Wissenschaft, Geld & Exzellenz

Gerald Schweiger

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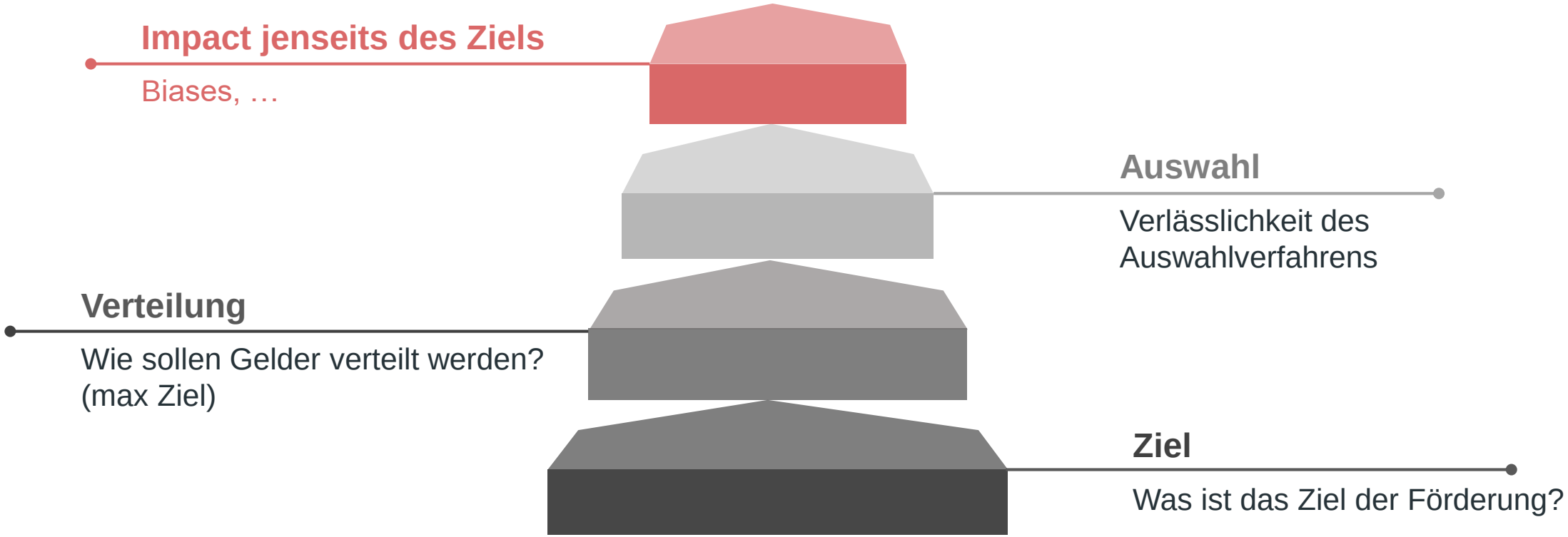
Forschungsgelder sind zentral

für Universitäten, Forscher:innen, Karrieren,...

Geld rein – Publikationen raus

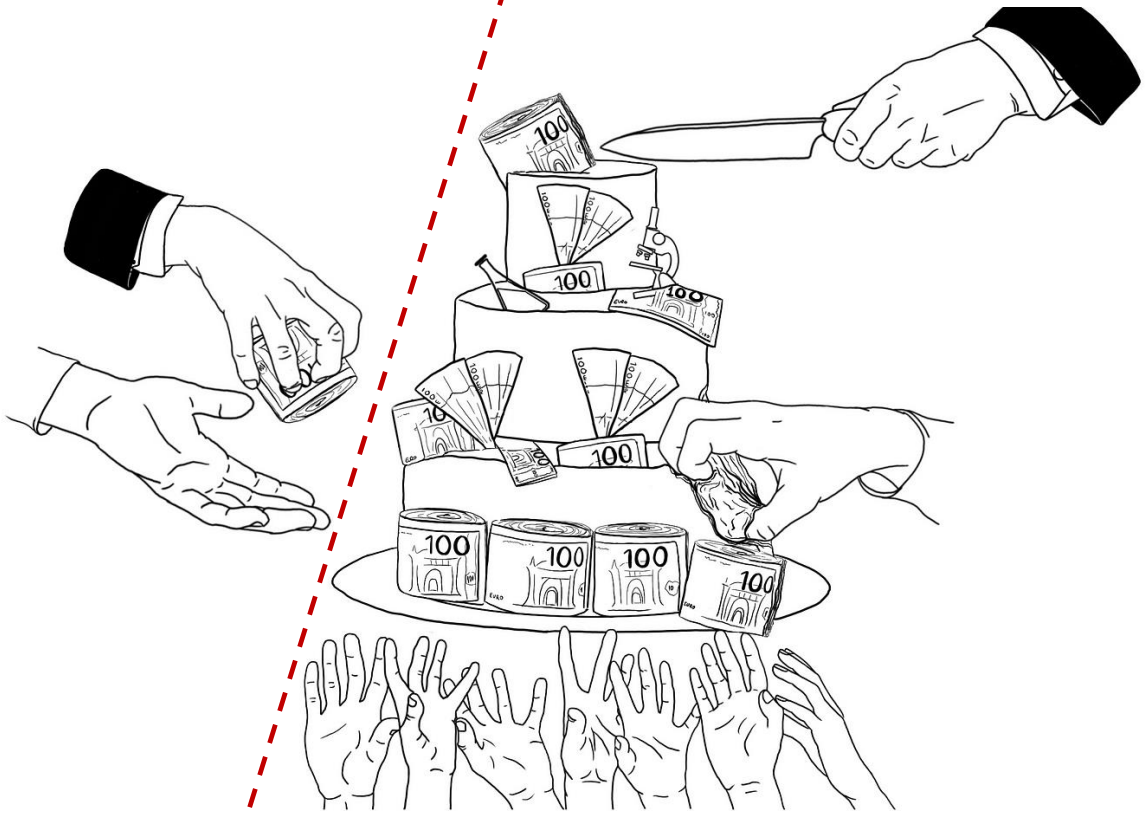
Geld erklärt rund 2/3 der Varianz [1]


Impact jenseits des Ziels
Biases, …
Auswahl
Verlässlichkeit des Auswahlverfahrens
Verteilung
Wie sollen Gelder verteilt werden? (max Ziel)
Ziel
Was ist das Ziel der Förderung?

