

Rotunde, 15:30-16:00

Big data analytics & impact of science

Anika Duut van Goor

Maria de Kleijn



Impact of Science

5-7 June 2019, Berlin

Big data analytics & impact of science

Innovation in the AESIS Network

Anika Duut van Goor

*General Manager of the AESIS Network,
The Netherlands*

AESIS

NUMBERS



Impact of Science

5-7 June 2019, Berlin

AESIS Network

Amsterdam, the Netherlands

5th of June 2015



AESIS Network

4 years (+1 day)

1462 days

35088 hours

126,316,800 seconds

70,000 steps

17,544 cups

AESIS Network

23 events

1204 members

764 organisations

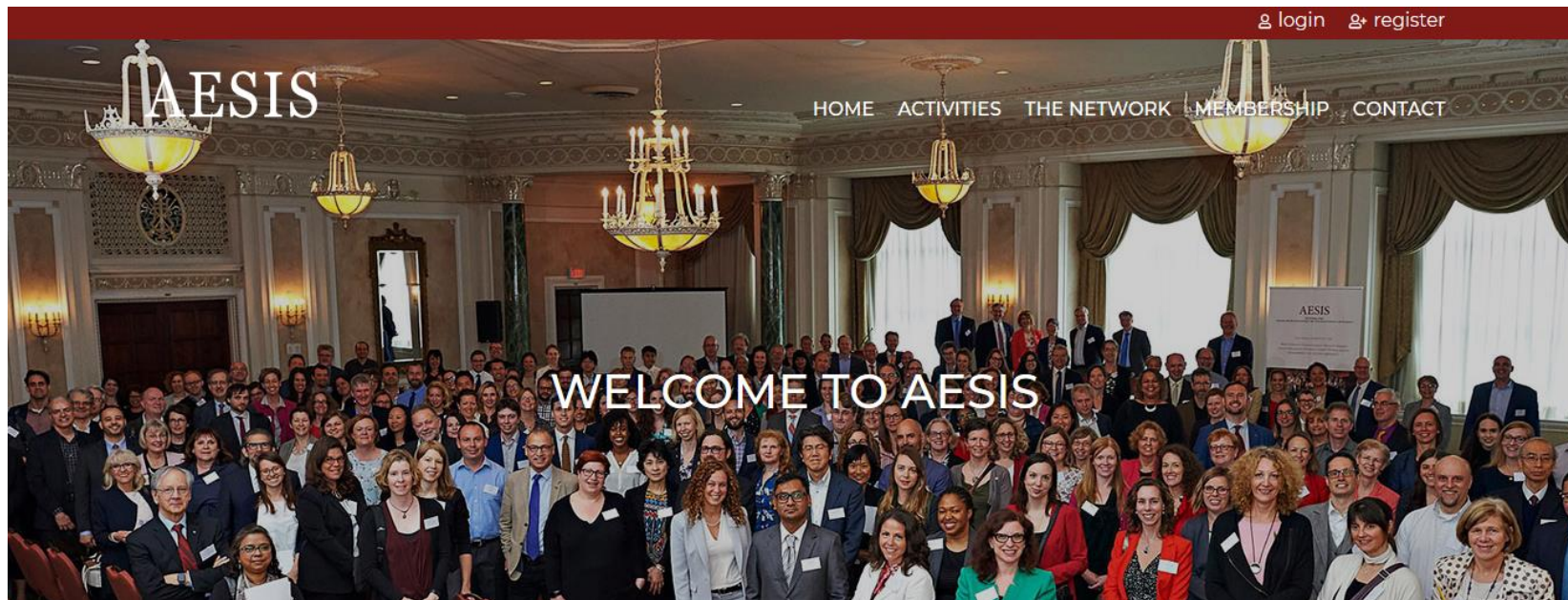
65 countries

*Vast variety of stakeholders of societal impact with
countless types of professional backgrounds and interests*

AESIS Network

So we are launching the AESIS⁺ membership

<http://aesisnet.com/membership/>





Impact of Science

5-7 June 2019, Berlin

AESIS⁺

Thank you!

AESIS



Impact of Science

5-7 June 2019, Berlin

Big data analytics & impact of science

Big data analytics & impact of science

Maria de Kleijn

*Senior Vice President Analytical Services,
Elsevier, Netherlands*



Using AI and big data to understand impact of science

June 2019, Maria de Kleijn
SVP Analytical Services



Science has impact!



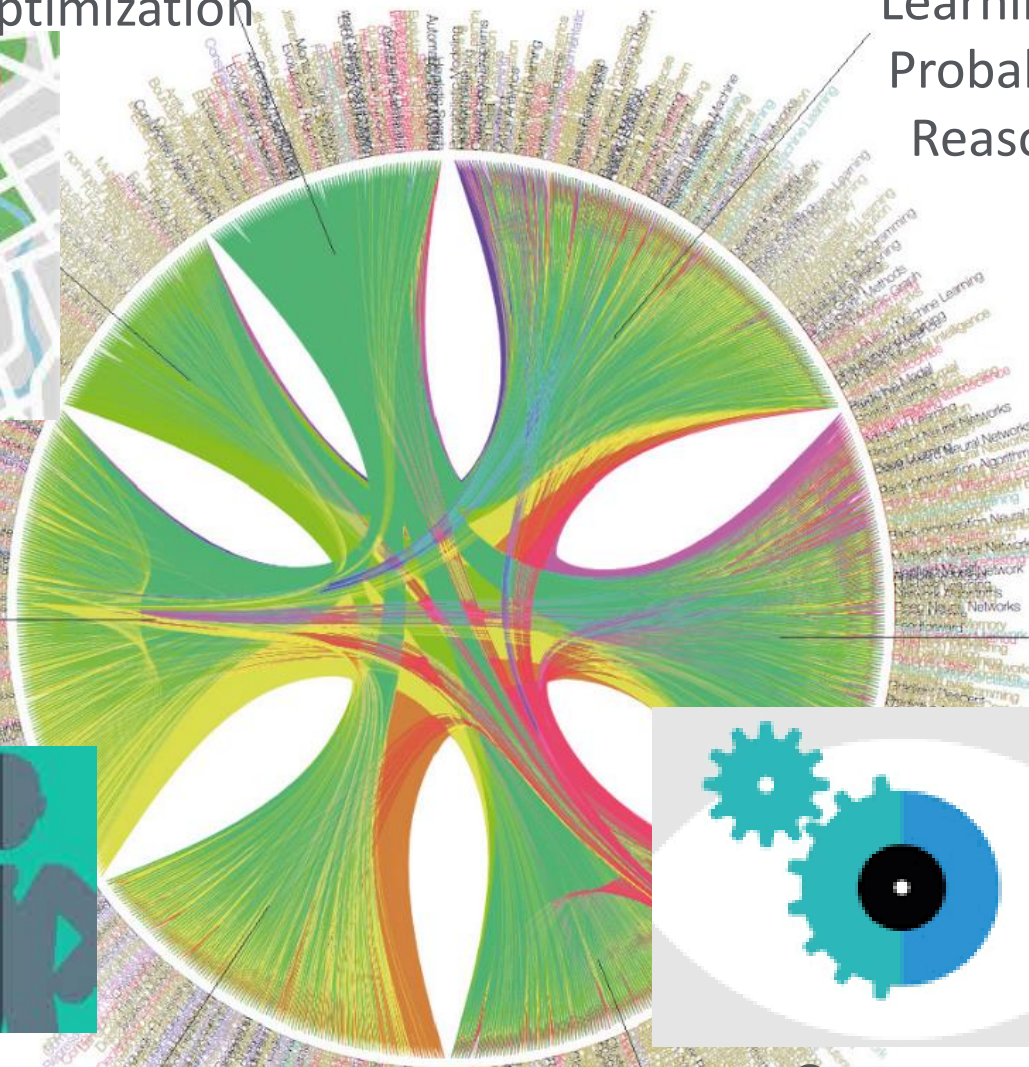
Fuzzy Systems

Planning

Search and Optimization

AI

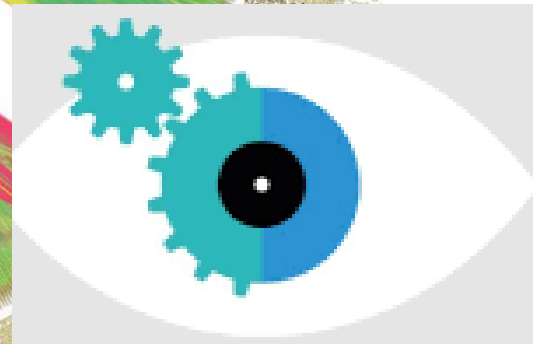
Machine Learning and Probabilistic Reasoning



Neural Networks



Natural language processing



Computer vision

But exactly how, and how much, is not clear



Impact comes not top of mind?



