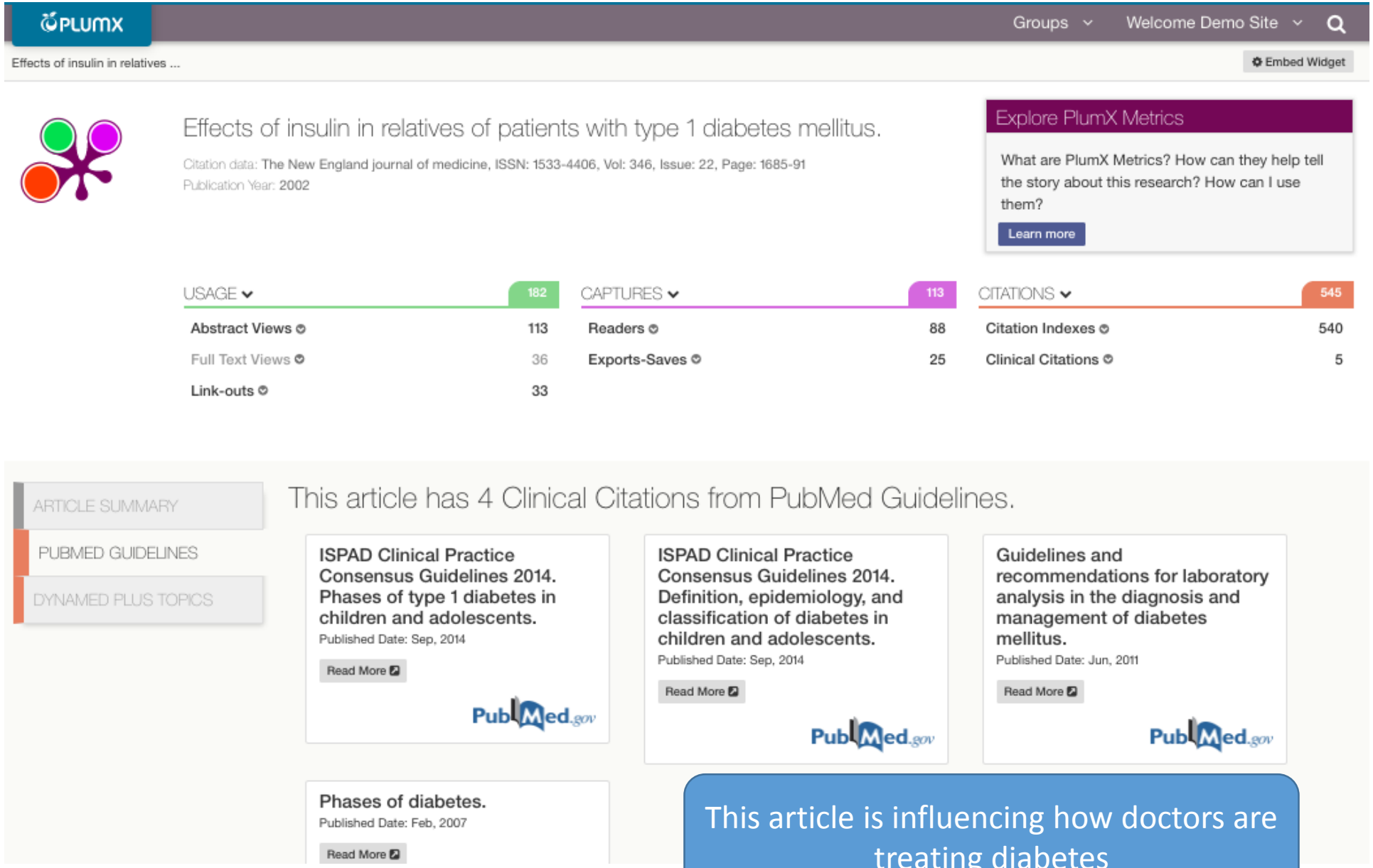
TRADITIONAL MEASURE OF IMPACT

(citation indexes, patent citations, clinical citations, policy citations)