Distribution

nicht kompetitiv

kompetitive



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.” [2]*

[…] Empirische Studien

Journal of Informetrics

Funding, evaluation, and the performance of national research systems

Sandström and Van den Besselaar 2018

Ziel: Analyse der Auswirkungen von Wettbewerb, Autonomie usw. auf die Effizienz (auf der Grundlage von 17 Ländern).

*"[…] 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"*

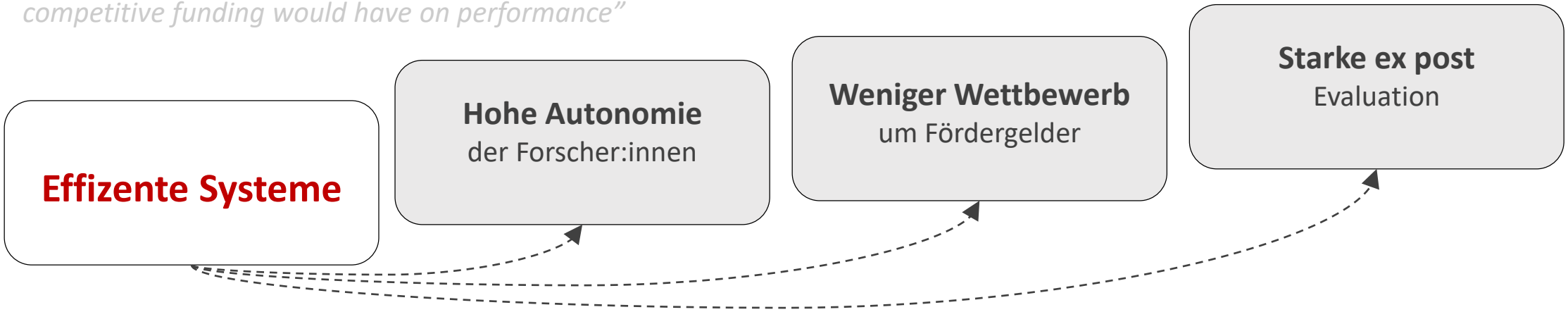
Journal of Informetrics

Funding, evaluation, and the performance of national research systems

Sandström 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

Funding, evaluation, and the performance of national research systems

Sandström and Van den Besselaar 2018

ELSEVIER

Research Policy

University research funding and publication performance

Auranen and Nieminen 2010

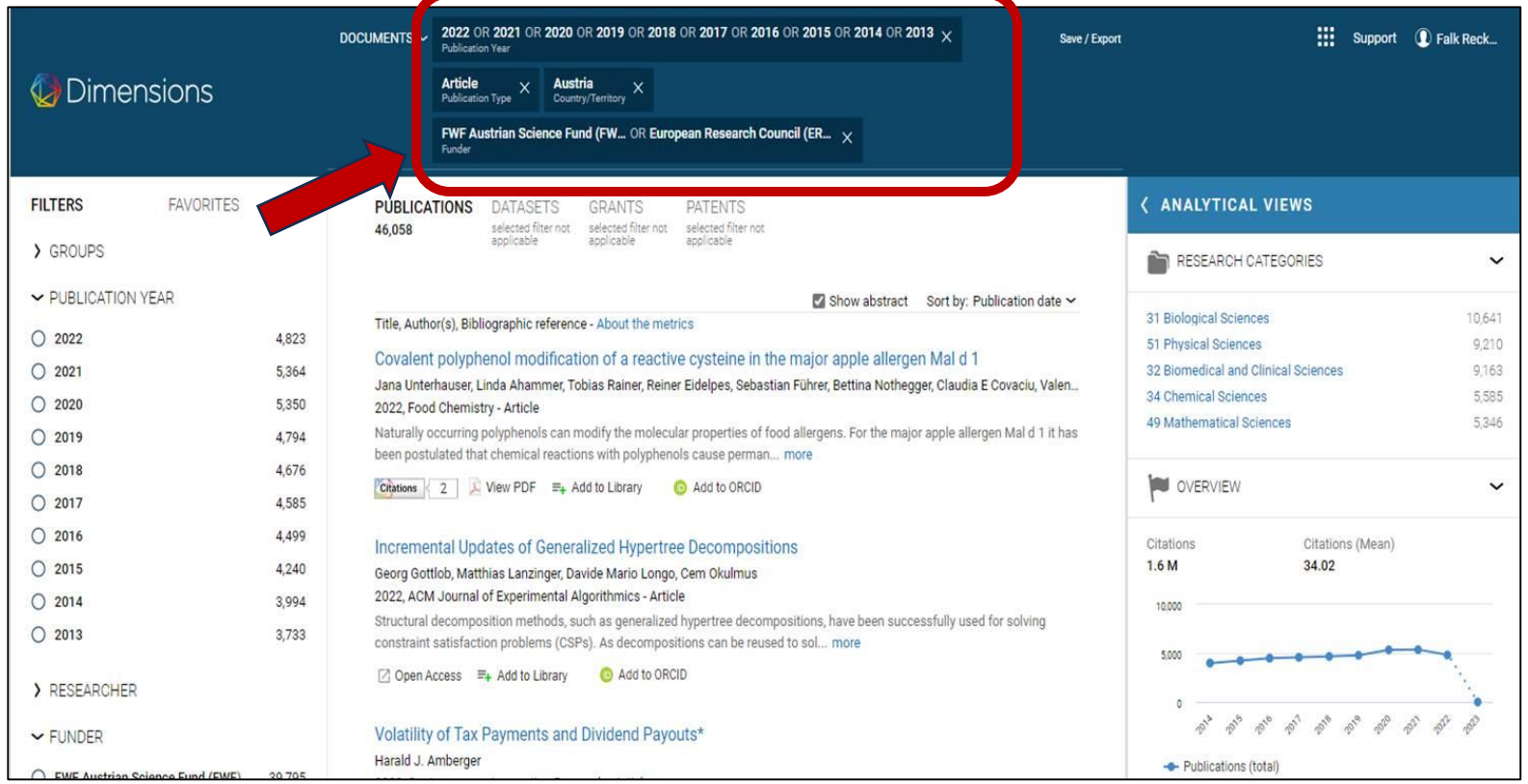
Ziel: Analyse der Auswirkungen des Wettbewerbs auf die Effizienz (auf der Grundlage von 8 Ländern).