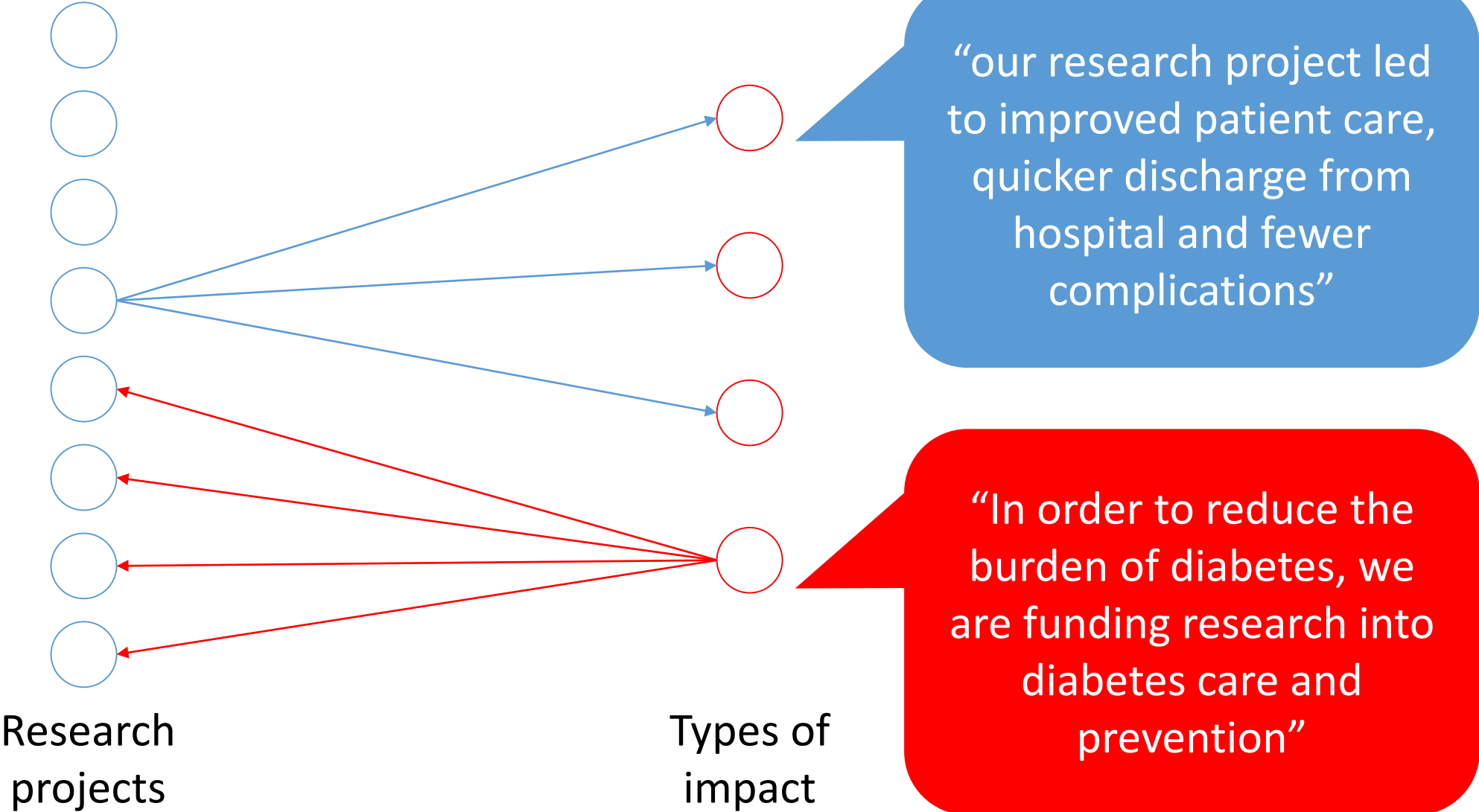
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The impact challenge