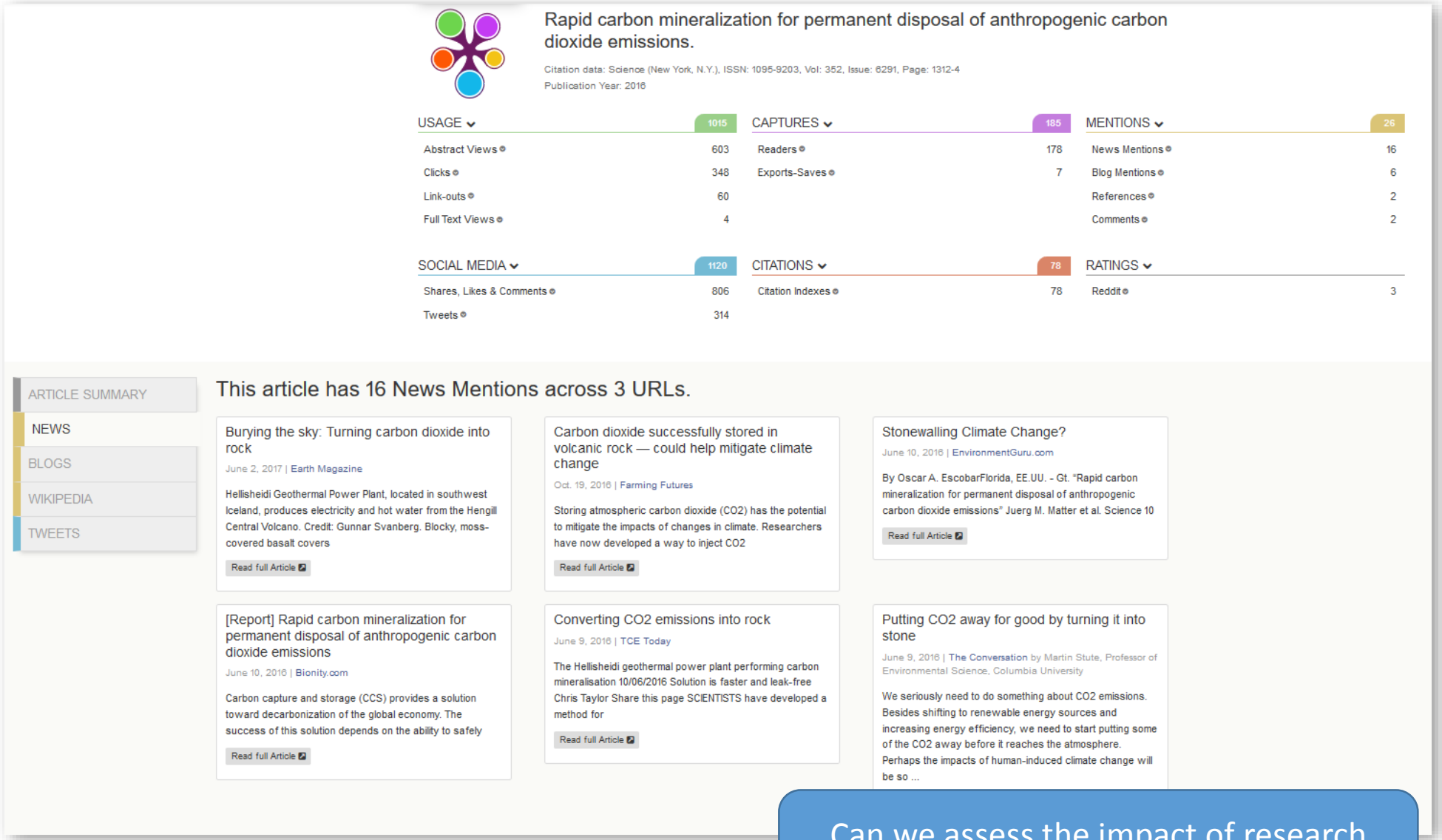
Book Specific Metrics



Clinical Guidelines



JRC output



Rapid carbon mineralization for permanent disposal of anthropogenic carbon dioxide emissions.

Citation data: Science (New York, N.Y.), ISSN: 1095-9203, Vol: 352, Issue: 6291, Page: 1312-4
Publication Year: 2016

USAGE	1015	CAPTURES	185	MENTIONS	26
Abstract Views	603	Readers	178	News Mentions	16
Clicks	348	Exports-Saves	7	Blog Mentions	6
Link-outs	60			References	2
Full Text Views	4			Comments	2
SOCIAL MEDIA	1120	CITATIONS	78	RATINGS	
Shares, Likes & Comments	806	Citation Indexes	78	Reddit	3
Tweets	314				

ARTICLE SUMMARY
NEWS
BLOGS
WIKIPEDIA
TWEETS

This article has 16 News Mentions across 3 URLs.

Burying the sky: Turning carbon dioxide into rock
June 2, 2017 | Earth Magazine
Hellisheidi Geothermal Power Plant, located in southwest Iceland, produces electricity and hot water from the Hengill Central Volcano. Credit: Gunnar Svanberg. Blocky, moss-covered basalt covers
Read full Article

Carbon dioxide successfully stored in volcanic rock — could help mitigate climate change
Oct. 19, 2016 | Farming Futures
Storing atmospheric carbon dioxide (CO2) has the potential to mitigate the impacts of changes in climate. Researchers have now developed a way to inject CO2
Read full Article

Stonewalling Climate Change?
June 10, 2016 | EnvironmentGuru.com
By Oscar A. EscobarFlorida, EE.UU. - Gt. "Rapid carbon mineralization for permanent disposal of anthropogenic carbon dioxide emissions" Juerg M. Matter et al. Science 10
Read full Article

[Report] Rapid carbon mineralization for permanent disposal of anthropogenic carbon dioxide emissions
June 10, 2016 | Bionity.com
Carbon capture and storage (CCS) provides a solution toward decarbonization of the global economy. The success of this solution depends on the ability to safely
Read full Article

Converting CO2 emissions into rock
June 9, 2016 | TCE Today
The Hellisheidi geothermal power plant performing carbon mineralisation 10/06/2016 Solution is faster and leak-free Chris Taylor Share this page SCIENTISTS have developed a method for
Read full Article

Putting CO2 away for good by turning it into stone
June 9, 2016 | The Conversation by Martin Stute, Professor of Environmental Science, Columbia University
We seriously need to do something about CO2 emissions. Besides shifting to renewable energy sources and increasing energy efficiency, we need to start putting some of the CO2 away before it reaches the atmosphere. Perhaps the impacts of human-induced climate change will be so ...

Can we assess the impact of research and policy?

Open Science

Empowering Knowledge

What is open science?

- Open Science describes a way of working which makes research more inclusive, more collaborative and more transparent.
- We believe open science can benefit research and society and drive research performance.
- Elsevier partners with the research community to enable open science.

