Kompetitive Forschungsfinanzierung

Effizienzsteigerung oder Innovationsbremse?

Gerald Schweiger

Priv. Doz. DDr. Mag. MA MA

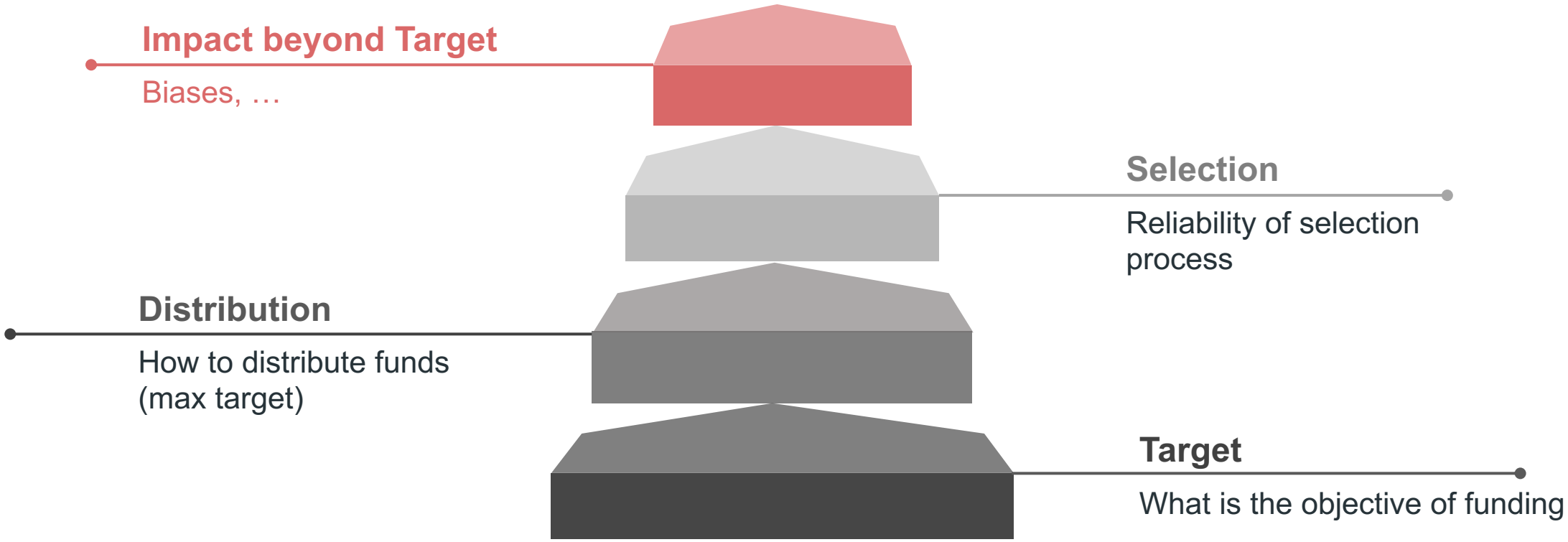

100
100
100
100
100
100
100
100
100
100

Money is a top priority

for universities, researcher, career paths, ...

Money in - publications out

money explains 2/3 of the variance


Impact beyond Target
Biases, …
Selection
Reliability of selection process
Distribution
How to distribute funds (max target)
Target
What is the objective of funding


Distribution

Nature article in 2011

> *“[…] it is a scandal that billions of dollars are spent on research without knowing the best way to distribute that money.” [i]*

[…] Empirical Studies

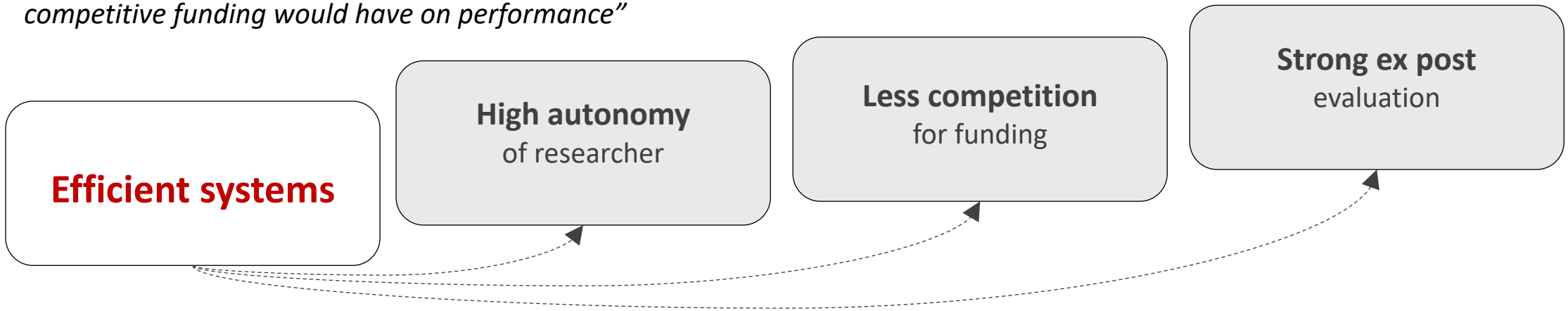
Journal of Informetrics

Funding, evaluation, and the performance of national research systems

Sandström a and Van den Besselaar 2018

Objective: They analyzed the impact of competition, autonomy, etc. on efficiency (based on 17 countries).

