

Title: Like penguins on an ice floe: The scary business of adopting open science practices

Date: Mar 26, 2018 10:00 AM

URL: <http://pirsa.org/18030098>

Abstract: In the talk I delineate a simple framework for open science and present empirical results on the adoption of open practices from my own research (+ others). The topics include data sharing, open access infrastructure, and replicability. I will show future perspectives for open science (including knowledge transfer and transdisciplinary research).



BENEDIKT FECHER

# OPEN SCIENCE: A DRAMA IN THREE ACTS

OPEN RESEARCH: RETHINKING SCIENTIFIC COLLABORATION / PERIMETER INSTITUTE

WATERLOO / MARCH 26 / 2018

# OPEN SCIENCE – A DRAMA IN THREE ACTS

ACT I HACKING THE IVORY TOWER?

WHAT IS OPEN SCIENCE? AND WHAT NOT?

ACT II LIKE PENGUINS ON AN ICE FLOE

INCENTIVES FOR OPEN RESEARCH (CASE: DATA SHARING)

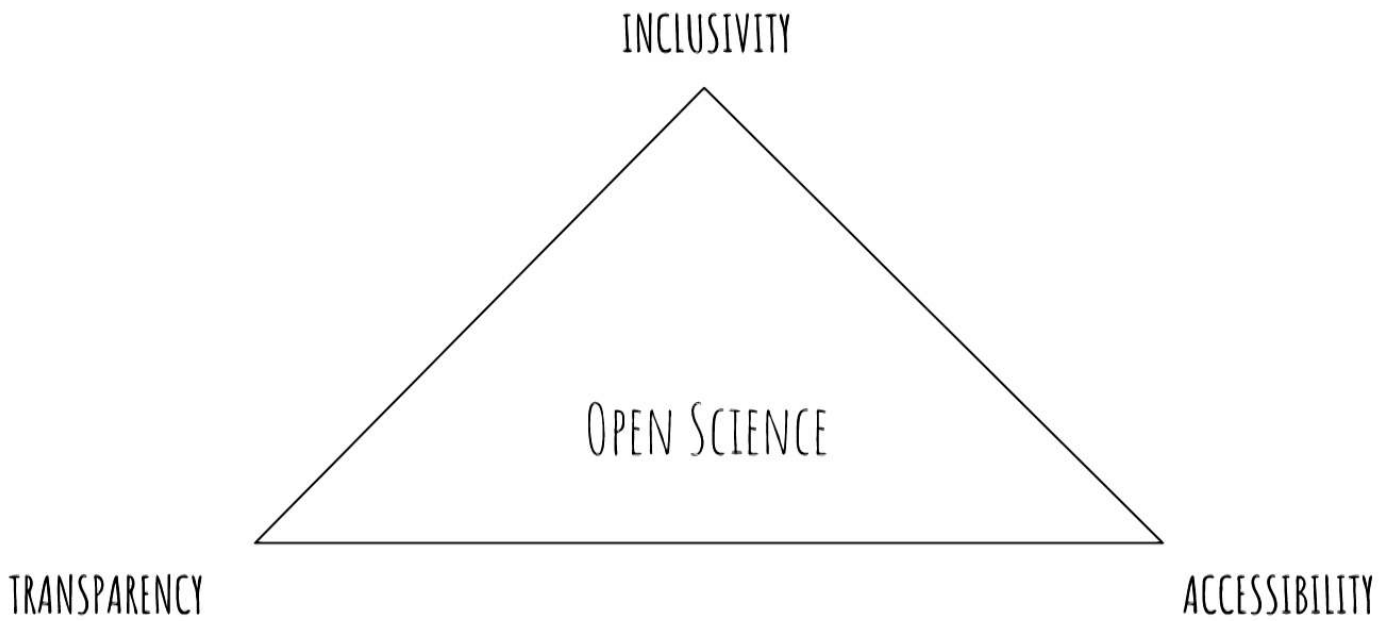
ACT III QWERTY WORLDS

INFRASTRUCTURE IN OPEN RESEARCH (CASE: OPEN ACCESS)



ACT I  
HACKING THE  
IVORY TOWER?