Open Science – *the European Commission's perspective*

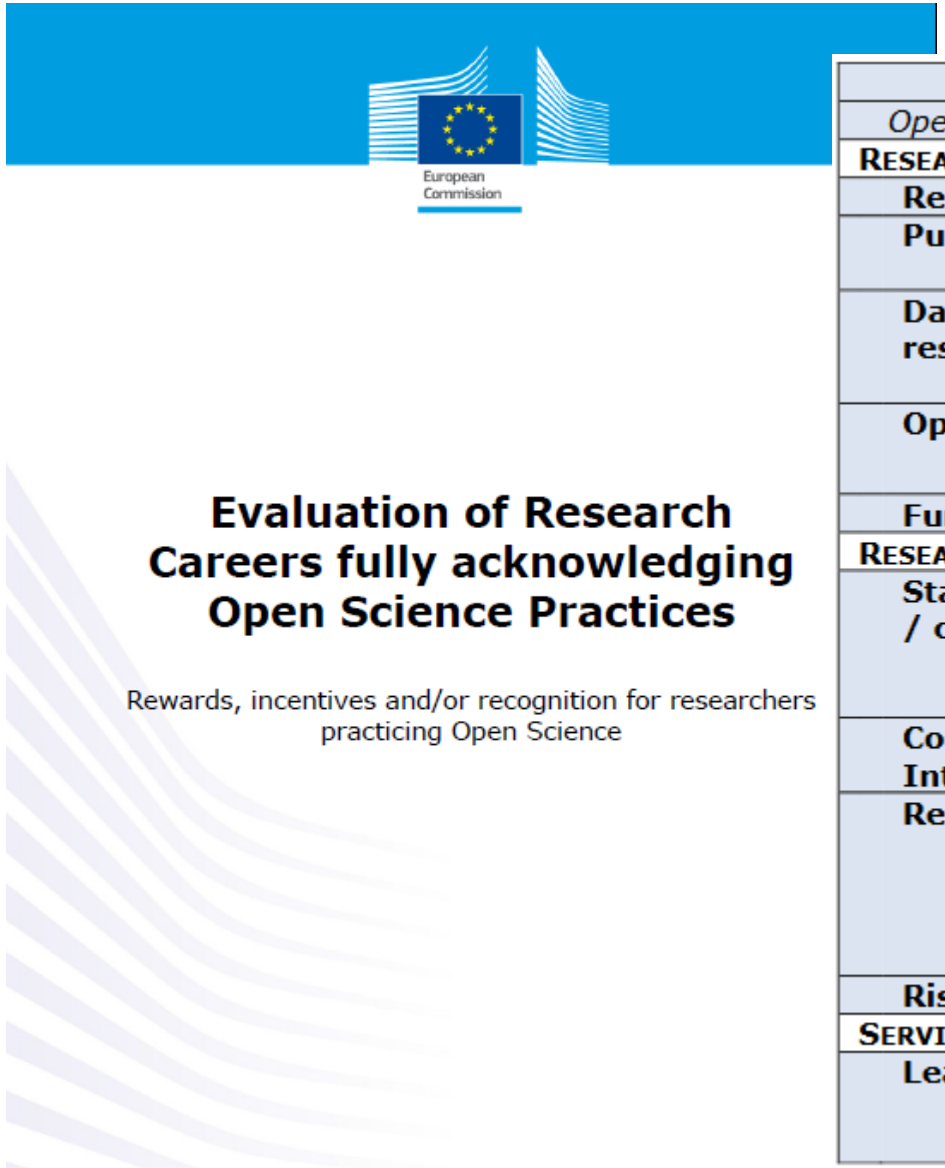
Open Science Policy Platform

High-Level Group Open Science Policy Platform
(20+ Members, co-chaired by the Commission, meets bi-annually)
Mandate: - Help develop the Open Science Policy Agenda
- Promote uptake of agreed best policy practices

WG	WG	WG	WG	WG	WG	WG	WG
FAIR Open data	Science Cloud	Altmetrics	Scientific publishing models	Rewards	Research Integrity	Education & Skills	Citizen Science

https://ec.europa.eu/research/openscience/index.cfm

Open Science – *OS-CAM*



Open Science Career Assessment Matrix (OS-CAM)	
Open Science activities	*Possible evaluation criteria*
RESEARCH OUTPUT	
Research activity	Pu
Publications	Pu Se
Datasets and research results	Us Ac M
Open source	Us De
Funding	Se
RESEARCH PROCESS	
Stakeholder engagement / citizen science	Ac Sh pl In
Collaboration and Interdisciplinarity	W Er
Research integrity	Be co ac Fu in
Risk management	Ta
SERVICE AND LEADERSHIP	
Leadership	De no Di
Academic standing	Developing an interr Contributing as edito
Peer review	Contributing to oper Examining or assess
Networking	Participating in nat science
RESEARCH IMPACT	
Communication and Dissemination	Participating in publi Sharing research res Translating research
IP (patents, licenses)	Being knowledgeable Transferring IP to th
Societal impact	Evidence of use of re Recognition from soc
Knowledge exchange	Engaging in open inn
TEACHING AND SUPERVISION	
Teaching	Training other resea Developing curricula open science data m Raising awareness a and masters' progra
Mentoring	Mentoring and enc capabilities
Supervision	Supporting early sta
PROFESSIONAL EXPERIENCE	
Continuing professional development	Investing in own capabilities
Project management	Successfully deliveri teams
Personal qualities	Demonstrating the users with open scie

https://ec.europa.eu/research/openscience/pdf/os_rewards_wgreport_final.pdf

European Commission

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

A renewed European Agenda for Research and Innovation - Europe's chance to shape its future

The European Commission's contribution to the Informal EU Leaders' meeting on innovation in Sofia on 16 May 2018

The take up of open science practices at different stages of the researchers' careers can also stimulate attractive career environments for all, give more recognition and reward international and science-business mobility.[51] The modernisation of universities and public research organisations should therefore also be supported with an **Open Science label**. Such a high-quality label could be awarded to individual universities and trans-national university partnerships, and would be recognised in future EU support for trans-national projects involving universities.[52]

Key steps

- **Contribute to the modernisation of universities and public research organisations with an Open Science label.**

https://ec.europa.eu/info/publications/renewed-european-agenda-research-and-innovation-europes-chance-shape-its-future_en

Open Science Monitor

Tracking trends for open access, collaborative and transparent research across countries and disciplines

Contacts
Project Coordinators:
david.osimo@lisboncouncil.net
katarzyna.jakimowicz@lisboncouncil.net

The Open Science Monitor **aims** to:

- provide data and insight to understand the development of open science in Europe

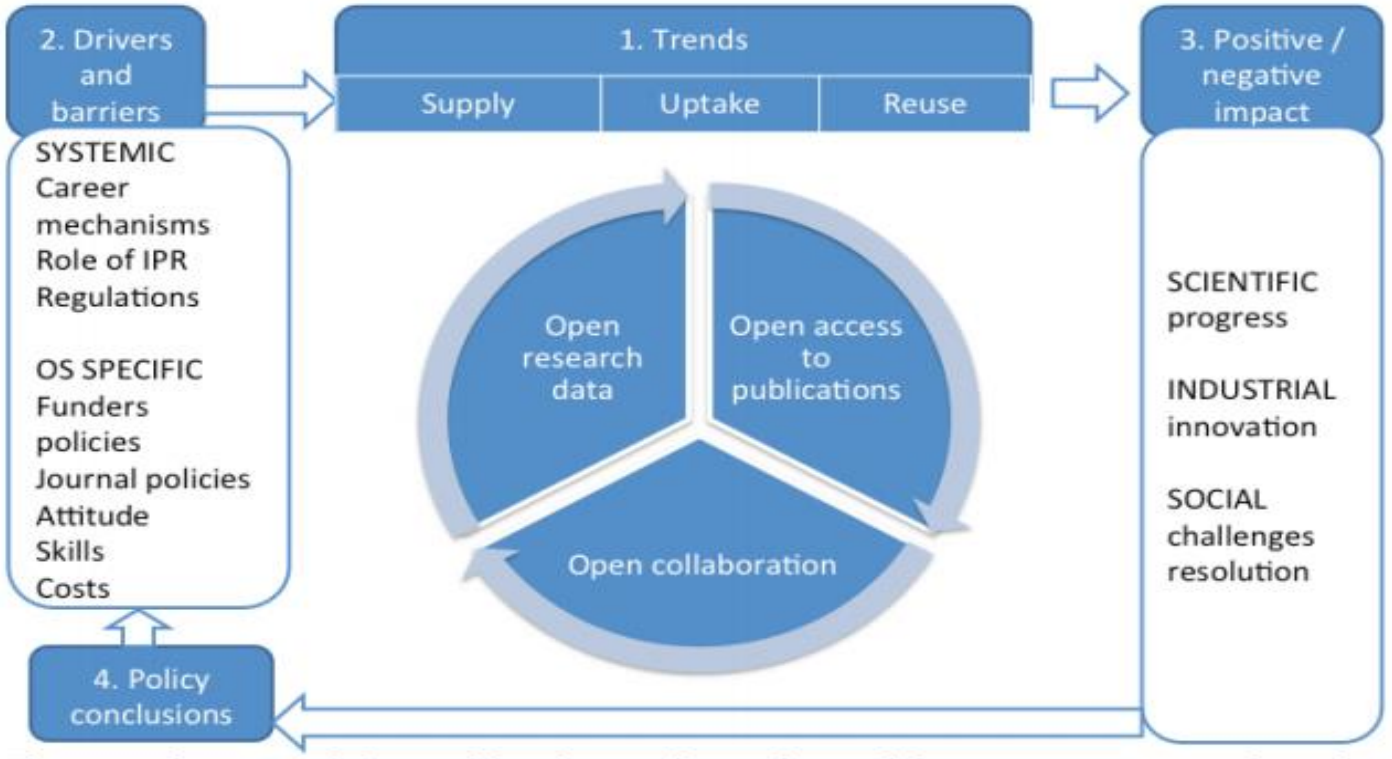
- gather the most relevant and timely indicators on the development of open science in Europe and other global partner countries