*"[…] we find a moderate to small **but negative correlation of about 0.3 between efficiency and** the level of **competitive project funding**. This finding seems to contradict many ideas about the positive effect any type of competitive funding would have on performance"*



ELSEVIER

Research Policy

University research funding and publication performance

Auranen and Nieminen 2010

Funding, evaluation, and the performance of national research systems

Sandström and Van den Besselaar 2018

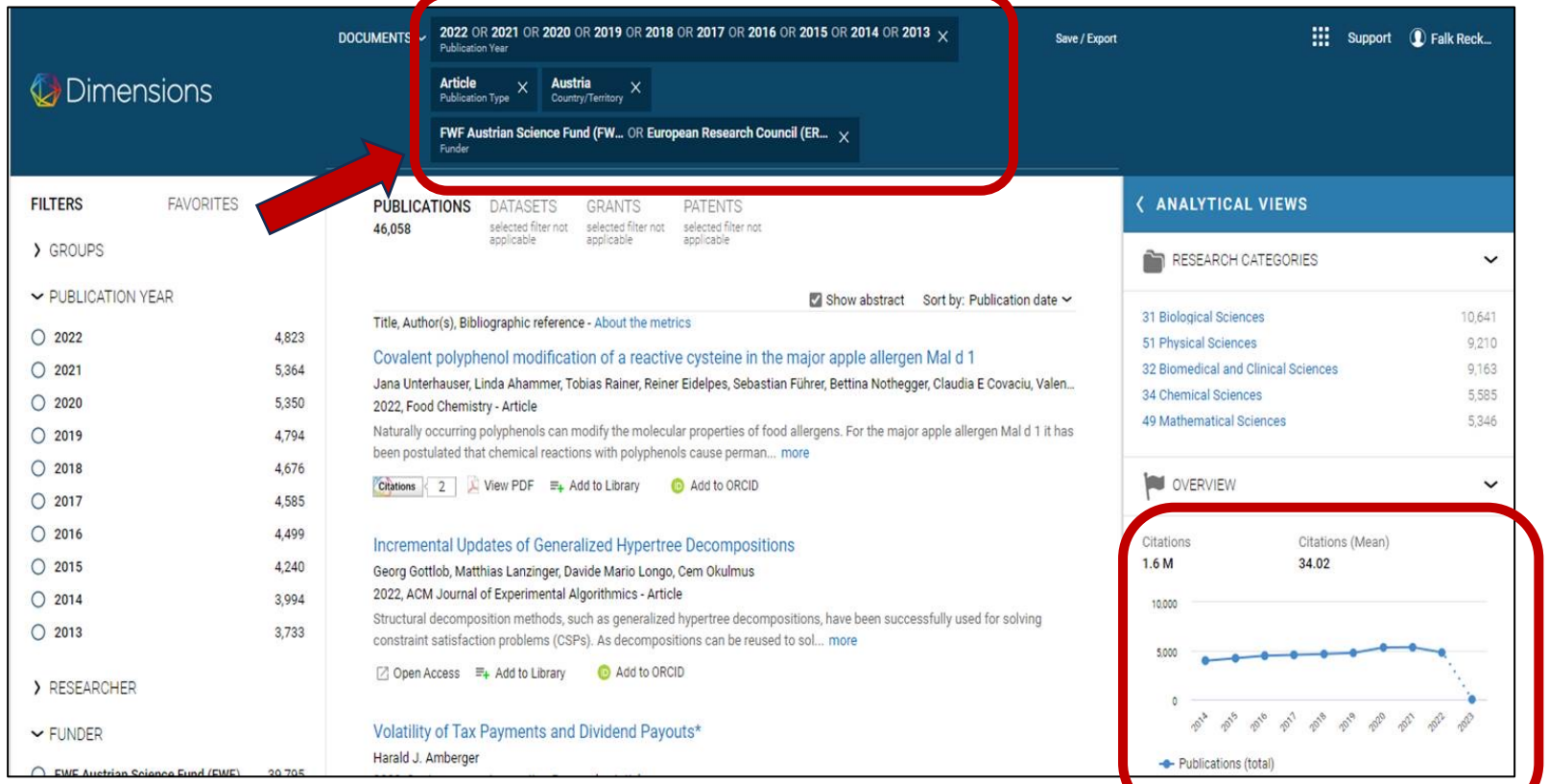
Objective: They analyzed the impact of competition on efficiency (based on 8 countries).