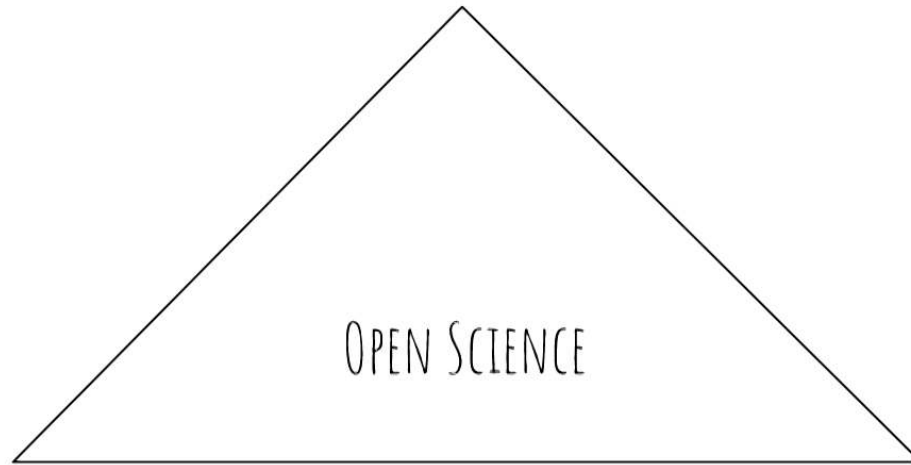
OPEN SCIENCE HAS THREE DIMENSIONS: INCLUSIVITY, TRANSPARENCY, ACCESSIBILITY.



FECHER ET AL. (2018, FORTHCOMING)

IDEALLY OPEN SCIENCE MAKES RESEARCH BETTER AND MORE EFFICIENT.

INCLUSIVITY --> COLLABORATION (E.G., OPEN DATA)



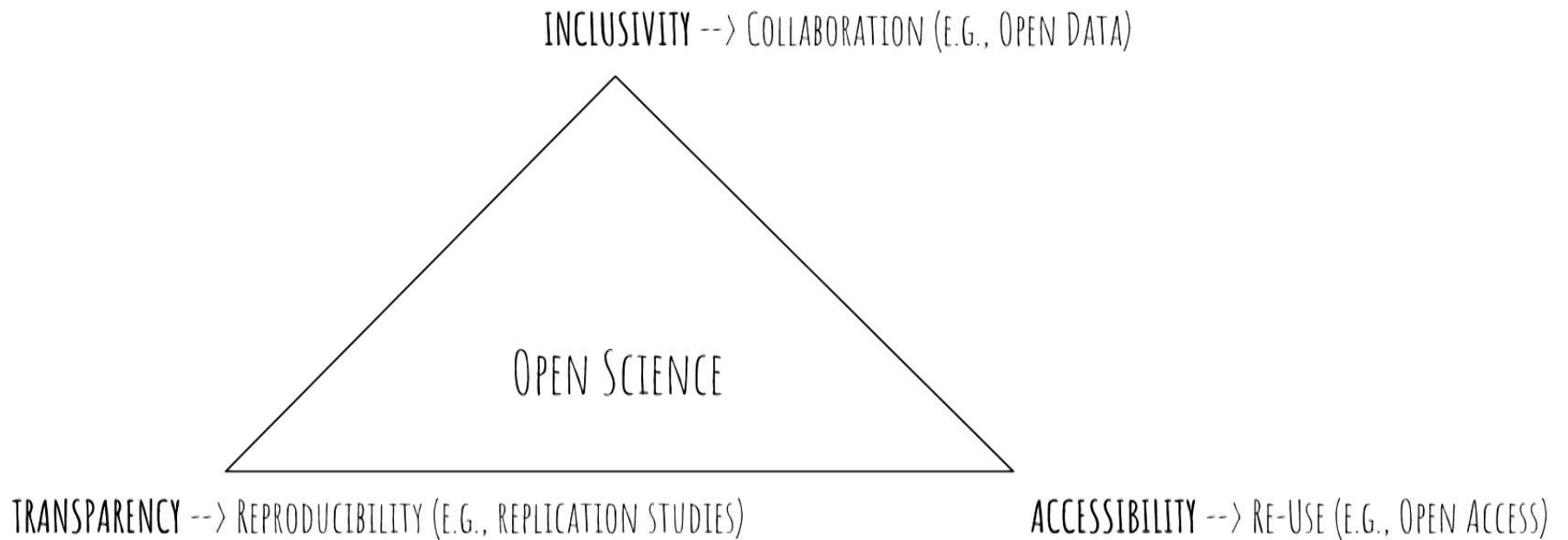
OPEN SCIENCE

TRANSPARENCY --> REPRODUCIBILITY (E.G., REPLICATION STUDIES)