"[…] 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 [i]”*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Country/Territory
FWF Austrian Science Fund (FW... OR European Research Council (ER...
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2013 3,733
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Title, Author(s), Bibliographic reference - About the metrics
Covalent polyphenol modification of a reactive cysteine in the major apple allergen Mal d 1
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2022, Food Chemistry - Article
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Georg Gottlob, Matthias Lanzinger, Davide Mario Longo, Cem Okulmus
2022, ACM Journal of Experimental Algorithmics - Article
Structural decomposition methods, such as generalized hypertree decompositions, have been successfully used for solving constraint satisfaction problems (CSPs). As decompositions can be reused to sol... more
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Volatility of Tax Payments and Dividend Payouts*
Harald J. Amberger
ANALYTICAL VIEWS
RESEARCH CATEGORIES
31 Biological Sciences 10,641
51 Physical Sciences 9,210
32 Biomedical and Clinical Sciences 9,163
34 Chemical Sciences 5,585
49 Mathematical Sciences 5,346
OVERVIEW
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Citations (Mean)
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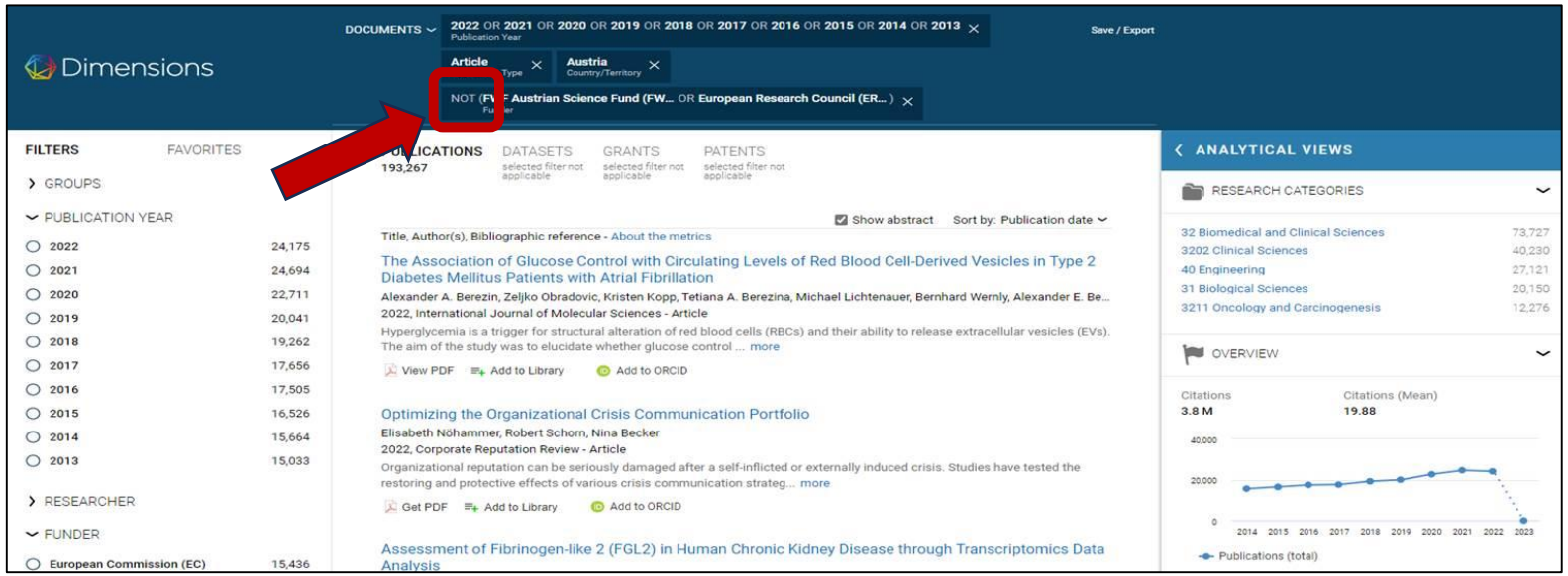
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Country/Territory
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European Commission (EC) 15,436
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Title, Author(s), Bibliographic reference - About the metrics
The Association of Glucose Control with Circulating Levels of Red Blood Cell-Derived Vesicles in Type 2 Diabetes Mellitus Patients with Atrial Fibrillation
Alexander A. Berezin, Zeljko Obradovic, Kristen Kopp, Tetiana A. Berezina, Michael Lichtenauer, Bernhard Wernly, Alexander E. Be...
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Hyperglycemia is a trigger for structural alteration of red blood cells (RBCs) and their ability to release extracellular vesicles (EVs). The aim of the study was to elucidate whether glucose control ... more
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RESEARCH CATEGORIES
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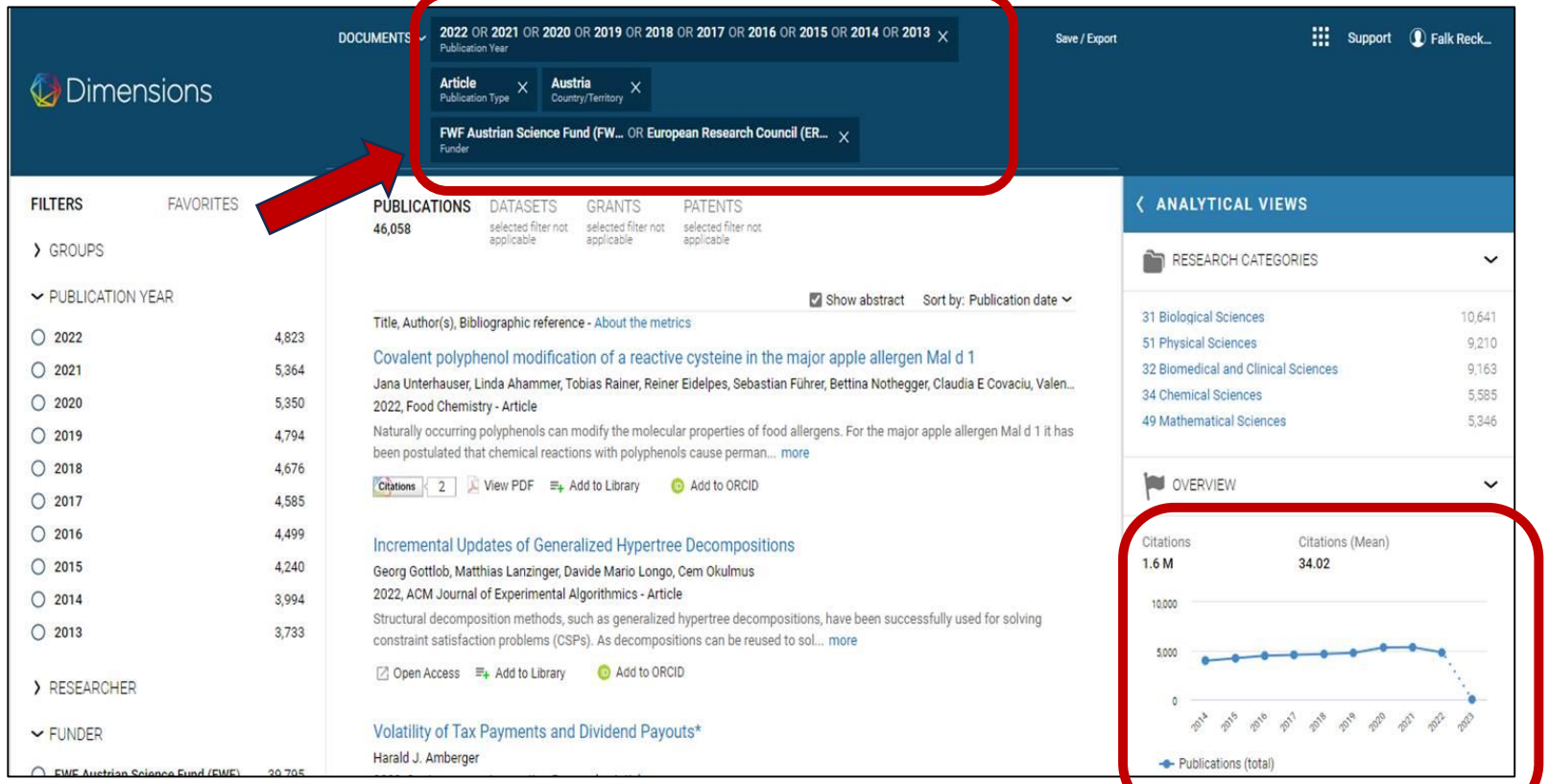
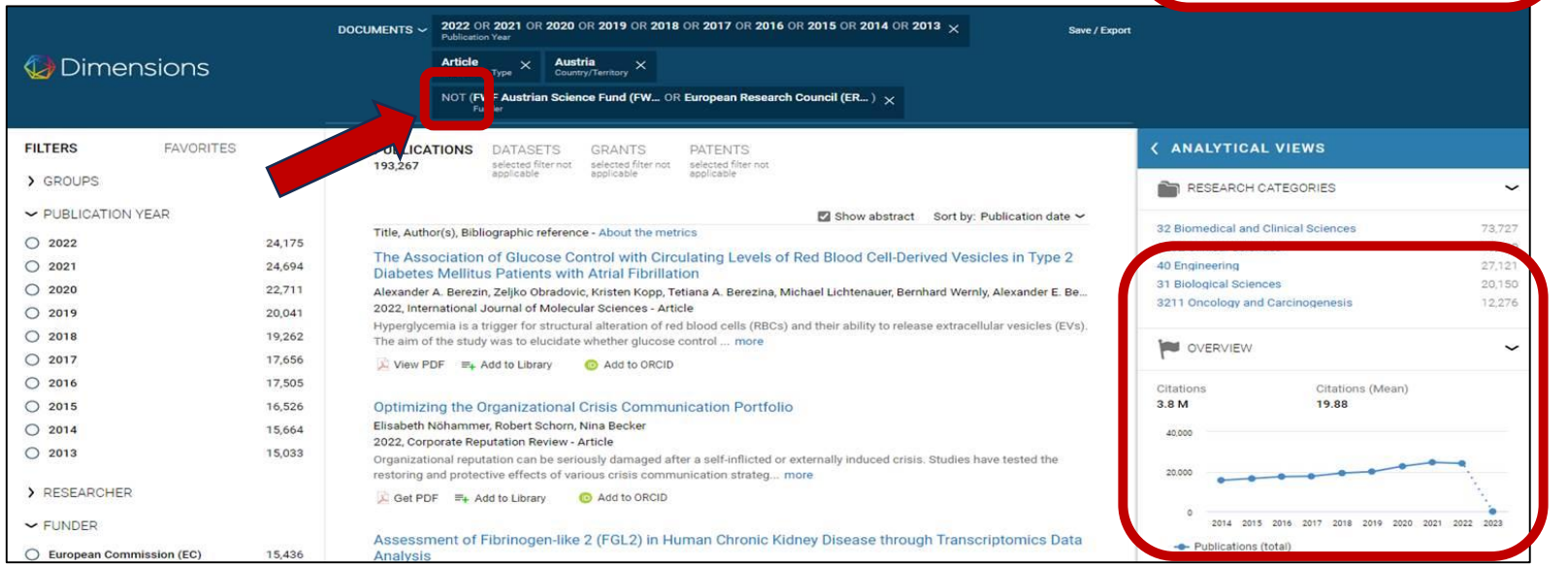
Publications (total)