*"[…] The idea of output and competition-based incentives promoting productivity in science is **more complex than policy-makers seem to believe**."*

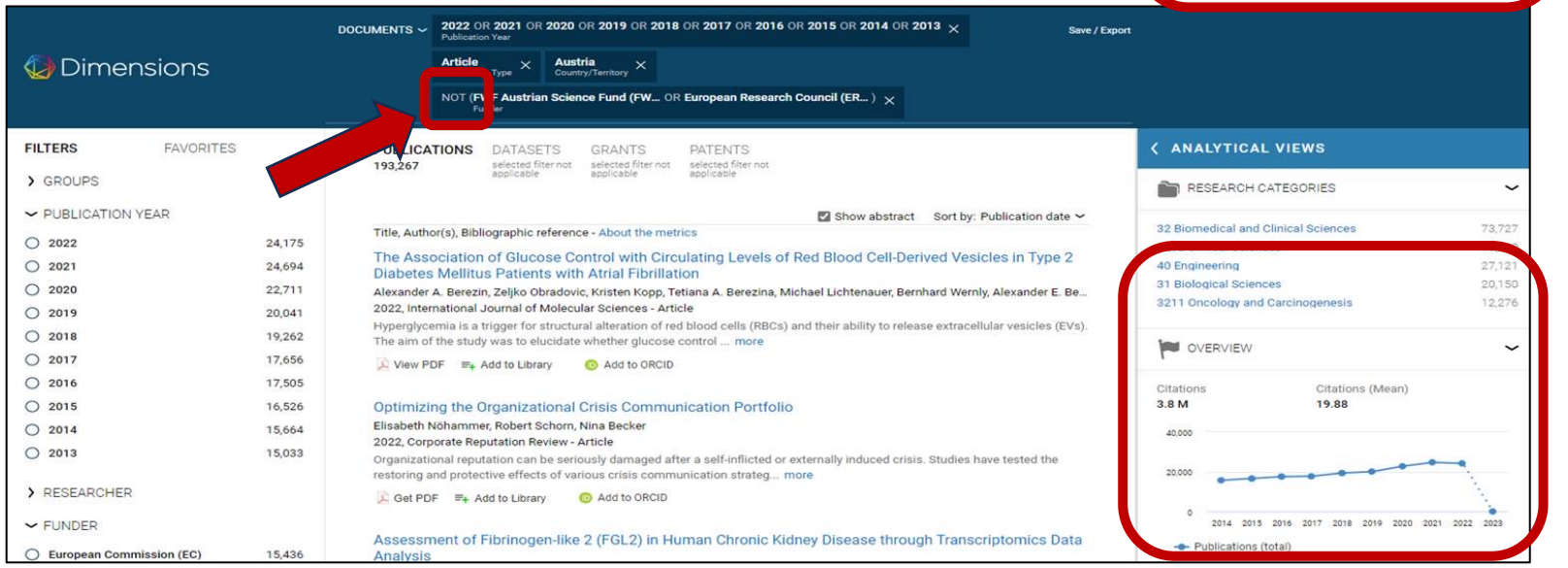
*"[…] **Too much competition may even be dysfunctional** from the perspective of productivity since competition for funding takes time and energy away from research and writing."*

Statement FWF

> *“[…] Und eine Erhebung zeigt, dass Forscherinnen und Forscher aus Österreich ohne Förderungen der großen Förderorganisationen, wie FWF oder European Research Council, weniger zitiert wurden als jene, die Förderungen und Grants erhielten. 17 Zitationen pro Publikation von nicht gefördeten Forschenden stehen 33 Zitationen bei geförderten Projekten gegenüber [1]”*



Per paper: 34 citations



Per paper: 20 citations

Statement FWF

> *"[…] Und eine Erhebung zeigt, dass Forscherinnen und Forscher aus Österreich ohne Förderungen der großen Förderorganisationen, wie FWF oder European Research Council, weniger zitiert wurden als jene, die Förderungen und Grants erhielten. 17 Zitationen pro Publikation von nicht gefördeten Forschenden stehen 33 Zitationen bei geförderten Projekten gegenüber[i]"*

- **First**: Influence of funding on the applicant's productivity
- **Second**: Cause & effect ?!
- **Third**: General problems with this statement

First: Influence of funding on the applicant's productivity

Bornmann, Loet, and Van den Besselaar.
"*A meta-evaluation of scientific research proposals: Different ways of comparing rejected to awarded applications*" Journal of Informetrics (2010)

Data

- 671 applications in social sciences (Dutch Economics and Social Research Council)
- 668 applications in life sciences (European Molecular Biology Organization)

Goal

- Compare funding decisions (award and rejection) with scientometric performance indicators

Statement FWF

"[…] Und eine Erhebung zeigt, dass Forscherinnen und Forscher aus Österreich ohne Förderungen der großen Förderorganisationen, wie FWF oder European Research Council, weniger zitiert wurden als jene, die Förderungen und Grants erhielten. 17 Zitationen pro Publikation von nicht gefördeten Forschenden stehen 33 Zitationen bei geförderten Projekten gegenüber[x]"

First: Influence of funding on the applicant's productivity

Bornmann et al. 2010

"[…] In both fields, awarded applicants perform on average better than all rejected applicants. If only the most preeminent rejected applicants are considered in both fields, they score better than the awardees on citation impact.