ACCESSIBILITY --> RE-USE (E.G., OPEN ACCESS)

FECHER ET AL. (2018, FORTHCOMING)

IDEALLY OPEN SCIENCE MAKES RESEARCH BETTER AND MORE EFFICIENT.

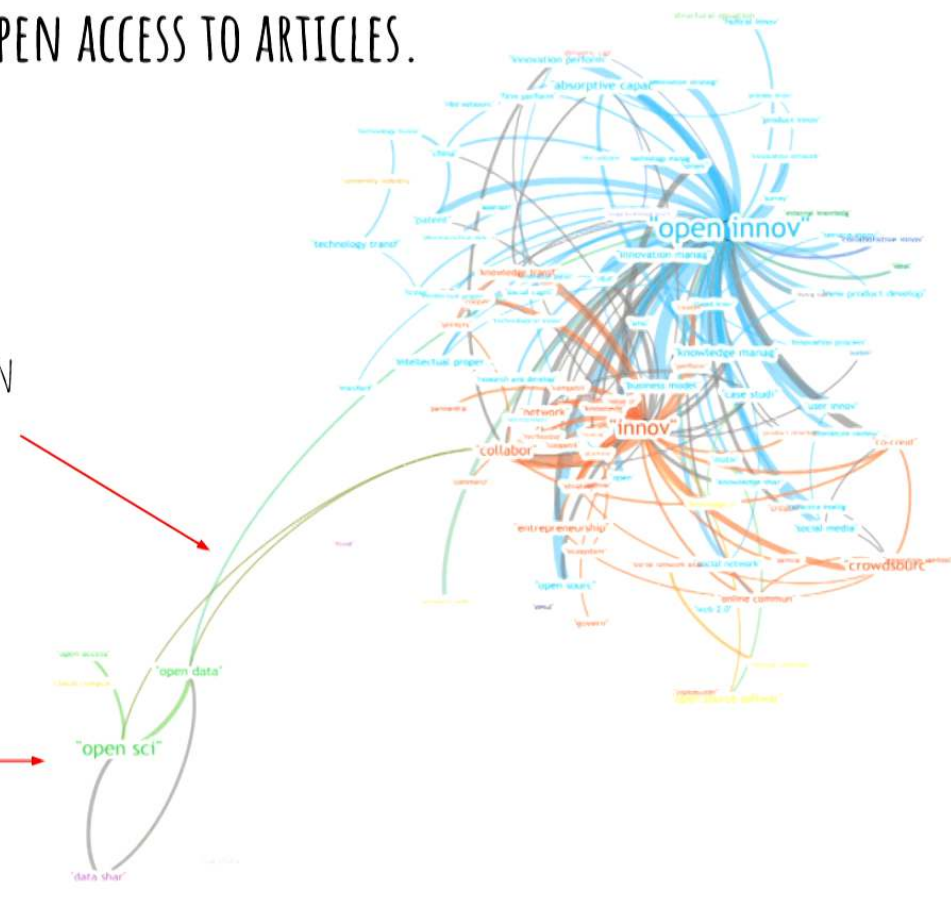


FECHER ET AL. (2018, FORTHCOMING)