Per paper: 34 citations



Per paper: 20 citations

Position paper:

On Money and Science:

The impact of competition in distributing scarce research funds

Per paper: 34 citations

Per paper: 20 citations

Statement FWF

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Erstens: Auswirkung der Förderung auf die Produktivität

Zweitens: Kausalität oder Korrelation?!

Drittens: Allgemeine Probleme mit dieser Aussage

Erstens: Auswirkung der Förderung auf die Produktivität

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

MaGW data set (ex post)					
Applications		Mean number of publications		Mean number of total citation counts	
Awarded	Rejected	Awarded	Rejected	Awarded	Rejected
Psychology					
119	251	6.8	5.9	65.3	41.6

Bornmann et al. "A meta-evaluation of scientific research proposals: Different ways of comparing rejected to awarded applications." Journal of Informetrics (2010)

MaGW data set (ex post)

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MaGW data set (ex post)

	Applications		Mean number of publications		Mean number of total citation counts	
	Awarded	Rejected	Awarded	Rejected	Awarded	Rejected
Economics	46	255	3.3	2.8	12.9	11.0

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Awarded	Rejected	Awarded	Rejected	Awarded	Rejected	
Psychology						
119	251	6.8	5.9	65.3	41.6	
119	119 (best)	6.3	8.2	59.6	71.3	
Economics						
46	255	3.3	2.8	12.9	11.0	
46	46 (best)	3.3	3.6	12.9	20.4	

„The group of the best-rejected applications is defined as those rejected applications (the same number of applications as was awarded) with the highest mean citation rates for papers published prior to application.“

MaGW data set (ex post)

Applications		Mean number of publications		Mean number of total citation counts	
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Erstens: Auswirkung der Förderung auf die Produktivität

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.*

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Erstens: Auswirkung der Förderung auf die Produktivität

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"

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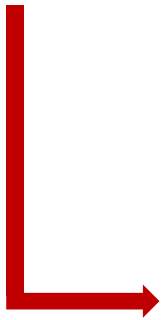

Zweitens: Kausalität oder Korrelation?!

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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.“*

Zweitens: Kausalität oder Korrelation?!

Thelwall, Mike, et al.
"Is research funding always beneficial? A cross-disciplinary analysis of UK research 2014–20."
Quantitative Science Studies (2023)

Es gibt viele mögliche Gründe, die die meist positive Korrelation erklären könnten

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- 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.

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- Funding might allow a study that would be impossible for the applicant(s) without external funding.

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- Funding-led research goals are more valued: Research projects that align with funders' strategic priorities may be highly valued

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- 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 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.**

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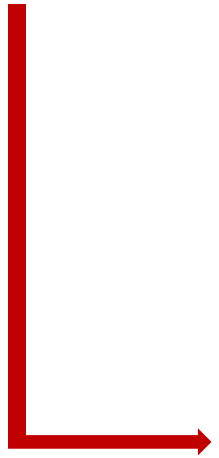

Drittens: Allgemeine Probleme mit dieser Aussage

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- 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.
- We could compare papers that have received different funding (e.g., base funding).

[…] Gibt es einen Ausweg?

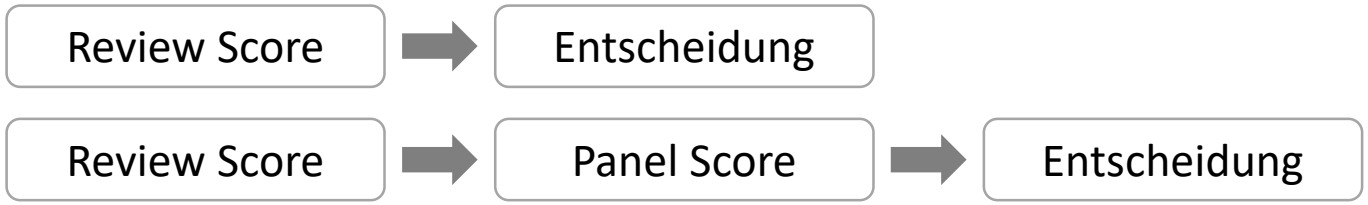
[…] Gibt es einen Ausweg?

⬇

Randomisierte Studien

Sind die Auswahlverfahren zuverlässig?

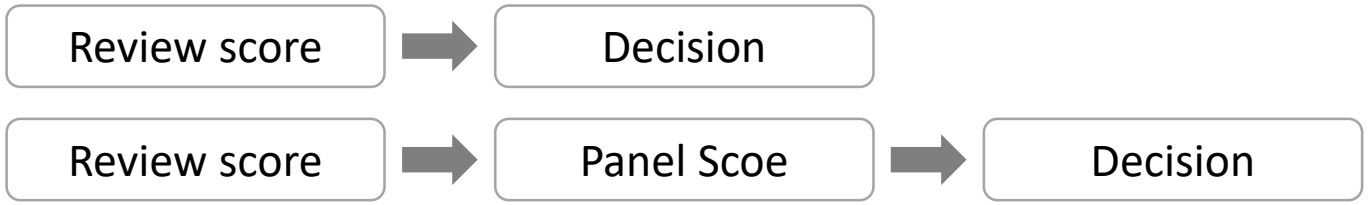
Grant review process



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].

Grant review process



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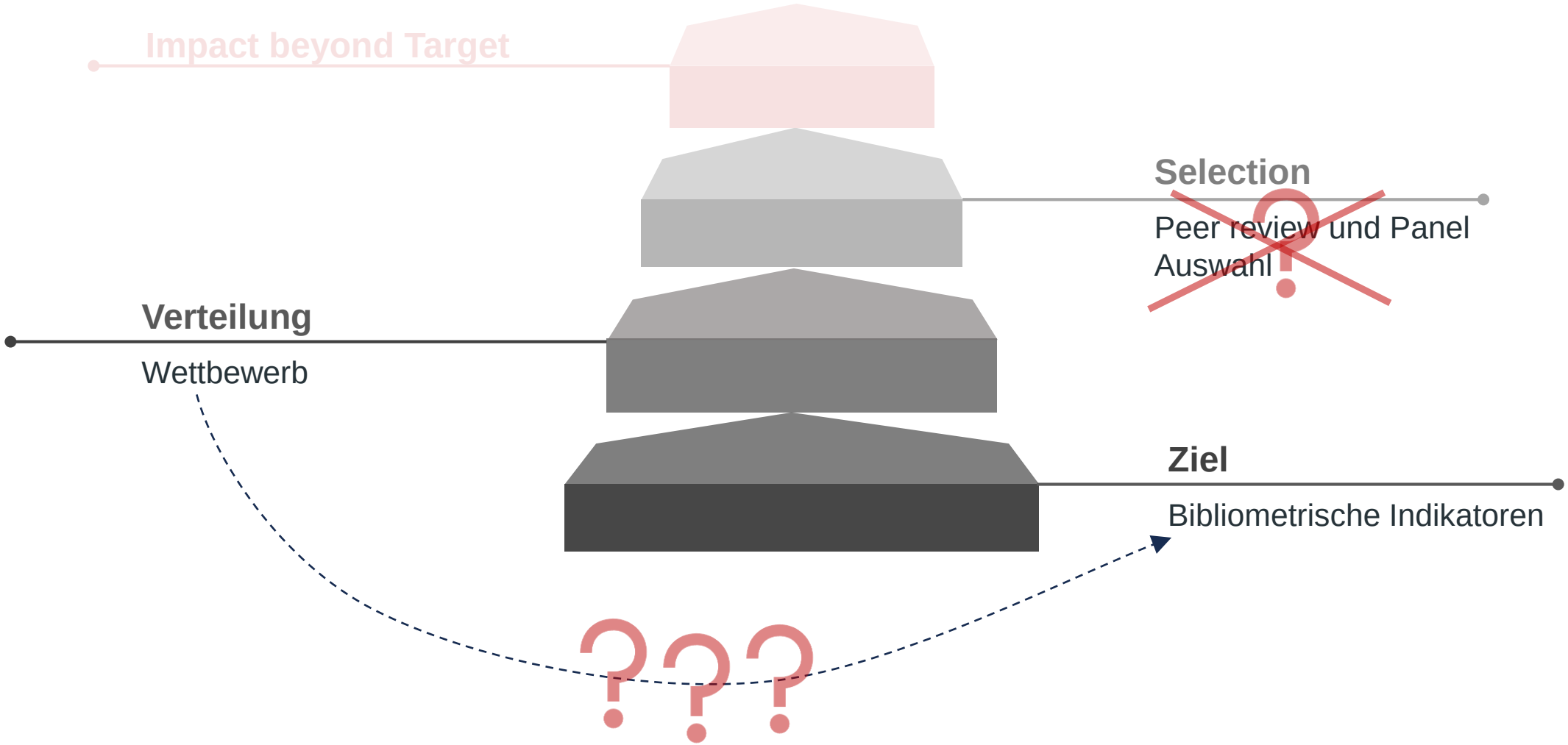
- Some studies: statistically flawed (they only analyze accepted proposals) [6].