Statement FWF

"[…] Und eine Erhebung zeigt, dass Forscherinnen und Forscher aus Österreich ohne Förderungen der großen Förderorganisationen, wie FWF oder European Research Council, weniger zitiert wurden als jene, die Förderungen und Grants erhielten. 17 Zitationen pro Publikation von nicht gefördeten Forschenden stehen 33 Zitationen bei geförderten Projekten gegenüber[x]"

First: Influence of funding on the applicant's productivity

Thorngate et al. 2002

[…] "Some of the losing proposals are truly bad, but not all; many of the rejected proposals are no worse than many of the funded ones . […] When proposals are abundant and money is scarce, the vast majority of putative funding errors are exclusory; a large number of proposals are rejected that are statistically indistinguishable from an equal number accepted" [2]

Second: Cause & effect ?!

Thelwall et al. 2023

> *"[…] For any analysis of the influence of funding on research, it is difficult to distinguish between cause and effect in terms of funders finding the best research/researchers or the funding improving/allowing research/researchers." [3]*

1: Although it seems self-evident that funding improves research → it is not always true.

2: There are many possible reasions that could explain the usually positive relationship:

- Funding improves existing research: it allow researchers to conduct better versions of the research that they had already intended; it support a larger scale survey, newer equipment, etc.
- Funding replaces weaker (or no) with stronger research: Funding might allow a study that would be impossible for the applicant(s) without external funding.
- Funding-led research goals are more valued. Research projects that align with funders' strategic priorities may be highly valued
- **Better researchers are more successful at attracting funding.**

Third: General problems with this statement

- Don‘t compare the citation impact of papers from different years and disciplines.
- Don‘t compare papers that have received funding with those that have not.

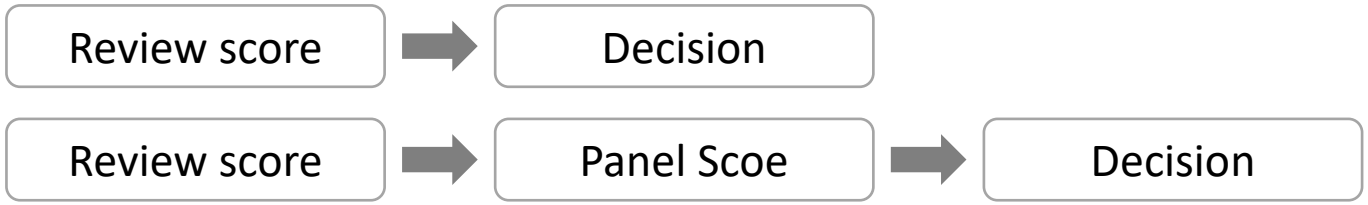
[…] Is there a way out?

⬇

Randomised studies

Are selection processes reliable?