# OPEN SCIENCE IS DATA SHARING AND OPEN ACCESS TO ARTICLES.

FEW TO NO LINKS TO OPEN INNOVATION

OPEN ACCESS, OPEN DATA & MASS COMPUTING



# OPEN DATA IS SUPPORTED BY FUNDERS AND POLICY MAKERS.

- OPEN ACCESS TO RESEARCH DATA DEEPLY ROOTED IN THE SCIENTIFIC SELF-CONCEPTION
  - MERTONIAN NORMS, E.G. COMMUNALISM, ORGANIZED SKEPTICISM
  - POPPER'S CRITICAL RATIONALISM, FALSIFIABILITY
- OPEN DATA / DATA SHARING POLICIES ADOPTED BY MANY FUNDERS
  - E.G. EUROPEAN RESEARCH COUNCIL, HORIZON2020, WELLCOME TRUST, ALL US FEDERAL AGENCIES (INCL. NSF AND NIH)
  - CANADA: CIHR, NSERC, SSHRC
- OPEN DATA AND SCIENTIFIC PROGRESS
  - EFFICIENCY, E. G., META-ANALYSIS
  - QUALITY, E. G., REPLICATION STUDIES



# RESEARCHERS LIKE OPEN DATA TOO ...

**Table 2: General perception towards open access to data**

From: A reputation economy: how individual reward considerations trump systemic arguments for open access to data

On a scale from 1 to 5; 1= "Strongly disagree"—5= "Agree completely"	Observation	IRR <sup>*</sup> (%)	Mean	Standard deviation	[95% Conf. interval]		Responses in per cent:				
							Strongly disagree	2	3	4	Agree completely
"Researchers should generally publish their data"	1491	95	4.10	1.00	4.05	4.15	1.95	5.90	16.57	31.32	44.27
"I have more disadvantages than advantages when I share my data with others"	1419	91	2.32	1.16	2.26	2.38	28.61	33.19	21.35	11.49	5.36