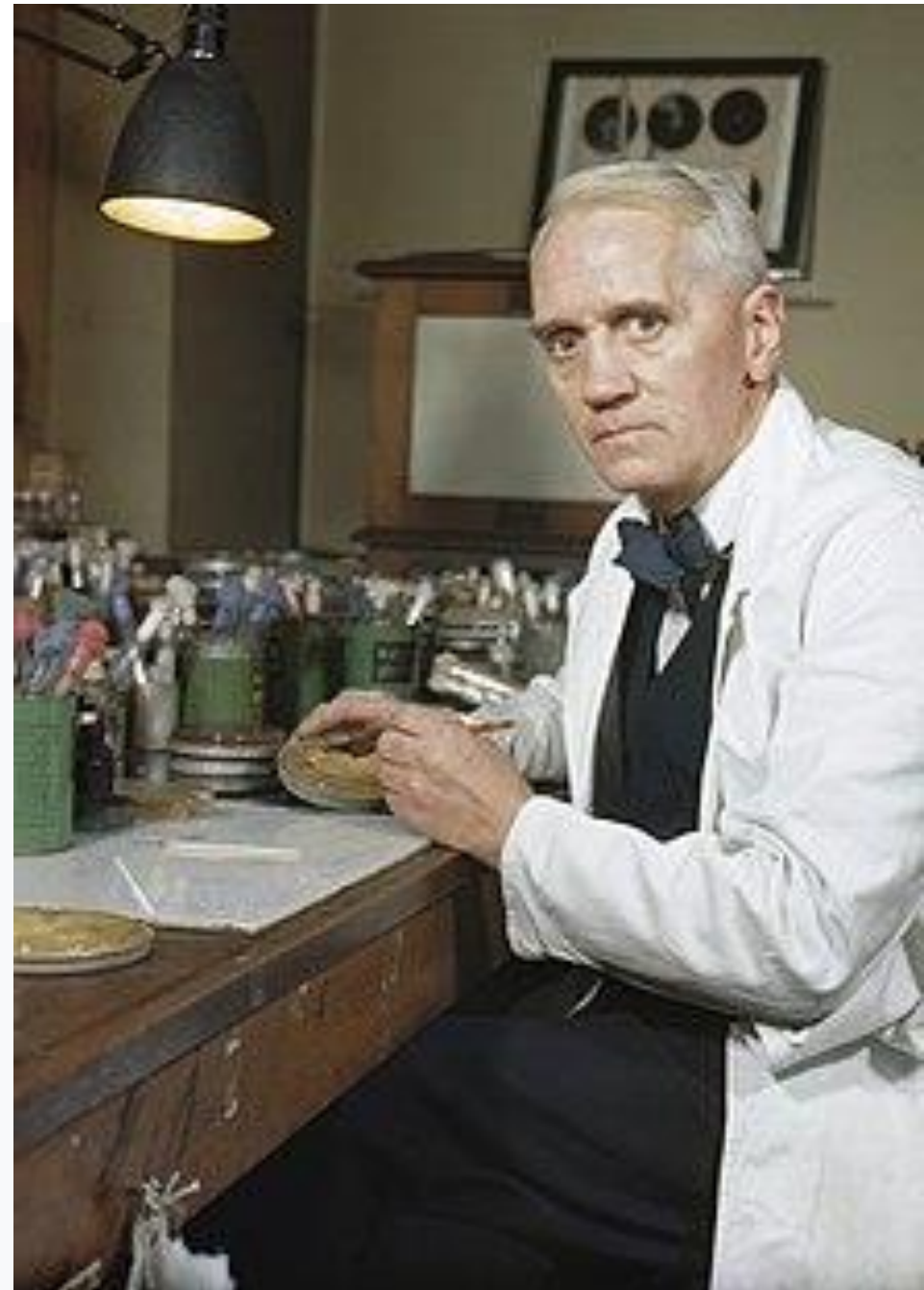
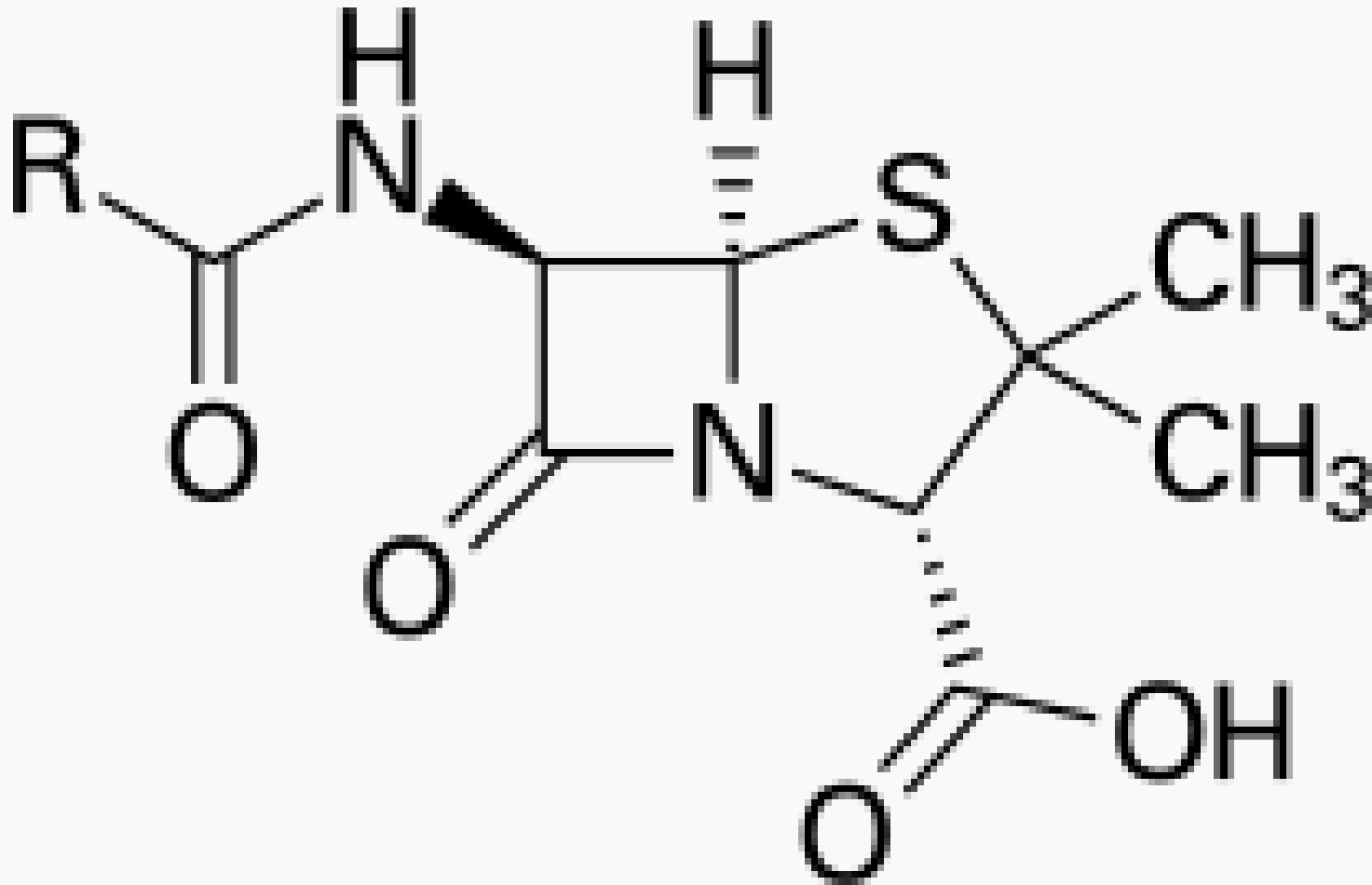
Big data about research

Conclusion

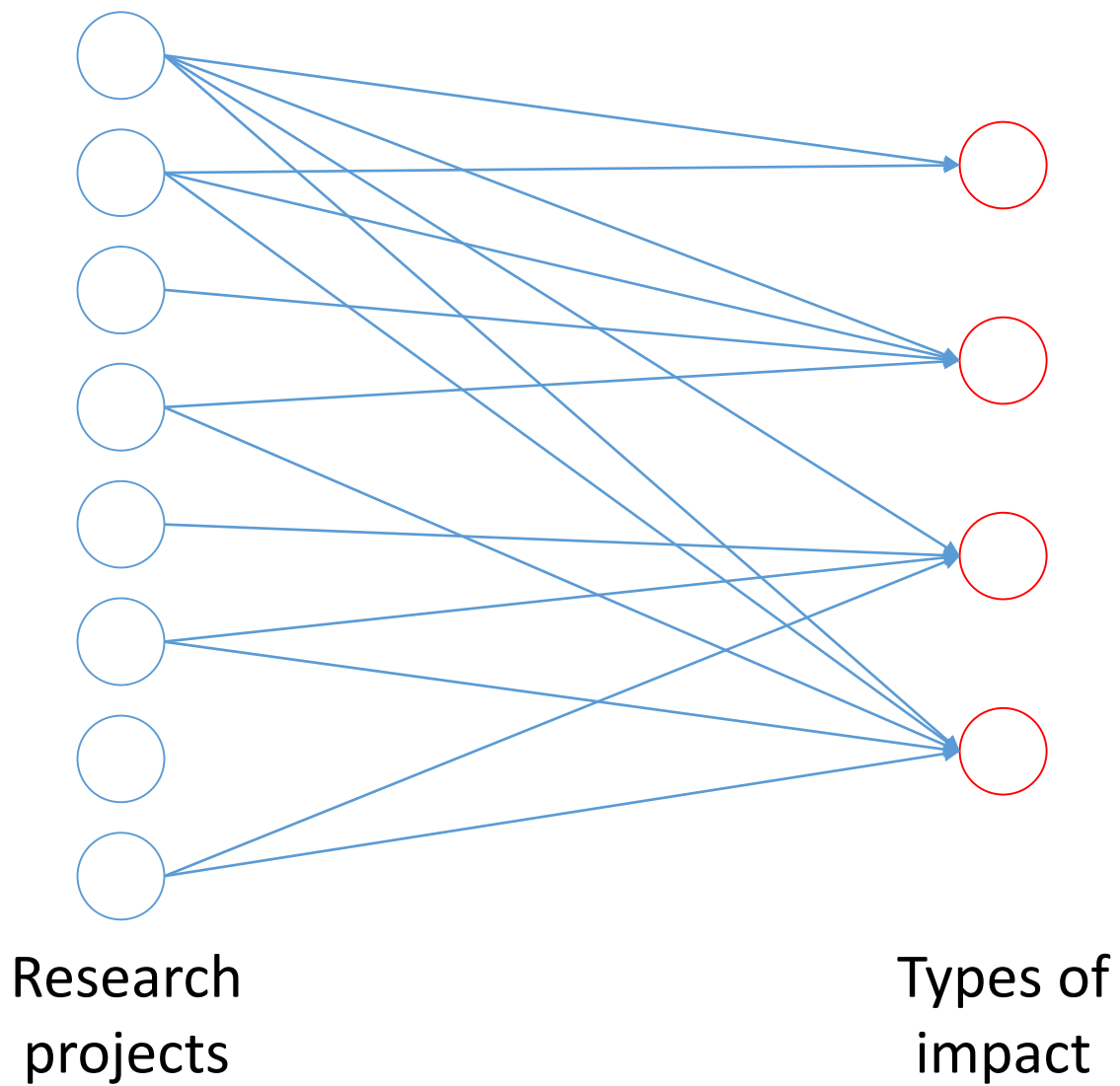
From “does science have impact” to:



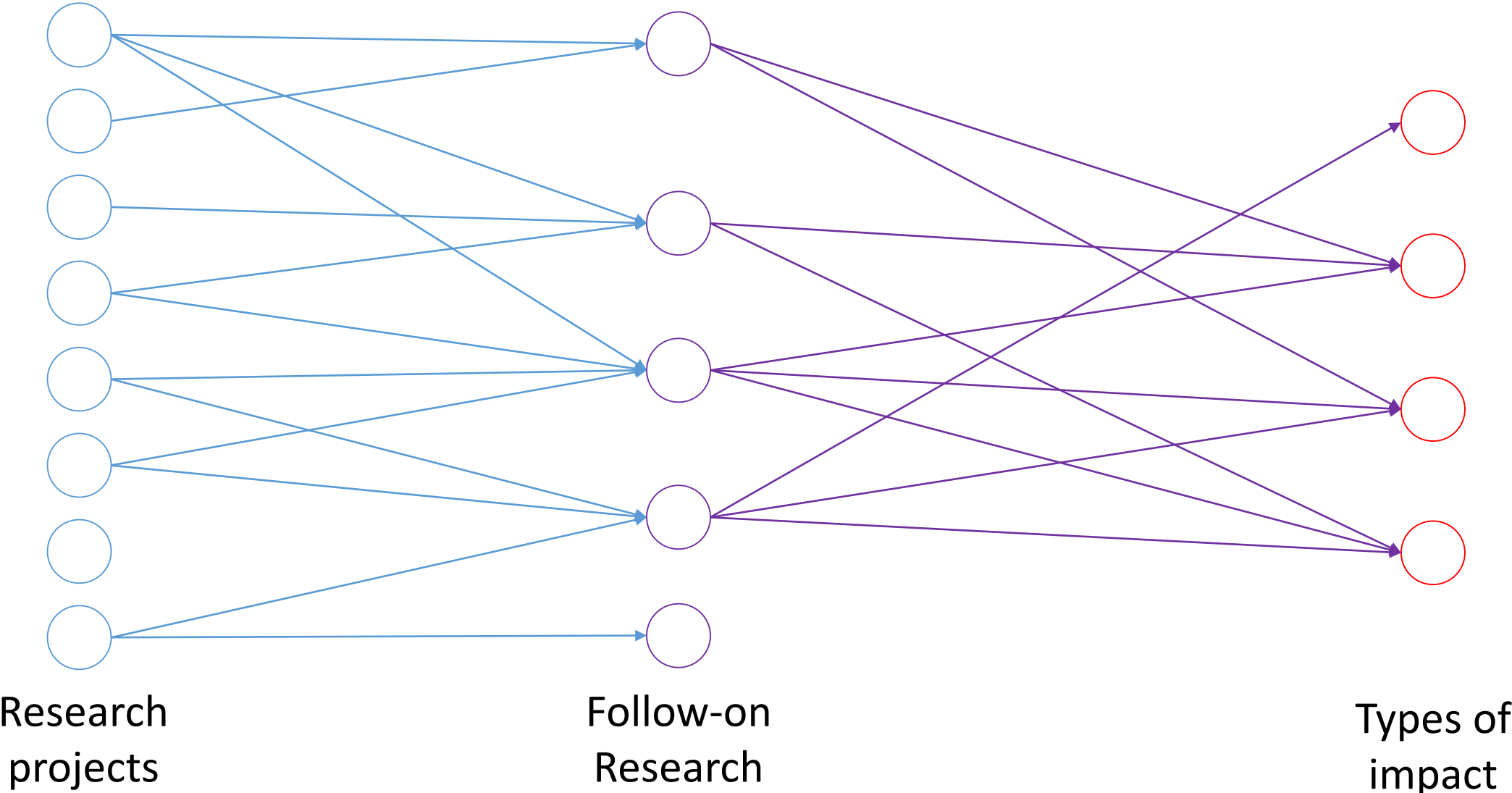
Serendipity, hand-overs and time lags separate research from impact



A many-to-many relationship...



... and indirect

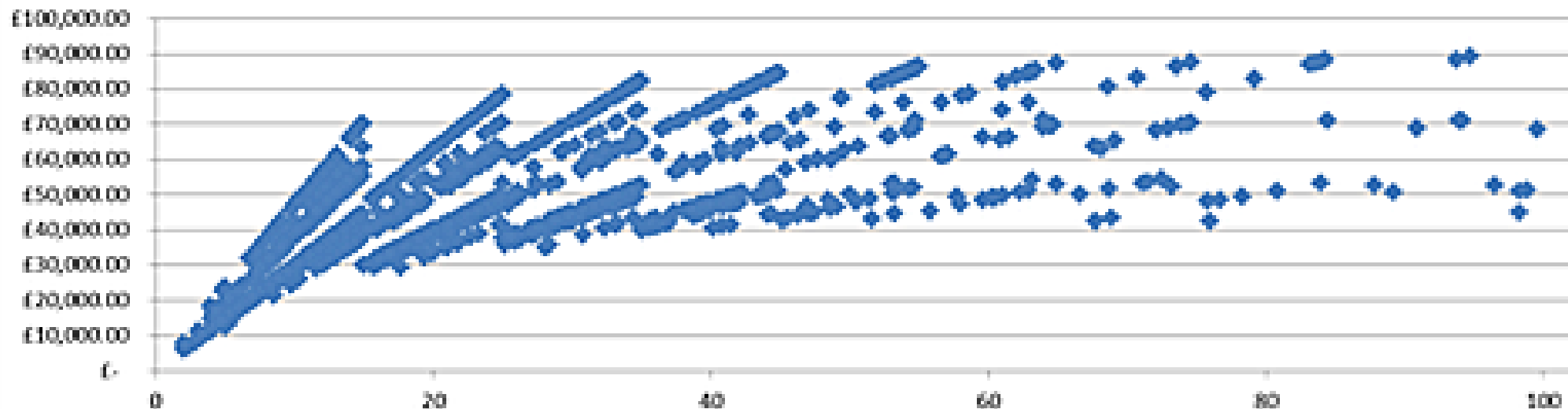


Tracing impact through case studies is costly

Paul Simmonds,
Technopolis UK

“The 2014 REF impact case studies cost approx. 55 mln GBP”

4* Case Study worth



Source: fasttrackimpact.com

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Introduction: digital, big data and analytics

Digital communication ...



'any type of information that can be sent digitally', e.g.

- Online surveys
- Digital literature
- GPS signals

... produces 'big data'...



'beyond what fits in a single computer', e.g.