It will also support European Commission initiatives such as the Open Science Policy Platform and the European Open Science Cloud

European Commission

Objectives

1. **Metrics** on the open science **trends** and their development
2. **Assessment of the drivers** (and barriers) to open science adoption
3. **Impacts** (both positive and negative) of open science
4. **Policy conclusions**



European Commission

Scope

Trends

Categories	Trends
Open access to publications	Green and gold open access adoption (bibliometrics)
	Open access policies (funders and journals)
Open research data	Open data policies (funders and journals)
	Open data repositories
	Open data adoption and researchers' attitudes
Open collaboration	Open Science
	Next generation metrics
	Open hardware
	Citizen science

- Entire cycle of the scientific process
- All research disciplines
- Geographic coverage: 28 Member States and G8 countries
- Data presented at country level
- Different types of stakeholders

European Commission

Indicators and data sources

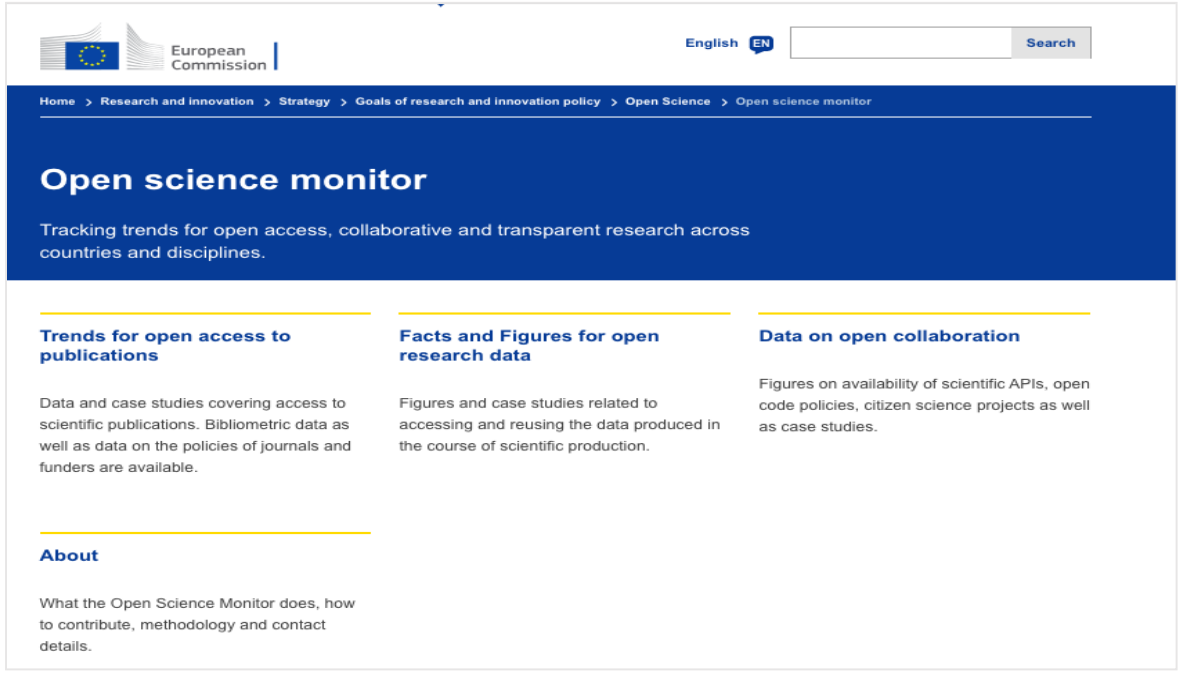
Wide variety of data sources used:

- **Bibliometrics:** for instance, open access to publications indicators, and partially for open data and next generation metrics
- **Online repositories**
- **Surveys**
- Ad hoc analysis in **scientific articles or reports**
- **Data from specific services**: open science services often offer data on their uptake, as for Sci-starter or Mendeley

Open Science Monitor

Updated indicators published on the EC website:

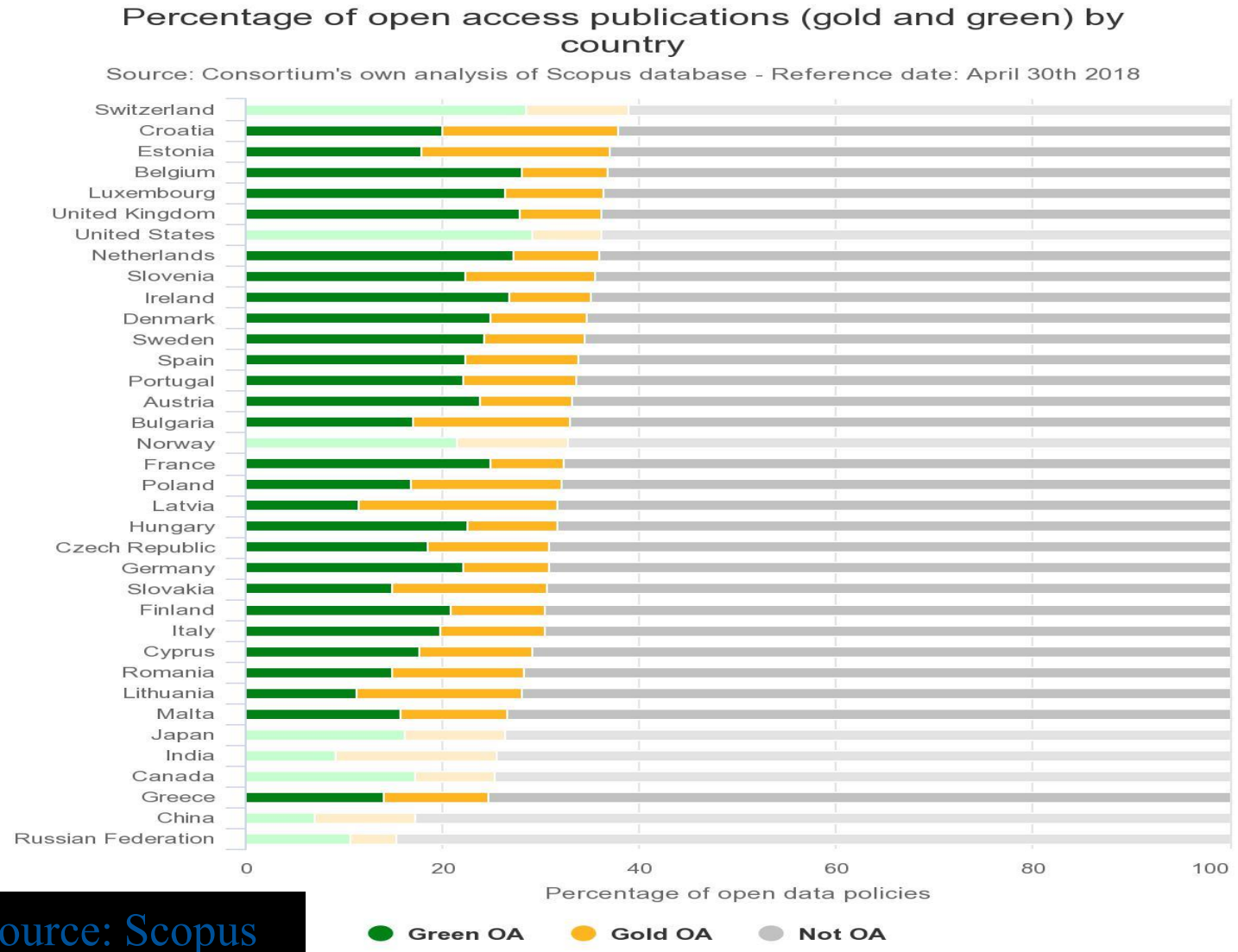
https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy/open-science/open-science-monitor_en



Contribute to improving OSM indicators:
https://www.makingspeechestalk.com/ch/Open_Science_Monitor/