"It deters me from publishing when a journal requires the publication of my data"	1412	90	1.94	1.14	1.88	2.00	48.30	25.71	13.95	7.86	4.18
"Openly available research data is a great contribution to scientific progress"	1449	93	4.34	0.94	4.29	4.39	1.73	3.80	11.32	25.05	58.11

FECHER ET AL. (2017)

... AND BELIEVE IT'S GOOD FOR SCIENTIFIC PROGRESS.

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FECHER ET AL. (2017)

## BUT THEY RARELY SHARE THEIR DATA OPEN.

Table 3: “Have you ever shared your research data with others?”

From: A reputation economy: how individual reward considerations trump systemic arguments for open access to data

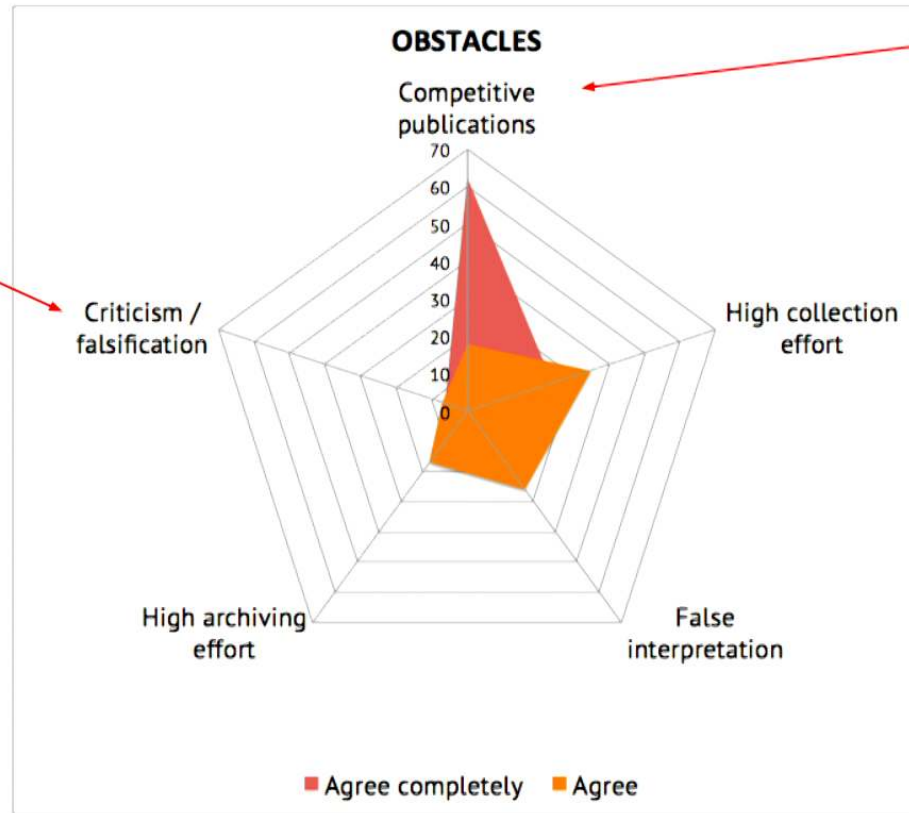
Binary, multiple choice; 1=selected; 0=not selected	Observation	Mean	Standard error	[95% Conf. interval]		Responses in per cent:	
						Selected	Not selected
“Yes, with researchers who I know personally”	1564	0.58	0.12	0.56	0.61	<b>58.06</b>	41.94
“Yes, with researchers within my institute or my organization”	1564	0.49	0.13	0.47	0.52	<b>49.36</b>	50.64
“Yes, with researchers who work on similar topics”	1564	0.40	0.12	0.38	0.43	<b>40.35</b>	59.65
“Yes, with all non-commercial researchers”	1564	0.14	0.08	0.13	0.16	<b>14.45</b>	85.55
“With commercial researchers”	1564	0.06	0.01	0.05	0.07	<b>5.88</b>	94.12
“Yes, with the public”	1564	0.13	0.01	0.11	0.15	<b>13.11</b>	86.89
“No”	1564	0.16	0.01	0.14	0.18	<b>16.30</b>	83.70