- All twitter activity
- GPS history of all mobile phones
- Data from all astronomy observatories

... on which to do 'advanced analytics' or even AI



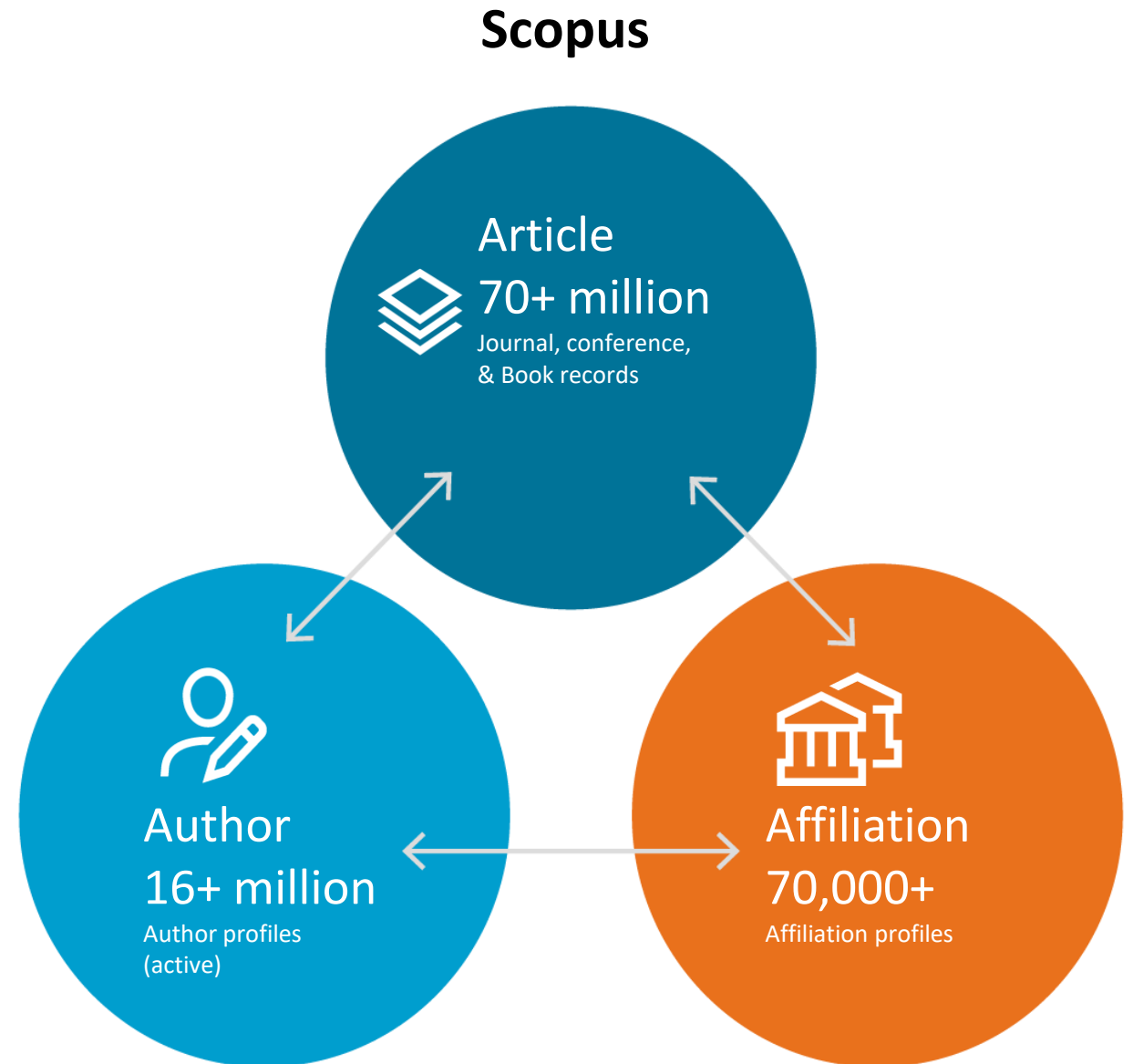
'analyses that can be used to drive change', e.g.

- Targeted, daily lifestyle advice
- Designing effective climate change interventions
- ...

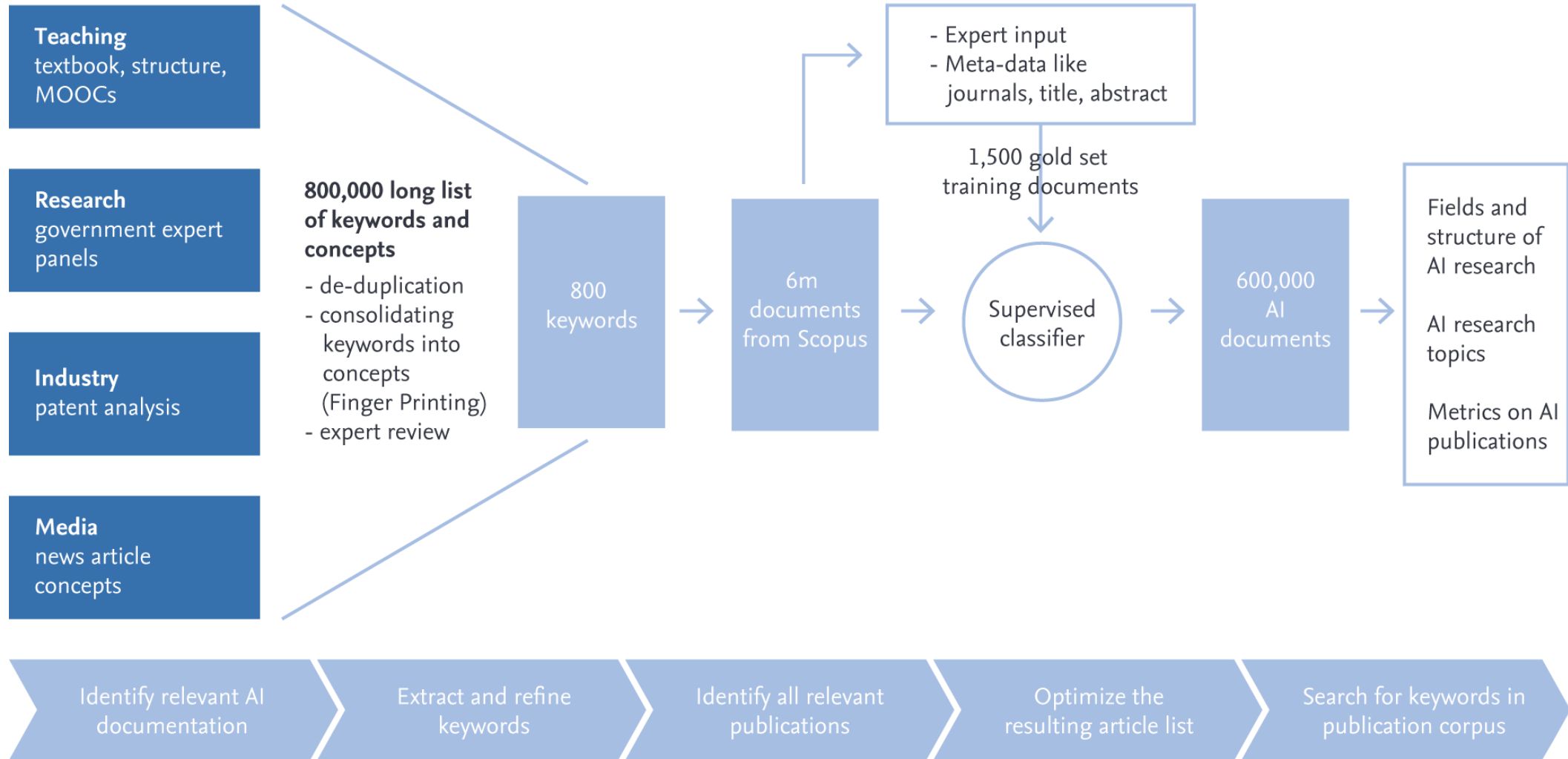
Big data sources at Elsevier

Other sources

- Preprints
- PlumX linkages to media, policy, clinical guidelines databases
- ScienceDirect
- Mendeley
- Patents
- Grants
- ...