Grant review process

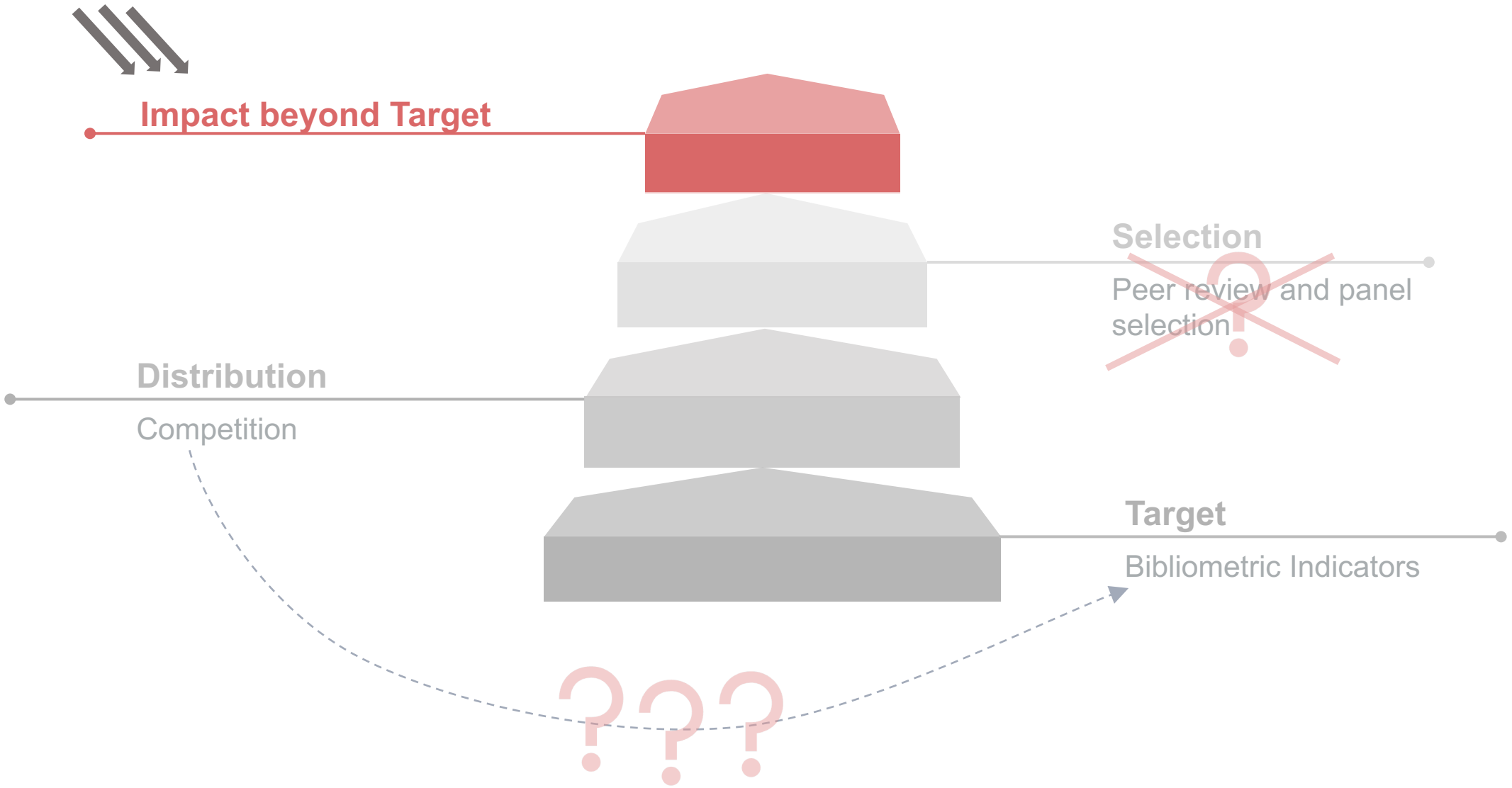


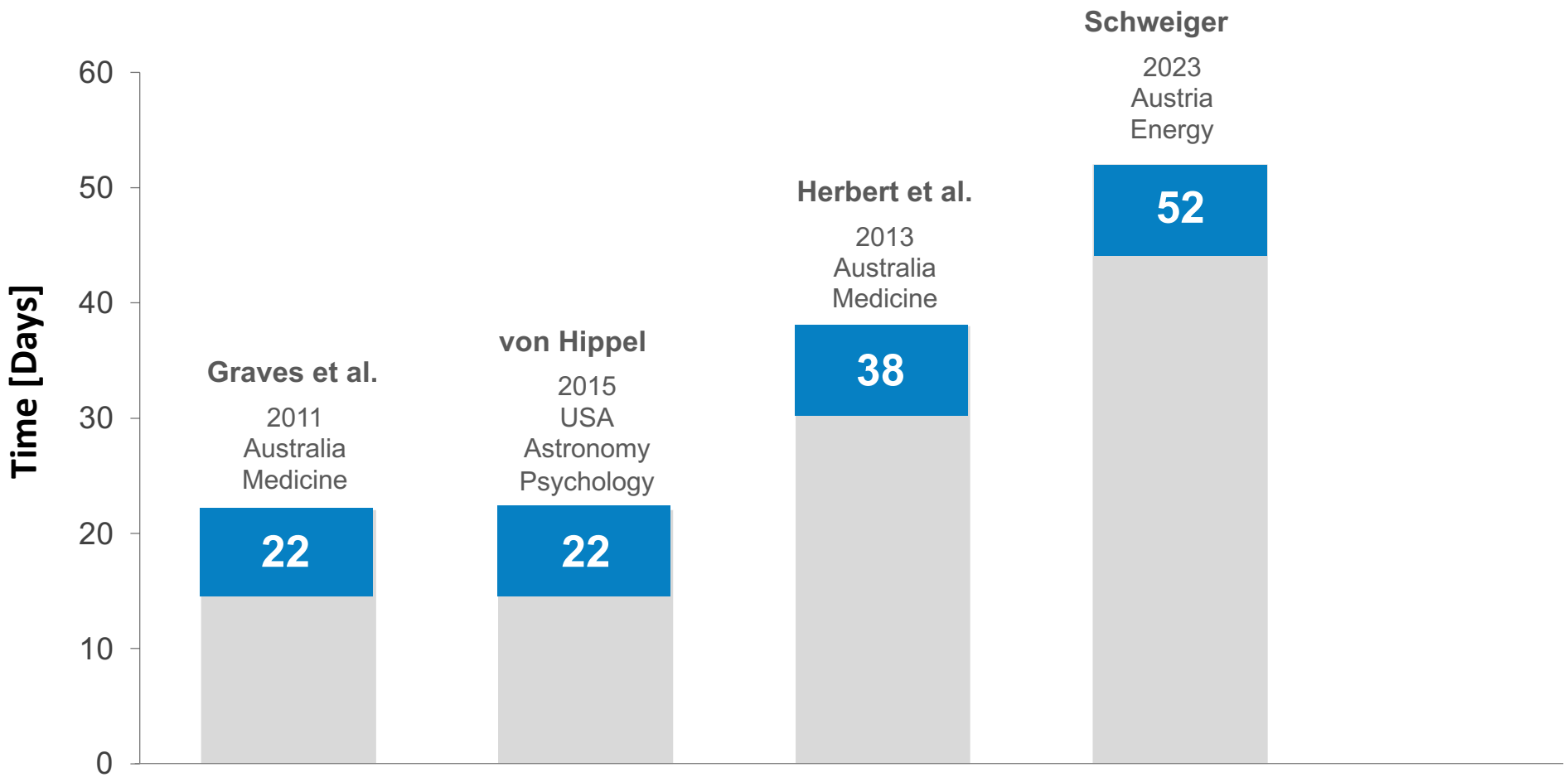
Review score - agreement between reviewers.