FECHER ET AL. (2017)

THE REASON THEY DON'T SHARE IS BECAUSE THEY FEAR A COMPETITIVE DISADVANTAGE.

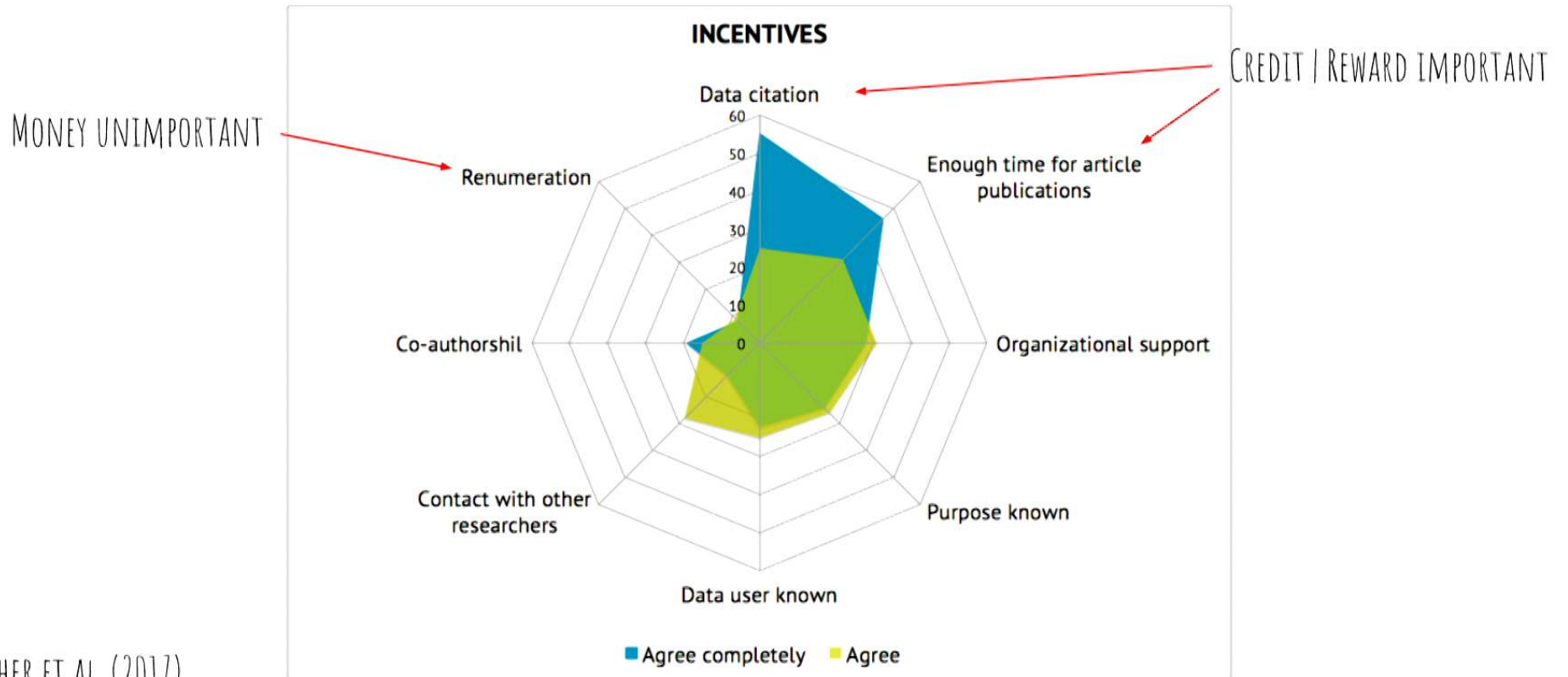
FALSIFICATION IS NOT AN ISSUE

CREDIT / REWARD IMPORTANT



FECHER ET AL. (2017)

THEY WOULD POTENTIALLY SHARE MORE IF DATA SHARING RECEIVED MORE FORMAL RECOGNITION.



FECHER ET AL. (2017)

BUT: DATA IS NOT CONSIDERED A SCIENTIFIC PRODUCT ITSELF (YET).

AND WHAT ABOUT SOFTWARE / CODE,  
RESEARCH INFRASTRUCTURE, TRANSFER  
PRODUCTS?





ACT II  
A QWERTY WORLD

## OPEN ACCESS IS SOON THE DEFAULT STATE.

- ALMOST HALF THE ARTICLES PUBLISHED ARE OPEN ACCESS
  - EUROPE: IN TOTAL 45%; GERMANY 45%; NETHERLANDS 58%
  - NORTH AMERICA: CANADA 49%; US 56% (ARTICLES PUBLISHED BETWEEN 2004 – 2011)
- MAJORITY (50+) OF ARTICLES PUBLISHED AS OA HAS BEEN REACHED IN GENERAL SCIENCE & TECHNOLOGY, IN BIOMEDICAL RESEARCH, BIOLOGY, AND MATHEMATICS & STATISTICS (FOR COMPARISON: SOCIAL SCIENCES 36 %)
- GREEN OA MOVES SLOWLY (2 % GROWTH RATE PER YEAR), GOLD AND HYBRID OA IS DRIVING IN THE FAST LANE (24% PER YEAR)
- CITATION ADVANTAGE (I.E., LAWRENCE 2001, ANTELMAN 2004)