Using AI to define AI

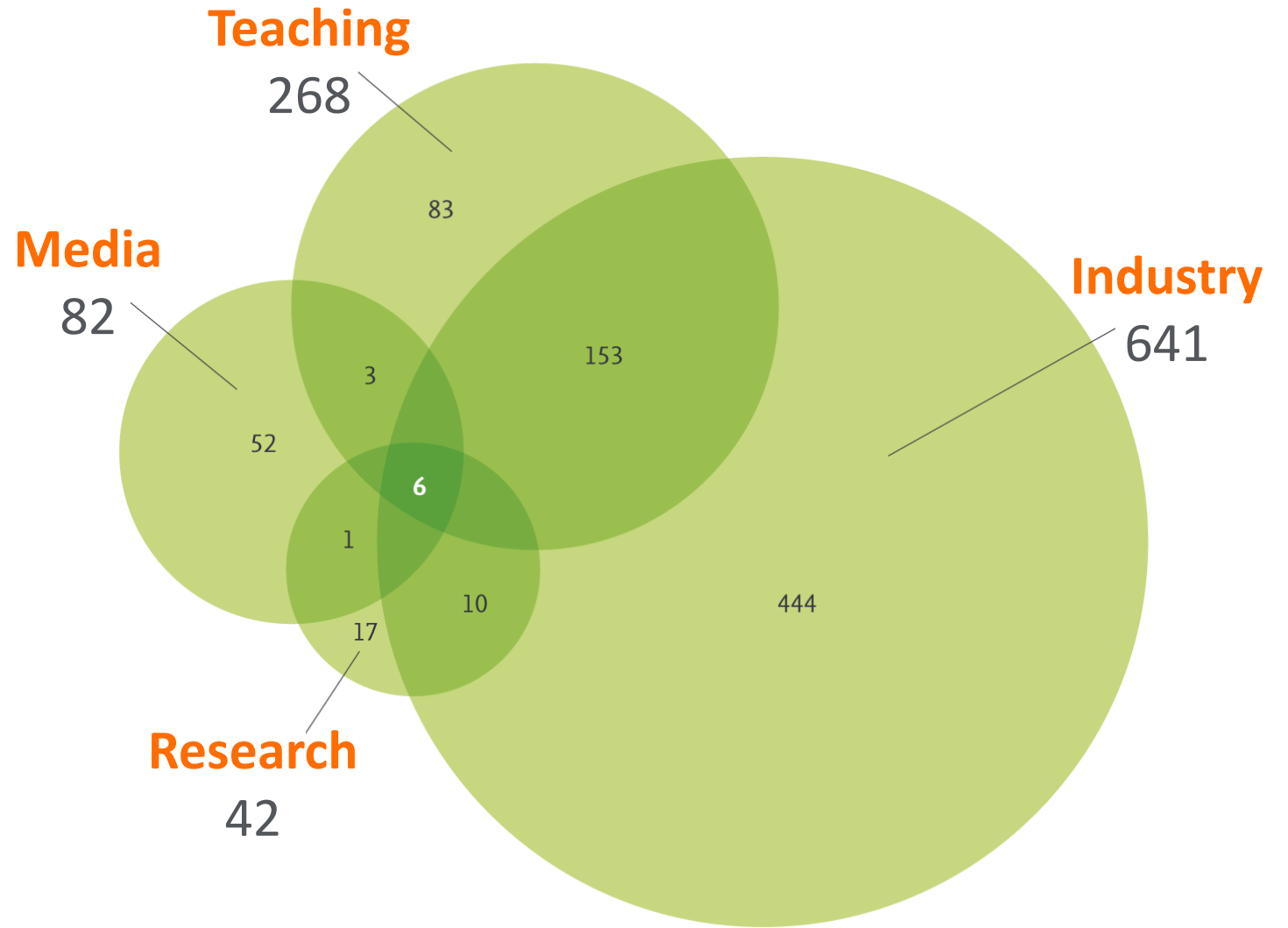


Process followed for selecting relevant AI publications for our analyses.

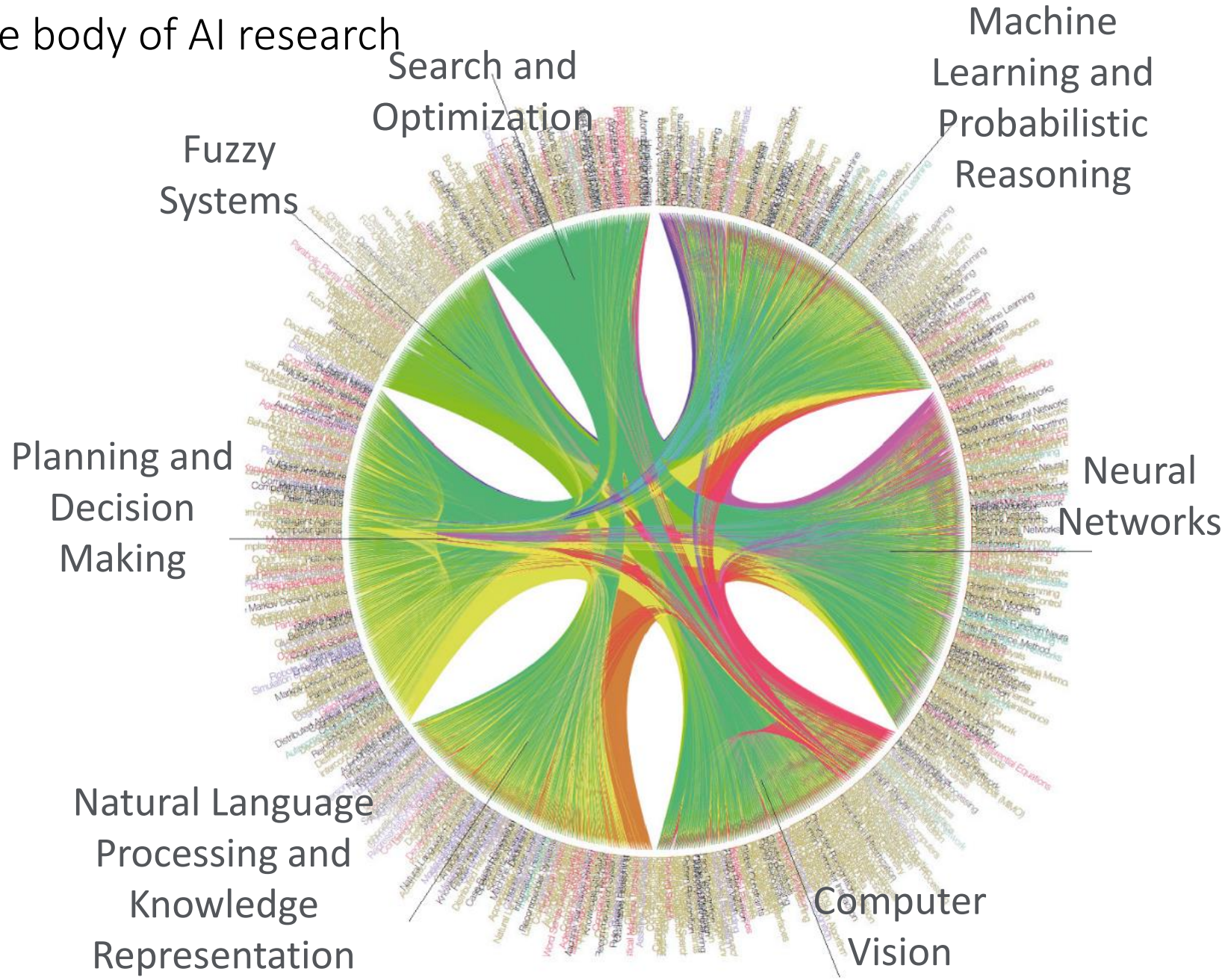
First finding: little common language

Keywords shared across all 4 perspectives:

- Artificial Intelligence
- Deep Learning
- Machine Learning
- Neural Network
- Reinforcement Learning
- Speech Recognition`