European Commission

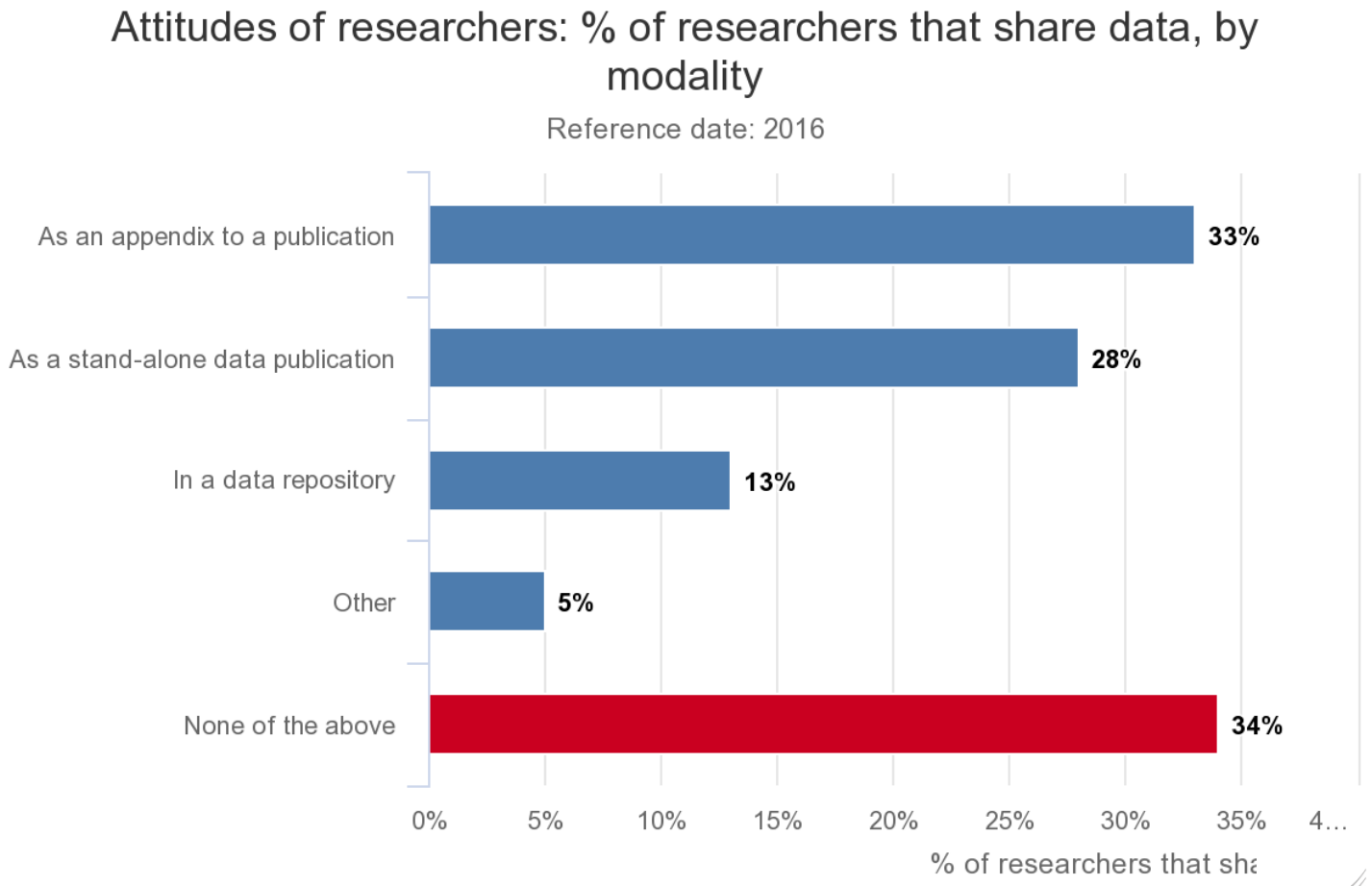
Example: Open Access to Publications



Source: Scopus

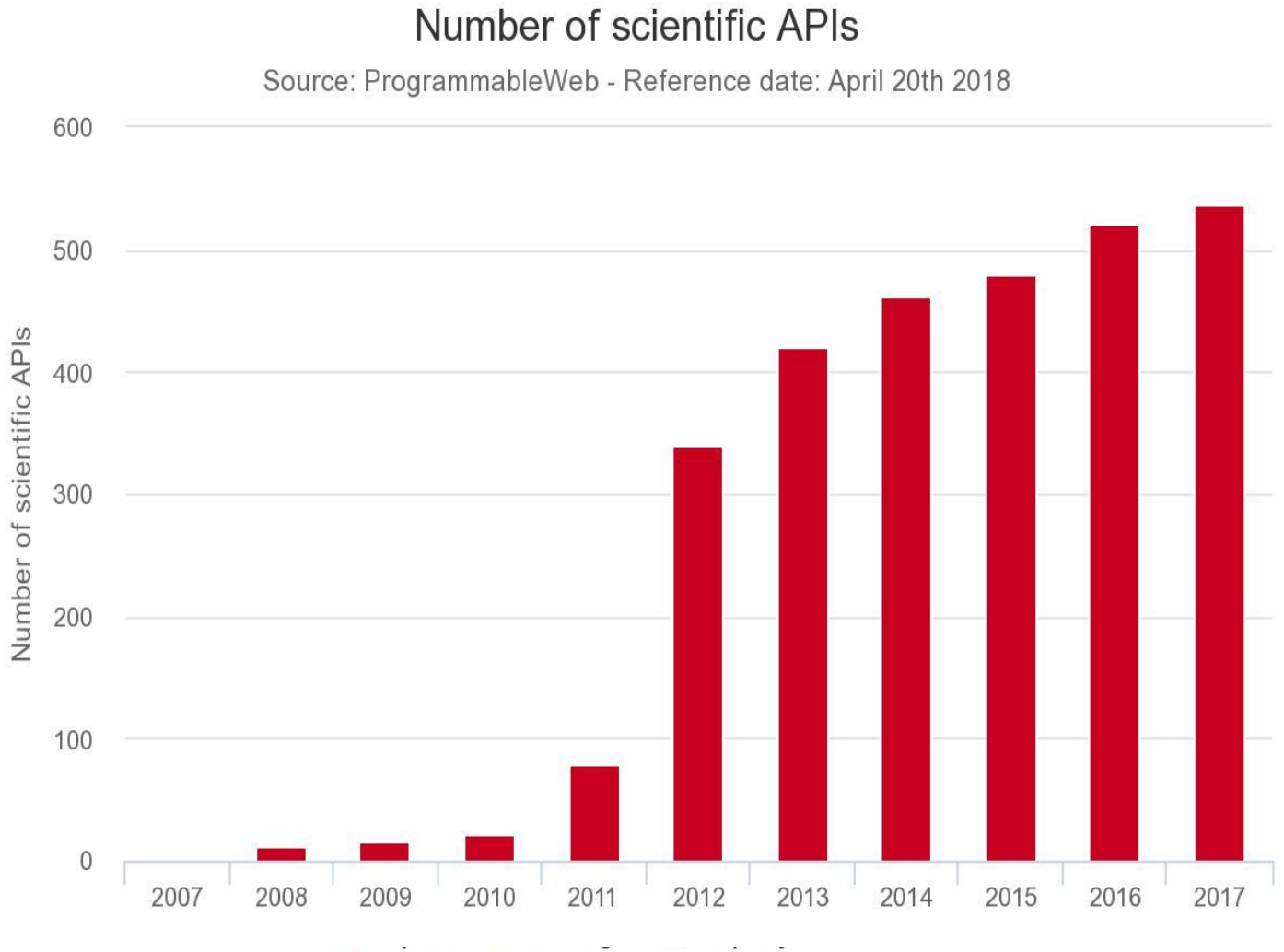
European Commission

Example: Open Research Data



Source: *Open Data, a researcher perspective* (CWTS-Elsevier)