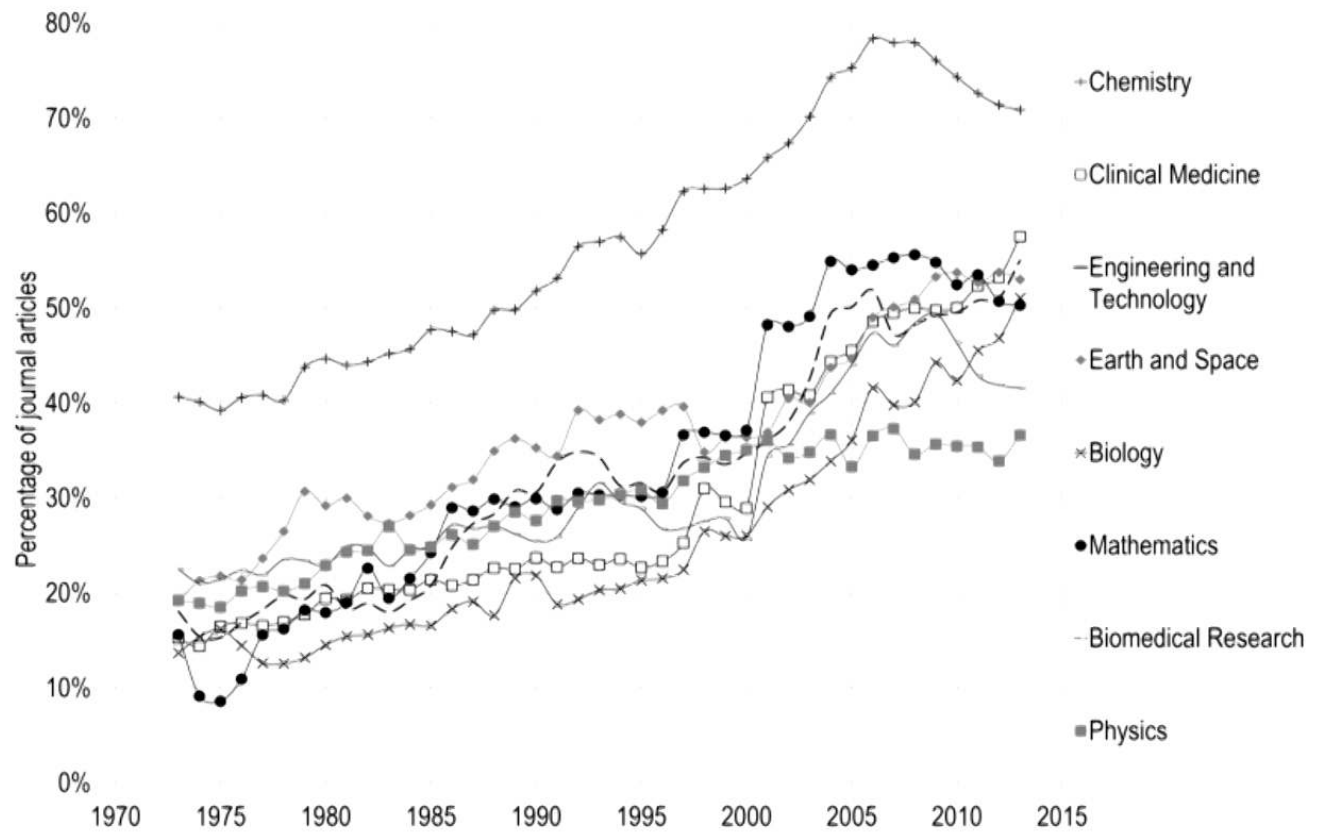


MAIN SOURCE

ARCHAMBAULT ET AL. 2013: PROPORTION OF OPEN ACCESS PEER-REVIEWED PAPERS AT THE EUROPEAN AND WORLD LEVELS—2004-2011

# A FEW COMMERCIAL PLAYERS ORGANIZE ACADEMIC PUBLISHING.

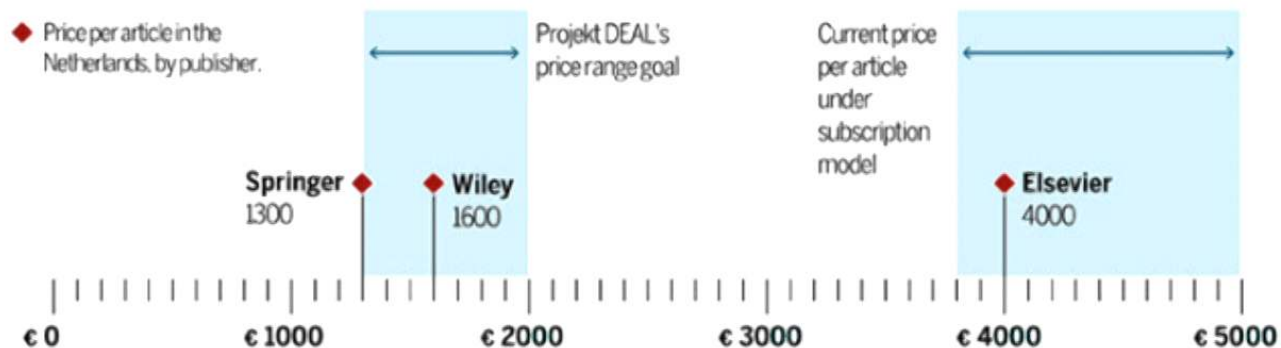
PERCENTAGE OF PAPERS PUBLISHED BY THE FIVE MAJOR PUBLISHERS, BY DISCIPLINE IN THE NATURAL AND MEDICAL SCIENCES, 1973-2013



LARIVIÈRE ET AL. (2015)

# A "BIG DEAL" IS A FLAT RATE TO PUBLISH OA AND READ FOR FREE.

BIG DEAL MEANS PAYING A LUMP SUM  
IN ORDER TO PUBLISH ALL GERMAN  
ARTICLES OA AND TO LET GERMAN  
RESEARCHERS READ ARTICLES FREELY.