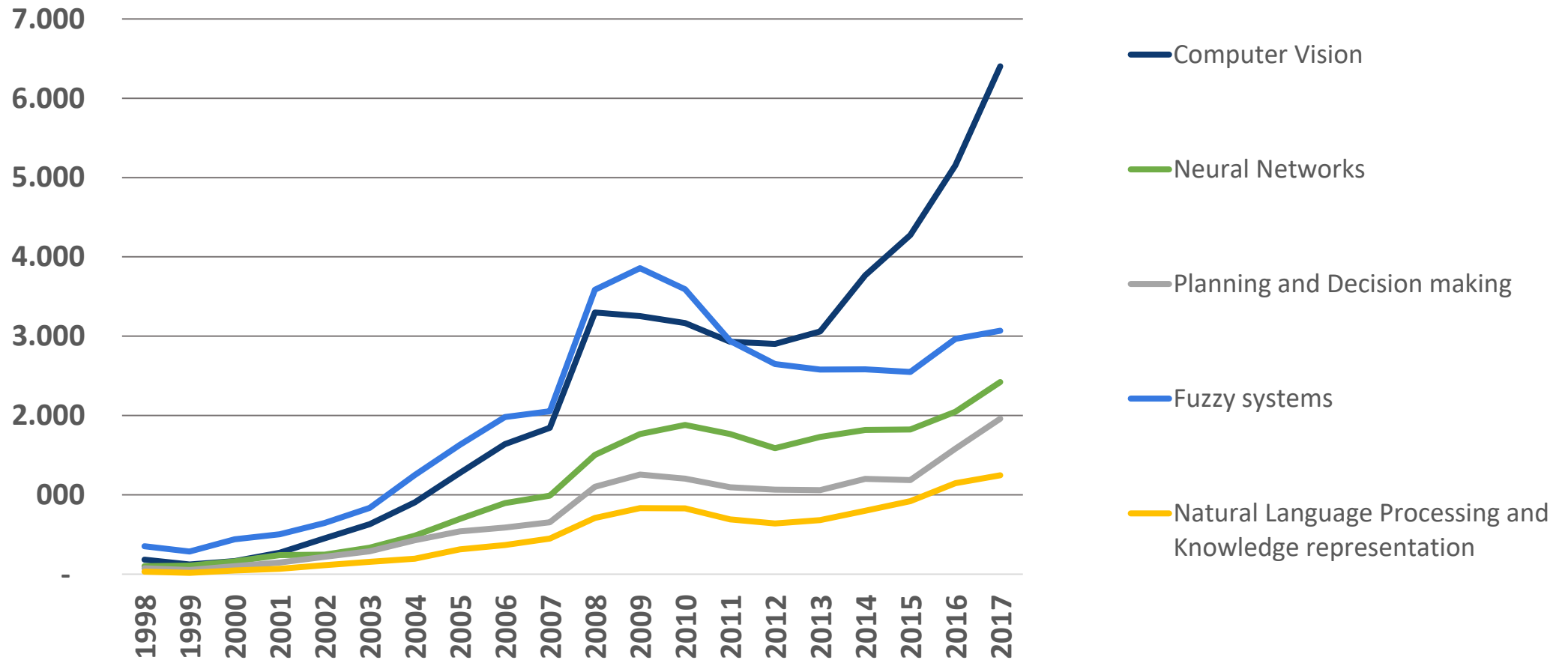


Structuring the body of AI research



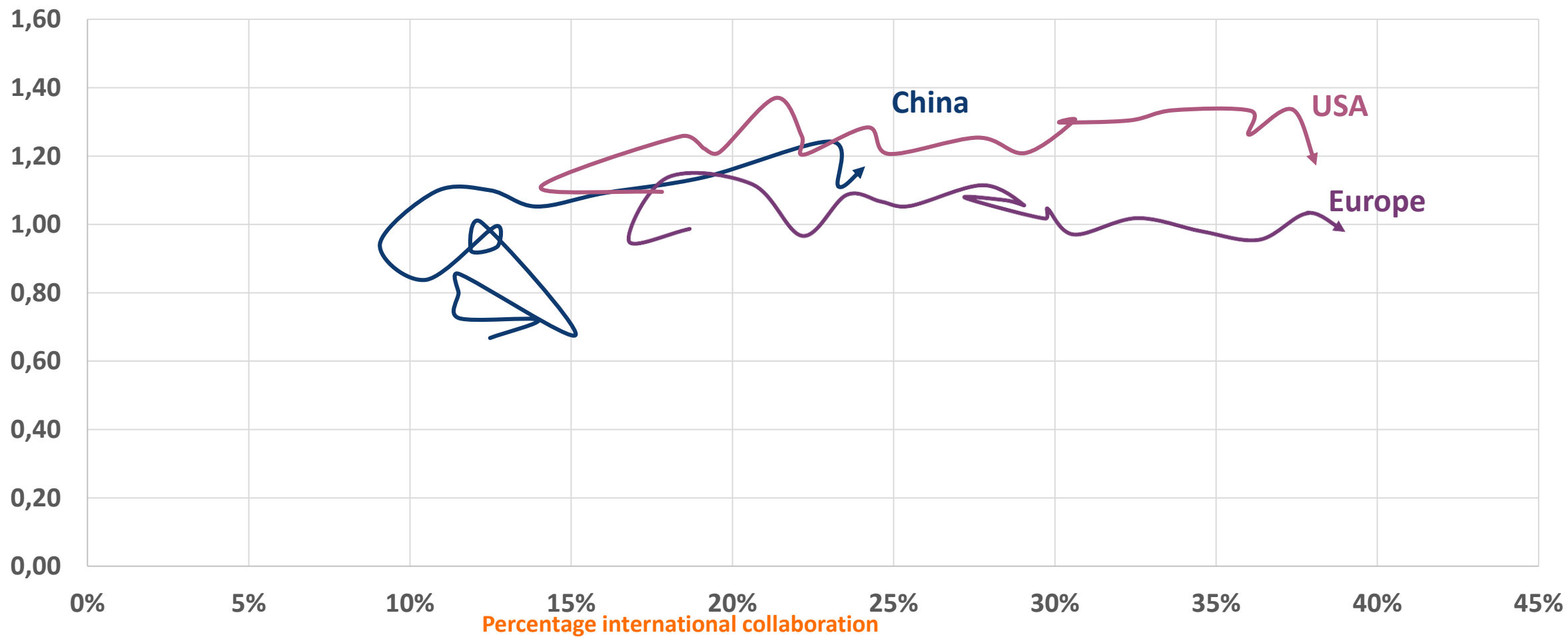
Clustering makes detailed analysis possible