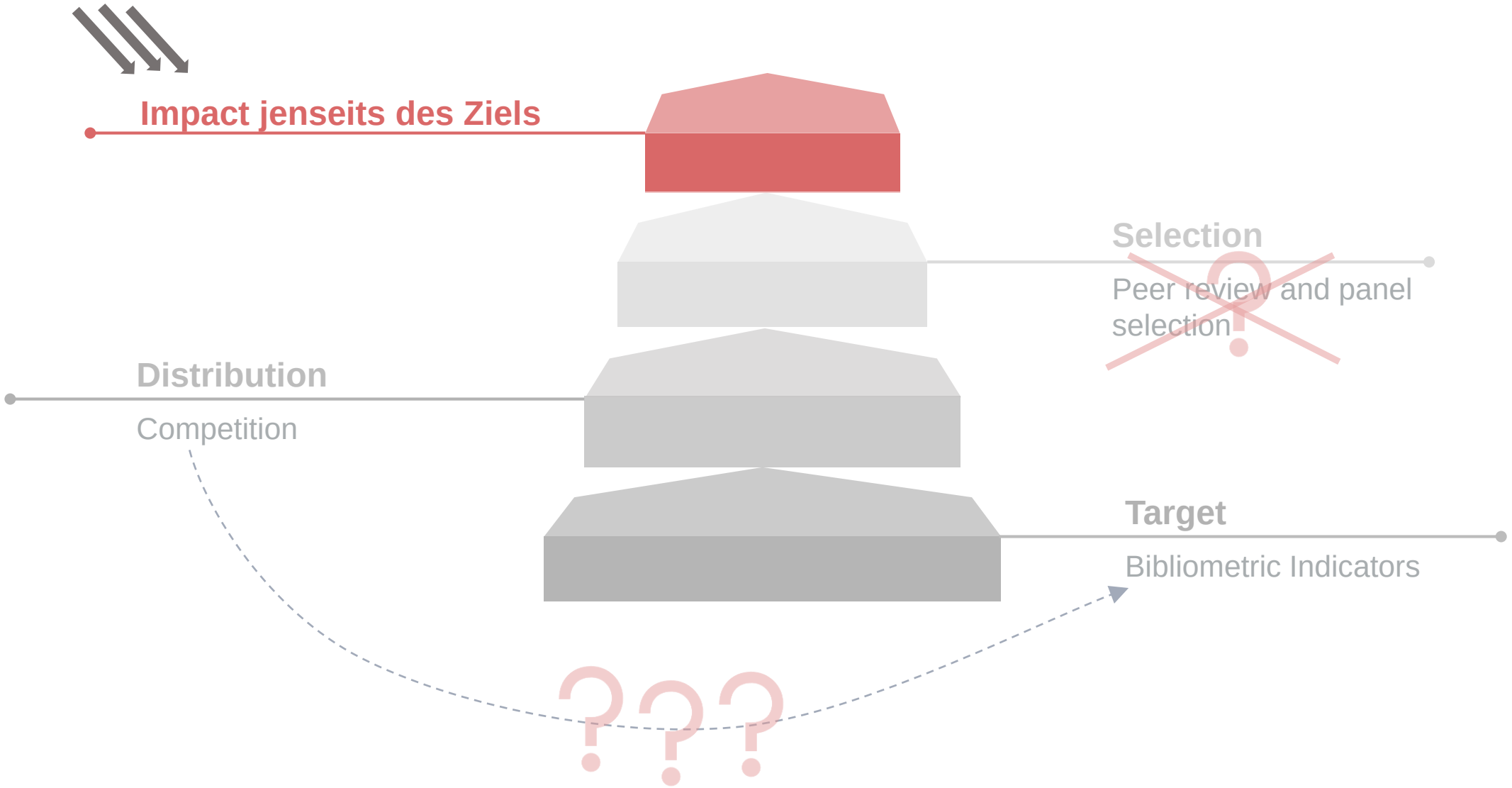
Panel score

- 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 [7].
- Confirmed by presence qualitative studies analysing evaluation processes [8].
- ”Replicates” the study of Cole et a. from 1981: *“We must begin to question wheter a system in which funding decisions depend to a significant degree on chance is the most rational one” [9].*

[...] Status


Impact beyond Target
Selection
Peer review und Panel Auswahl
Verteilung
Wettbewerb
Ziel
Bibliometrische Indikatoren