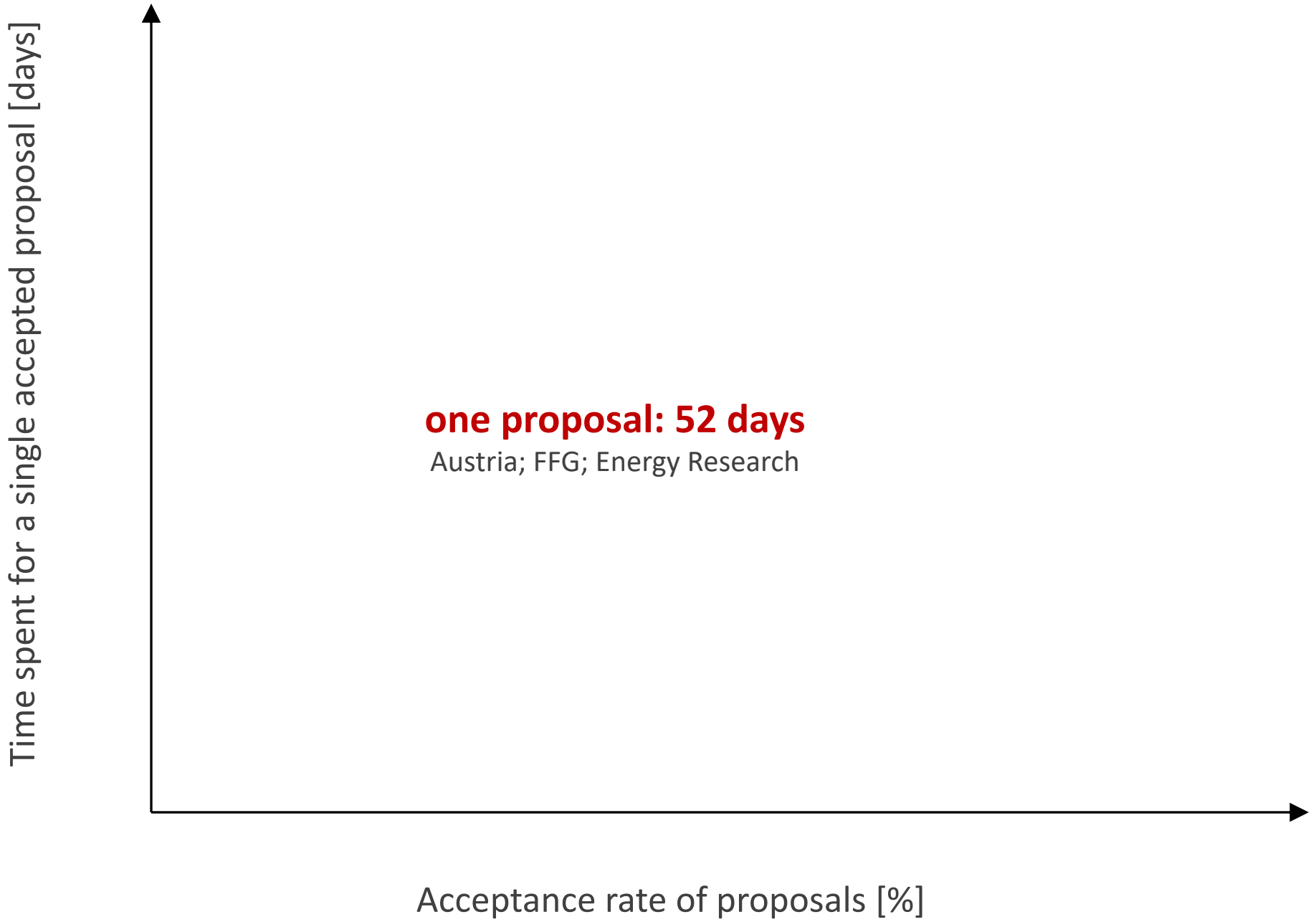
- Some studies: peer review process is entirely arbitrary [3].
- Some studies: very low [4] to moderate agreement [5].
- Some studies: statistically flawed (they only analyze accepted proposals) [6].