China, Number of publications

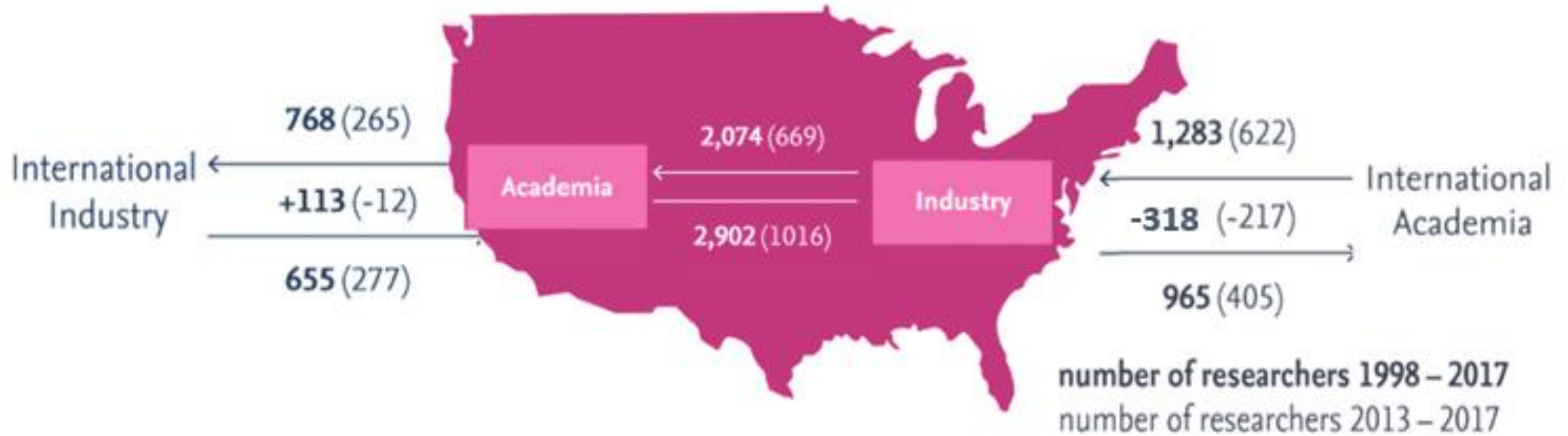


... showing trends over time

Rebased FWCI vs. international collaboration



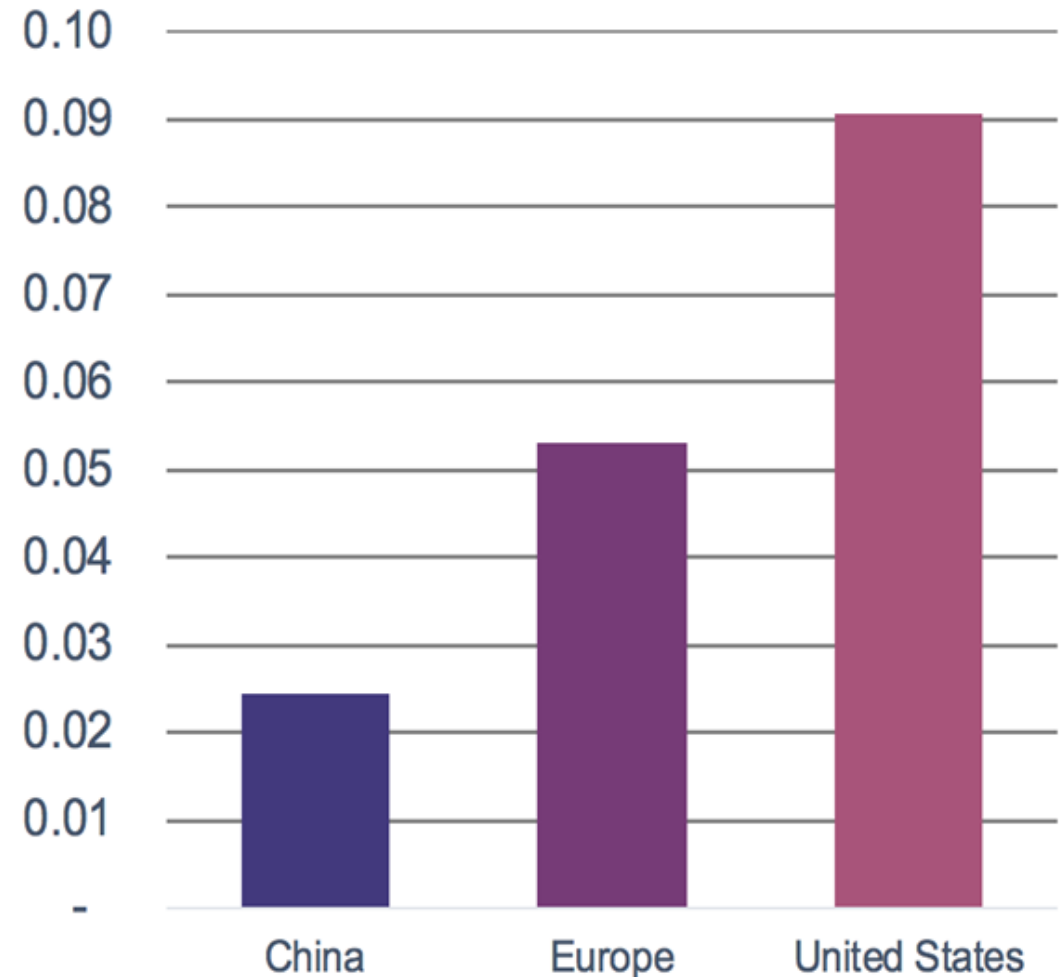
... and answering questions on “brain drain/gain”



... and linking to (proxies for) impact outside academia

- Patents
- Social media, news
- Policy citations
- Clinical guidelines
- ...

Average blogging & news mentions per publication



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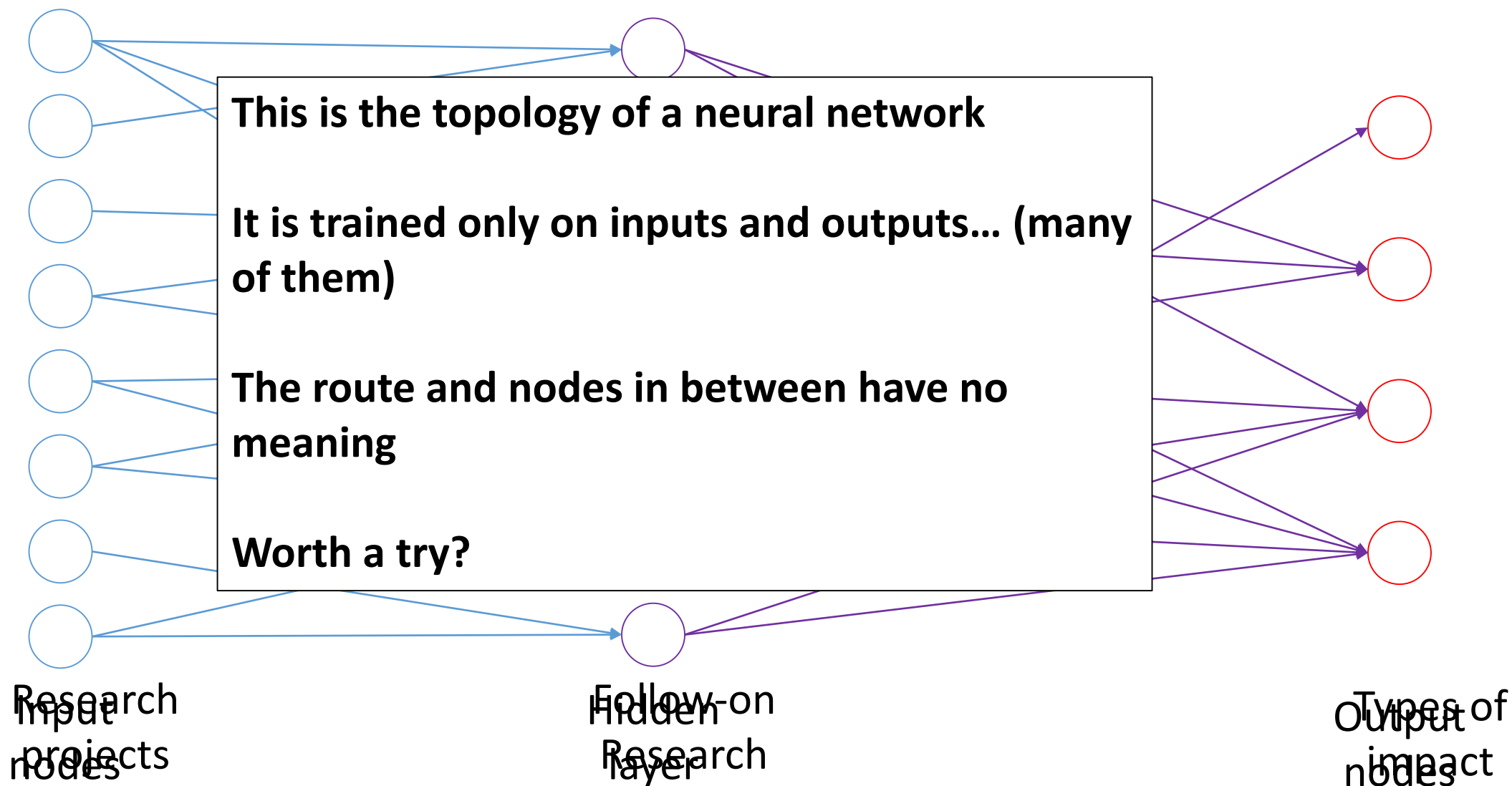
Big data about research

Conclusion

Conclusion

- Research has impact!
- There's often no straight line between research and impact
 - Research is organised around disciplines
 - Impact may be serendipitous and far into the future
 - It's a many-to-many relation
- Case studies show impact of research, but are labour intensive. Big data analytics can connect research to impact, on portfolio level
- With machine learning and AI, a wealth of opportunity opens up already today
 - Text mining to bring integrate society perspective into research
 - Using machine learning to identify the relevant body of research for a mission, technology, challenge,...
 - Using clustering algorithms to self-cluster within a field
 - Tracing citation links to other databases

Parting thought... Impact 2.0?





Thank you



Upcoming webinar later this fall

Contact Günther Hansen