VOGEL & KUPFERSCHMIDT (2017)

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BUT: A "BIG DEAL" COULD HAVE ADVERSE EFFECTS.

EXCLUSION OF RESEARCHERS FROM POORER INSTITUTIONS AND COUNTRIES

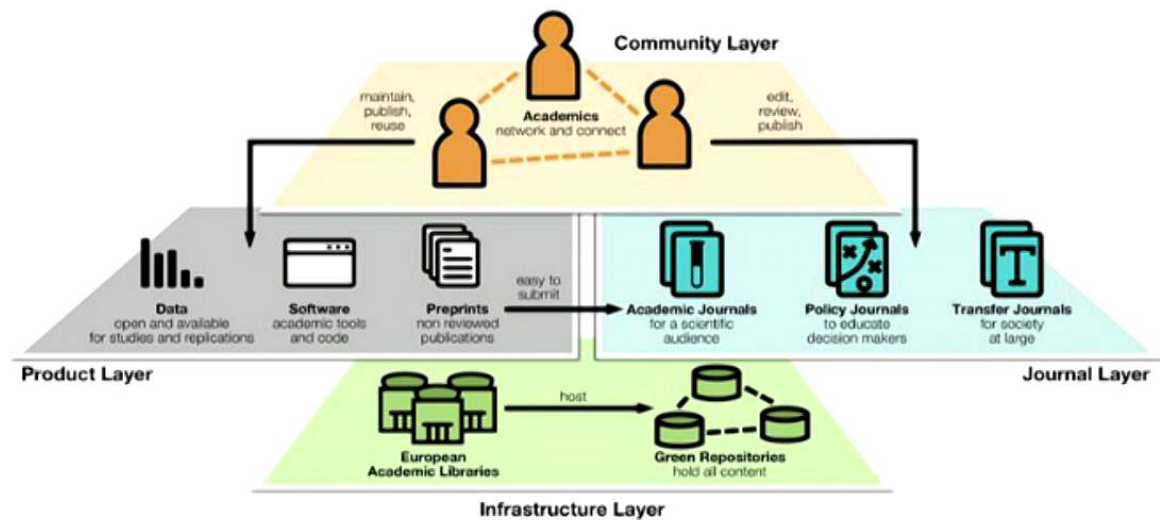
REPRODUCING DEPENDENCE ON THE ARTICLE

REPRODUCING DEPENDENCE FROM A FEW COMMERCIAL PUBLISHERS

FECHER ET AL. (2017)

OPEN SCIENCE IS ALSO ABOUT RECLAIMING THE INFRASTRUCTURE FOR THE SCIENTIFIC VALUE CREATION.

### Public European Open Access Platform



AND WHAT ABOUT SOFTWARE / CODE,  
RESEARCH INFRASTRUCTURE, TRANSFER  
PRODUCTS?

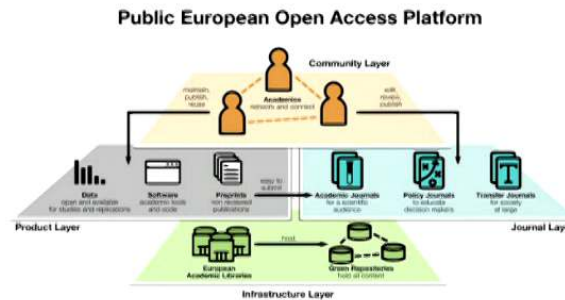
VOGEL & KUPFERSCHMIDT (2017)

# FOR OPEN SCIENCE TO BECOME REALITY, WE NEED TO ...

... MAKE IT WORTH IT



... CREATE PUBLIC INFRASTRUCTURES



... REFLECT ABOUT ITS ADDED SOCIAL VALUE



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THANK YOU VERY MUCH.

GET IN TOUCH

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