Example: Open Collaboration



European Commission

Thank you

ELSEVIER

Euro Science

ESOF 2018 TOULOUSE

9-14 JULY 2018

SHARING SCIENCE: TOWARDS NEW HORIZONS

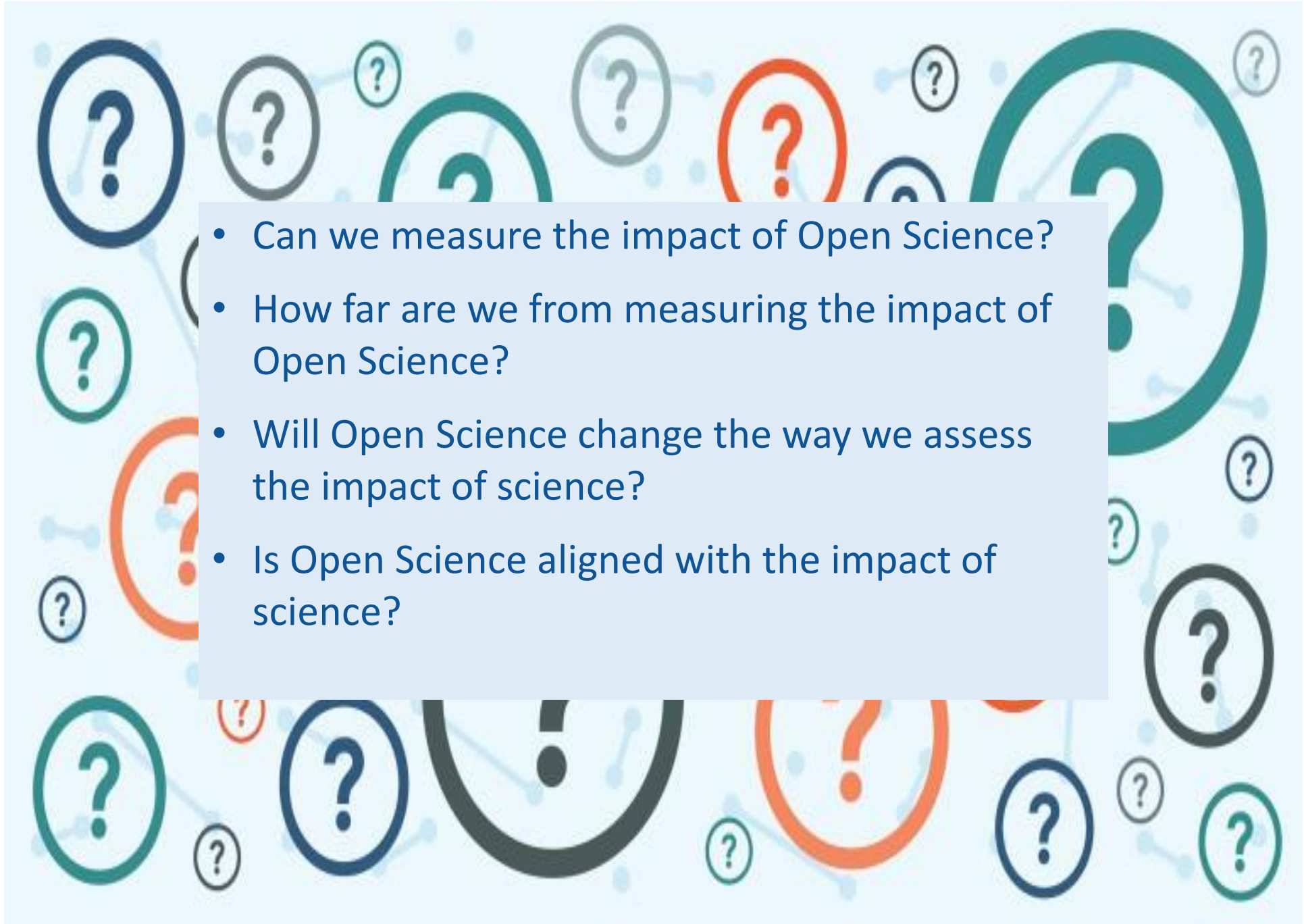
Stephane Berghmans

Vice President, Academic & Research Relations, Elsevier

Governing Board Member, EuroScience

s.berghmans@elsevier.com

+32-471-781900


• Can we measure the impact of Open Science?
• How far are we from measuring the impact of Open Science?
• Will Open Science change the way we assess the impact of science?
• Is Open Science aligned with the impact of science?

Open Science – *OS-CAM*

Open Science Career Assessment Matrix (OS-CAM)	
Open Science activities	*Possible evaluation criteria*
RESEARCH OUTPUT	
Research activity	Pushing forward the boundaries of open science as a research topic
Publications	Publishing in open access journals Self-archiving in open access repositories
Datasets and research results	Using the FAIR data principles Adopting quality standards in open data management and open datasets Making use of open data from other researchers
Open source	Using open source software and other open tools Developing new software and tools that are open to other users
Funding	Securing funding for open science activities
RESEARCH PROCESS	
Stakeholder engagement / citizen science	Actively engaging society and research users in the research process Sharing provisional research results with stakeholders through open platforms (e.g. Arxiv, Figshare) Involving stakeholders in peer review processes
Collaboration and Interdisciplinarity	Widening participation in research through open collaborative projects Engaging in team science through diverse cross-disciplinary teams
Research integrity	Being aware of the ethical and legal issues relating to data sharing, confidentiality, attribution and environmental impact of open science activities Fully recognizing the contribution of others in research projects, including collaborators, co-authors, citizens, open data providers
Risk management	Taking account of the risks involved in open science
SERVICE AND LEADERSHIP	
Leadership	Developing a vision and strategy on how to integrate OS practices in the normal practice of doing research Driving policy and practice in open science

https://ec.europa.eu/research/openscience/pdf/os_rewards_wgreport_final.pdf

Open Science – *OS-CAM*

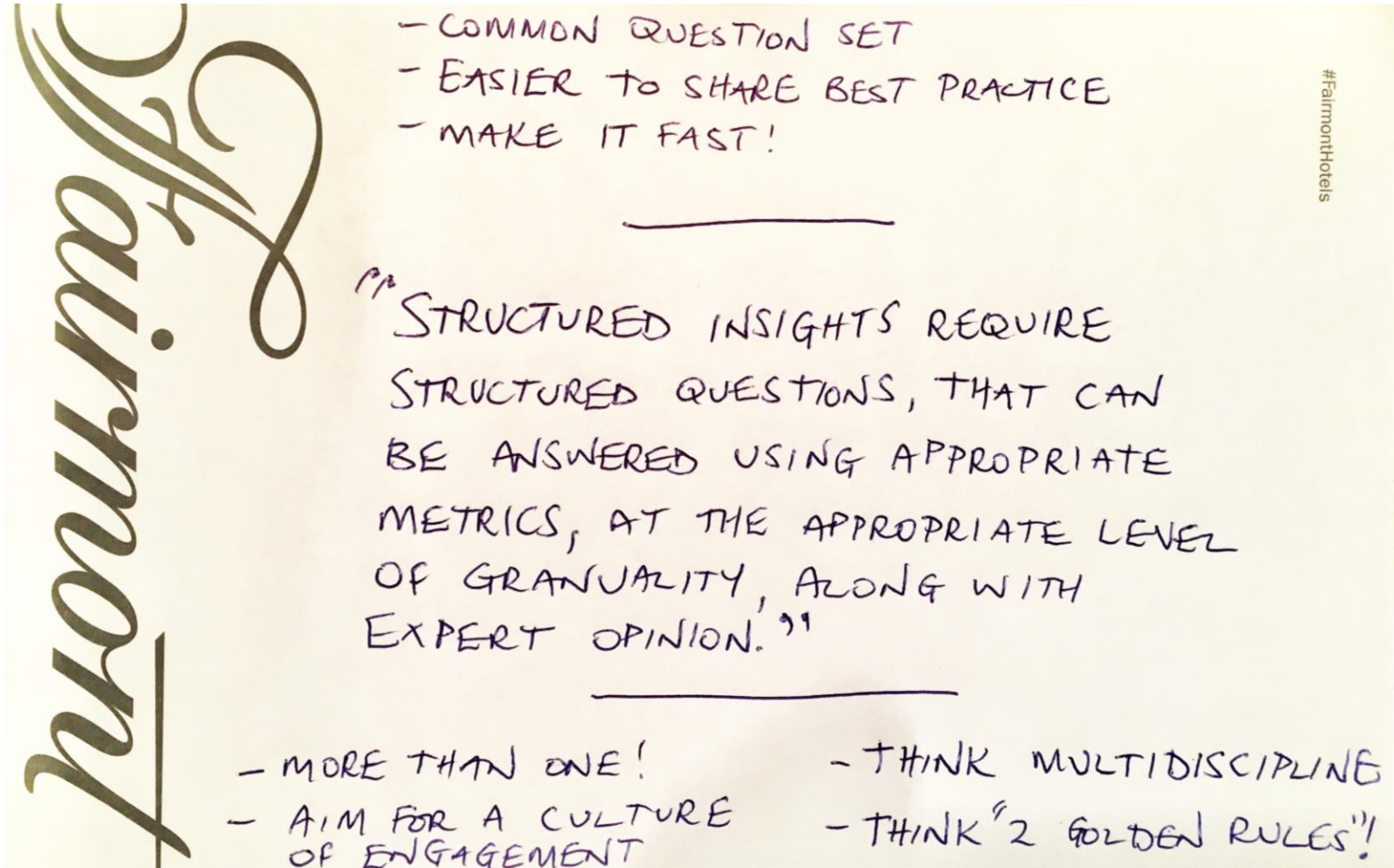
Academic standing	Developing an international or national profile for open science activities Contributing as editor or advisor for open science journals or bodies
Peer review	Contributing to open peer review processes Examining or assessing open research
Networking	Participating in national and international networks relating to open science
RESEARCH IMPACT	
Communication and Dissemination	Participating in public engagement activities Sharing research results through non-academic dissemination channels Translating research into a language suitable for public understanding
IP (patents, licenses)	Being knowledgeable on the legal and ethical issues relating to IPR Transferring IP to the wider economy
Societal impact	Evidence of use of research by societal groups Recognition from societal groups or for societal activities
Knowledge exchange	Engaging in open innovation with partners beyond academia
TEACHING AND SUPERVISION	
Teaching	Training other researchers in open science principles and methods Developing curricula and programs in open science methods, including open science data management Raising awareness and understanding in open science in undergraduate and masters' programs
Mentoring	Mentoring and encouraging others in developing their open science capabilities
Supervision	Supporting early stage researchers to adopt an open science approach
PROFESSIONAL EXPERIENCE	
Continuing professional development	Investing in own professional development to build open science capabilities
Project management	Successfully delivering open science projects involving diverse research teams
Personal qualities	Demonstrating the personal qualities to engage society and research users with open science