Impact beyond Target
Selection
Peer review and panel selection
we are not there yet
Distribution
Competition
Target
Bibliometric Indicators
???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Bibliometric Indicators
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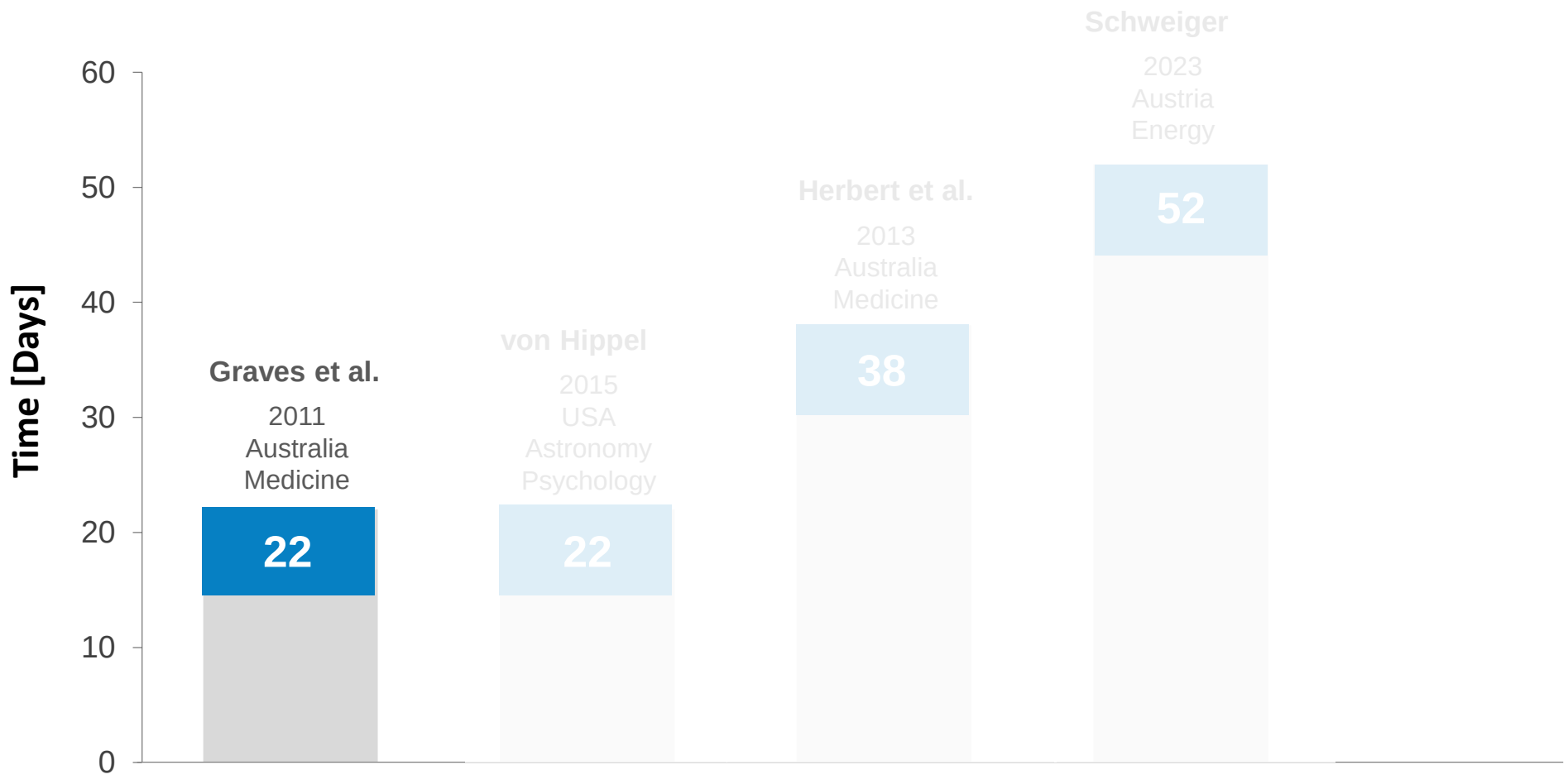
Time [Days]
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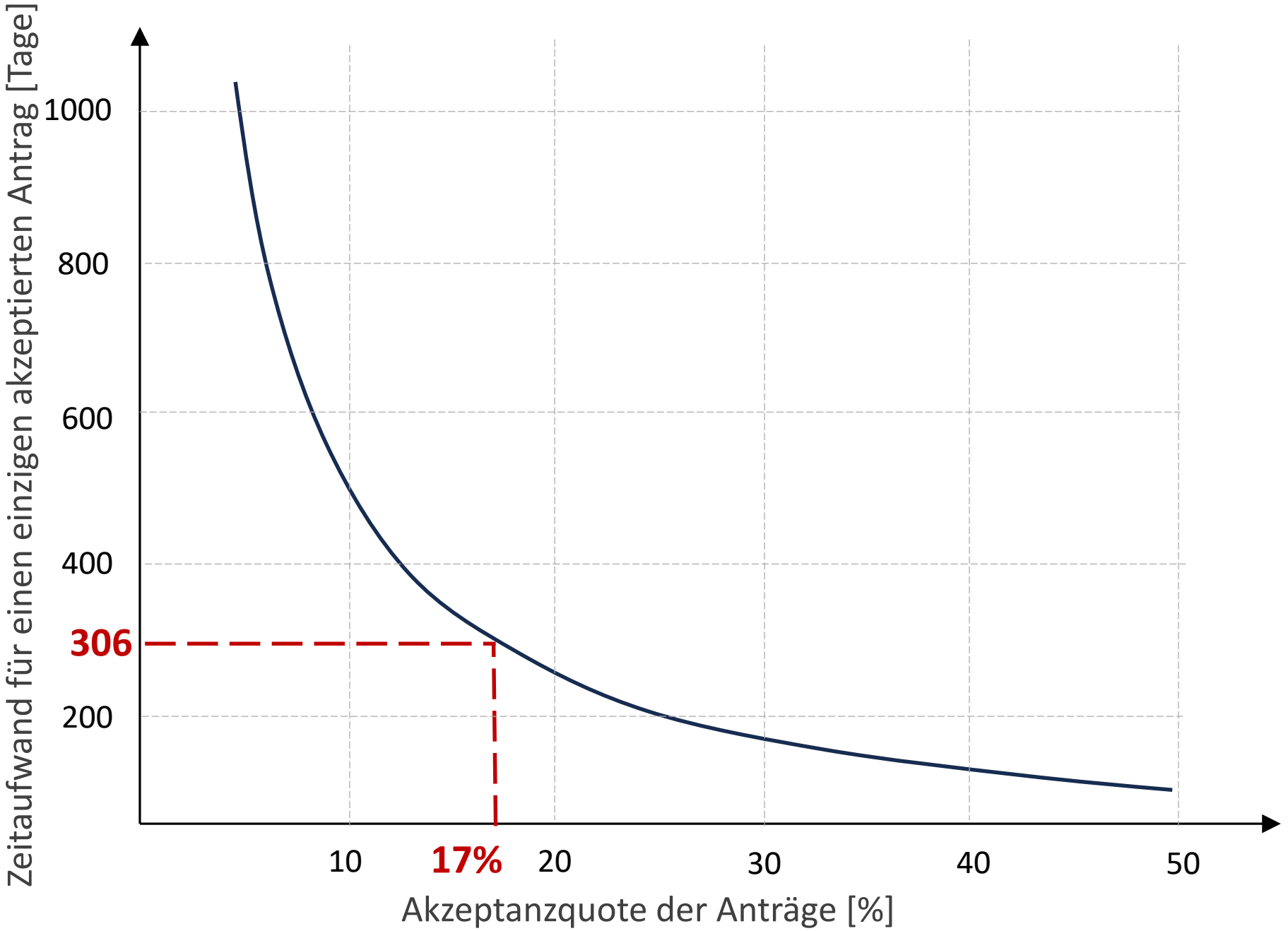
Graves et al.
2011
Australia
Medicine
22
von Hippel
2015
USA
Astronomy
Psychology
22
Herbert et al.
2013
Australia
Medicine
38
Schweiger
2023
Austria
Energy
52