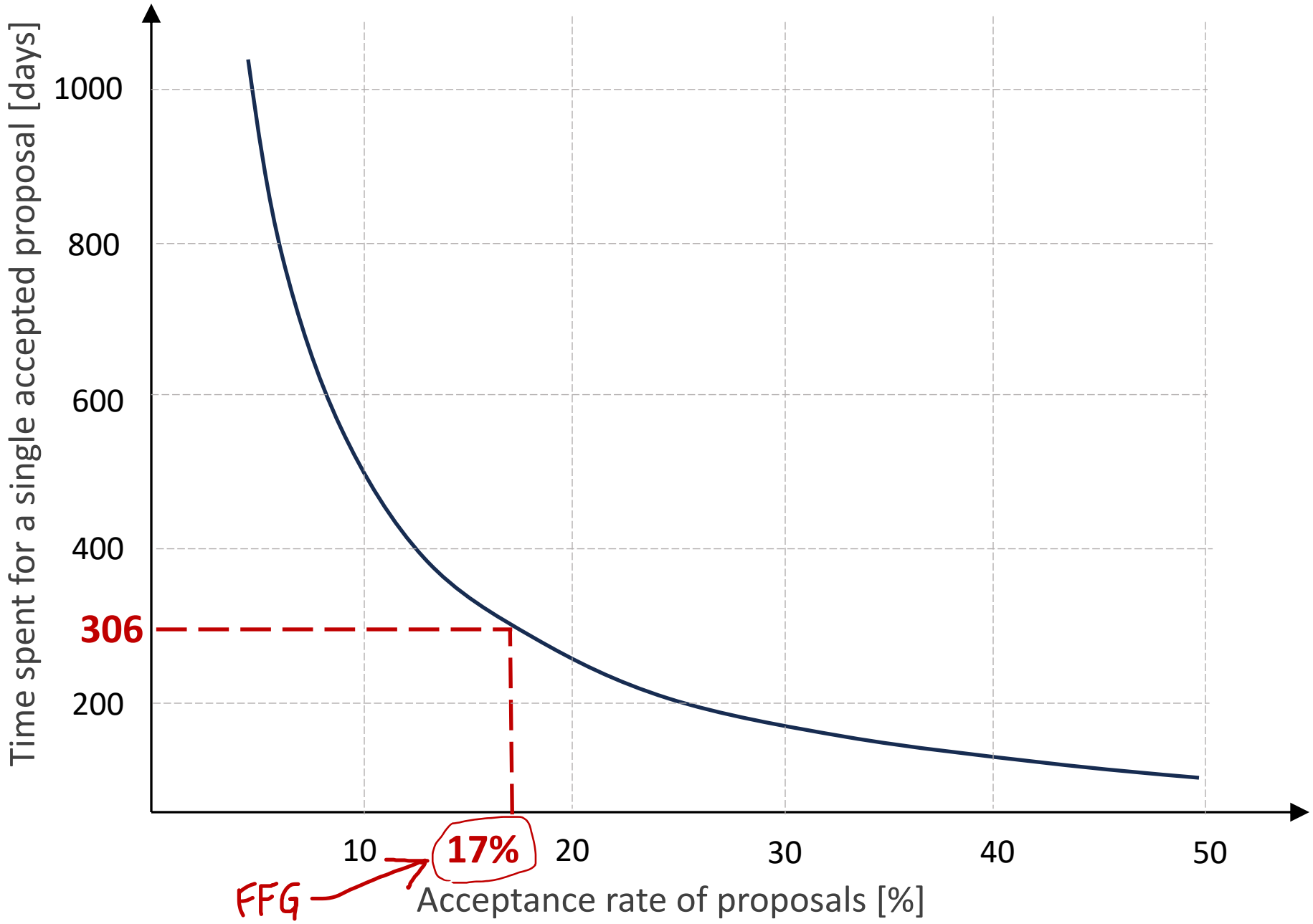
Panel score

- Study: proposals were evaluated by one of 45 panels: only 10% were always funded. They conclude that it is not only a costly but also a somewhat random process [8].
- Confirmed by presence qualitative studies analysing evaluation processes [9].
- *"We must begin to question whether a system in which funding decisions depend to a significant degree on chance is the most rational one" [10]… this was written in 1981*


Impact beyond Target
Selection
Peer review and panel selection
Distribution
Competition
Target
Bibliometric Indicators
???