https://ec.europa.eu/research/openscience/pdf/os_rewards_wgreport_final.pdf

Recommendation

Measurement Tools

Chris James



AESIS

Recommendation

Internal evaluation policies

Robert Haché

Impact is more than assessment driven.

Recommendation

Assessment for funders

David Sweeney

Funding strategy are based on gender diverse people, on the funders and their success metric.

Recommendation

Indicators for SSH impact

Brent Herbert-Copley

Impacts are achieved through pathways that connect academia with broader society, and assessment of impacts must acknowledge complexity and diversity across disciplines.

Recommendation

Entrepreneurial knowledge transfer

Cynthia Goh

Students are an important vector for entrepreneurship. You need to provide them with the opportunity to know if it is right for them, surround them with good support and help them understand how to minimize their risks

Recommendation

Global challenges/issues

Jean Lebel

Climate change, sustainable development, global health, food and nutrition. These challenges transcend borders and national interests.

Recommendation

Collaboration with industry

Yuko Harayama

Invest in industry and university relationships, also find common interests or problems to solve, then act together.

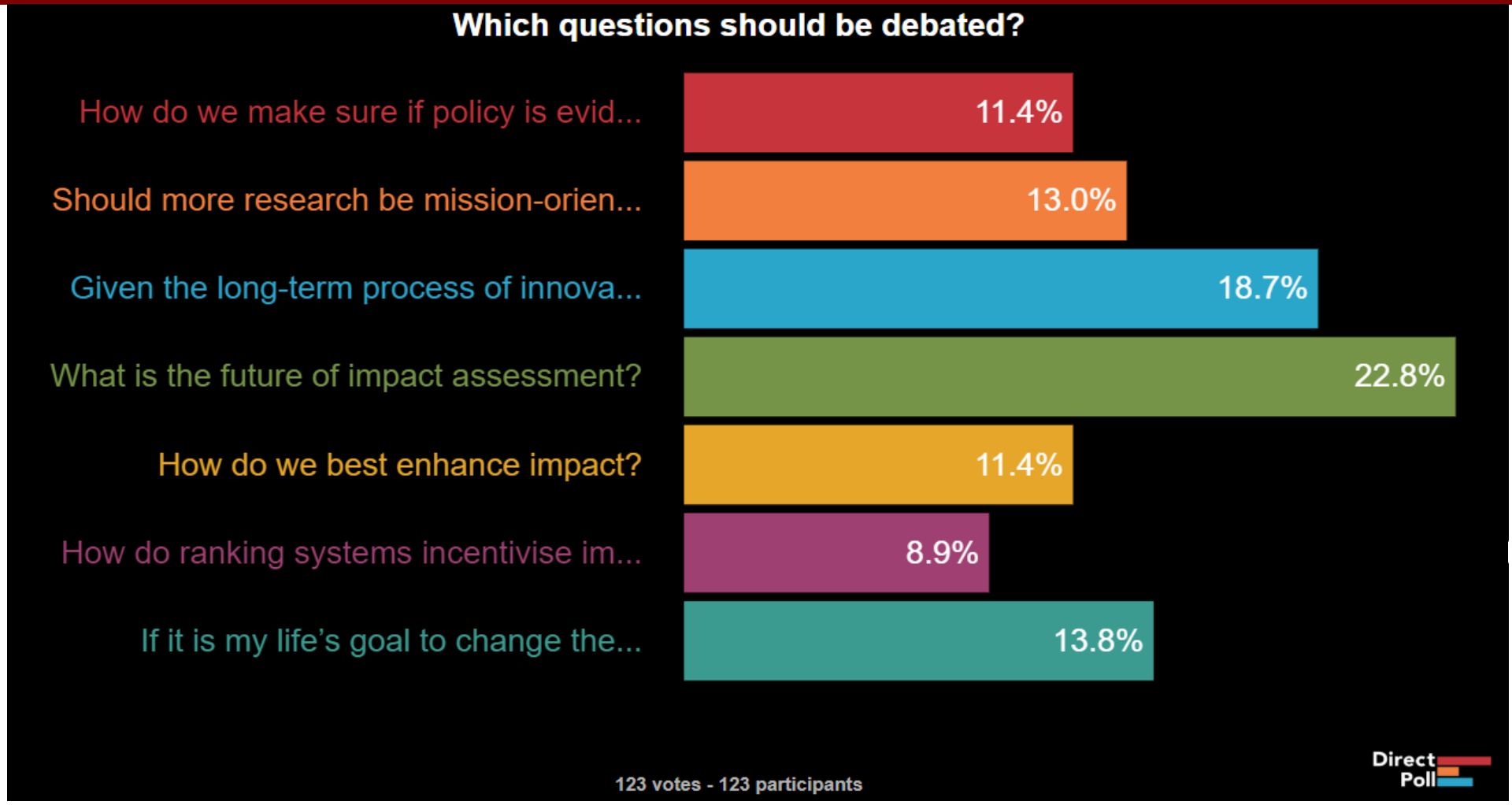
Recommendation

Community Engagement

Wendy Naus

University research does not hold monopoly on knowledge – co-creation/"ecology of knowledge". Make scientific knowledge more accessible – common language, trust, humility.

Outcomes poll:



AESIS

Drawing Room, 16.00-17.15

Interactive debate: Conditions for integrating impact in policies: shared and tailored approaches

Moderator: *Martin Kirk*

Panel Members:

Alfred LeBlanc

David Sweeney

Wendy Naus