Time [Days]
60
50
40
30
20
10
0
Graves et al.
2011
Australia
Medicine
22
von Hippel
2015
USA
Astronomy
Psychology
22
Herbert et al.
2013
Australia
Medicine
38
Schweiger
2023
Austria
Energy
52

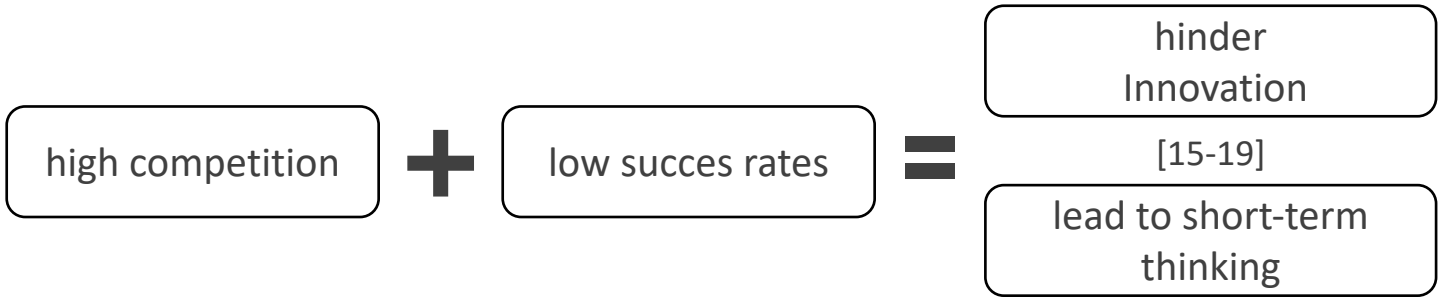

Time spent for a single accepted proposal [days]
one proposal: 52 days
Austria; FFG; Energy Research
Acceptance rate of proposals [%]


Time spent for a single accepted proposal [days]
1000
800
600
400
306
200
10
17%
20
30
40
50
FFG
Acceptance rate of proposals [%]

306 days for a single proposal

Austria; FFG; Energy Research

Bias?



Gender bias?

- A meta-analysis found no significant gender differences [20]

What else do we know?

Concentration or dispersal of funding

- A review shows the benefits of increased dispersal [21].
- Another study concludes that the output (measured in publications) per unit of money is smaller for large projects [22].

Researchers view

- 90% of researchers perceive that they spend too much time preparing proposals [14].
- Only 10% of researchers believe that the current competitive third-party funding system positively affects the quality of research [14].
- Studies have reported the negative impacts of competition on applicants' health and family life [23].

Management vs. Autonomy

- Increased power for management negatively affects performance, while high autonomy for researchers positively impacts performance [24].

[…] Fair weather science and the problem of bad ideas not dying

Let's assume you are leading a team of 10 people developing .....

... and all are funded by competitive third-party grants

Anton Zeilinger [25]

> *[…] wenn wir damals schon das Ziel klar definieren hätten müssen und die Methoden angeben hätte ich niemals den Nobelpreis bekommen.*
>
> *[…] es geht darum das ungewöhnliche zu finden und für das unvorhersehbare offen zu sein…es geht nicht um den nächsten Schritt den man klar definieren kann.*
>
> *[…] ich habe den Eindruck, dass Fördermechanismen heute immer stärker Richtung Praxis und Innovation.*

Anton Zeilinger [26]

> *[...] zugleich ist einiges, was unter angewandte Forschung geführt wird, vielleicht nicht ganz Forschung.*

What to we mean by (scientific) excellence?

Excellence: Everyone claims to have it

> *Excellence is a fuzzy notion, a somewhat ambiguous term to which different meanings can be described; excellence is a rationalizing myth [27].*

> *Some scholars even go a step further and argue that excellence has no intrinsic meaning in academia and that this leads to hyper-competition that contradicts the qualities of good research, problems with reproducibility, fraud, and conservatism [28].*

[…] Conclusion

We need to talk about excellence

[meta science, indeces, manager]

We need to talk about competition

[traditionally part of science?]

We need to talk about the research landscape

[non-academic research, applied research,...]

Self-correction, criticism, & the rejecting of bad ideas

[vs. Fair weather science]

Change the distribution process or accept chance

[lottery, 2-stage]

Less management (power), more autonomy for the researcher

[i] Ioannidis. Fund people not projects. Nature, 2011.
[1] https://science.orf.at/stories/3219220/
[2] Thorngate et al.Mining the archives: Analyses of CIHR research grant adjudications. Ottawa, Ontario. Carleton University, 2002
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[22] Fortin, Jean-Michel, and David J. Currie. Big science vs. little science: how scientific impact scales with funding."PloS one, 2013.
[23] Herbert et al. The impact of funding deadlines on personal workloads, stress and family relationships: a qualitative study of Australian researchers. BMJ, 2014
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[25] Festrede von Anton Zeilinger, Salzburger Festspiele
[26] https://www.wienerzeitung.at/h/die-welt-ist-offener-als-wir-glauben
[27] Jong, Franssen, and Pinfield. 'Excellence' in the research ecosystem: a literature review. RoRI Working Paper Series, 2021
[28] Moore et al. Excellence R Us: university research and the fetishisation of excellence. Palgrave Communications, 2017