Ein Antrag: 52 Tage

Österreich; FFG; Energieforschung

Zeitaufwand für einen einzigen akzeptierten Antrag [Tage]
Ein Antrag: 52 Tage
Österreich; FFG; Energieforschung
Akzeptanzquote der Anträge [%]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1000
800
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200
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17%
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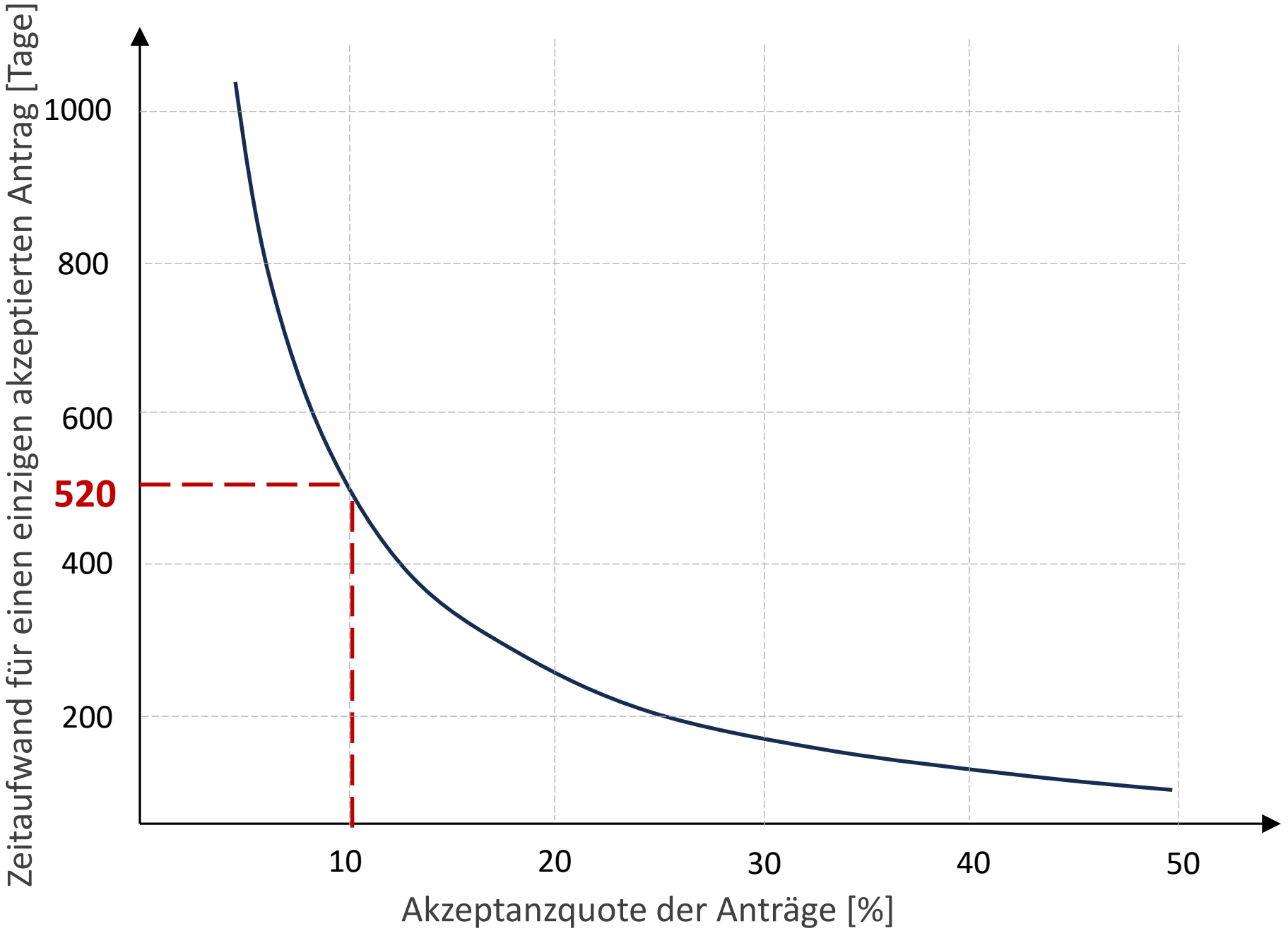
Akzeptanzquote der Anträge [%]

306 Tage für ein gefördertes Projekt

Österreich; FFG; Energieforschung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1000
800
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520
400
200
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20
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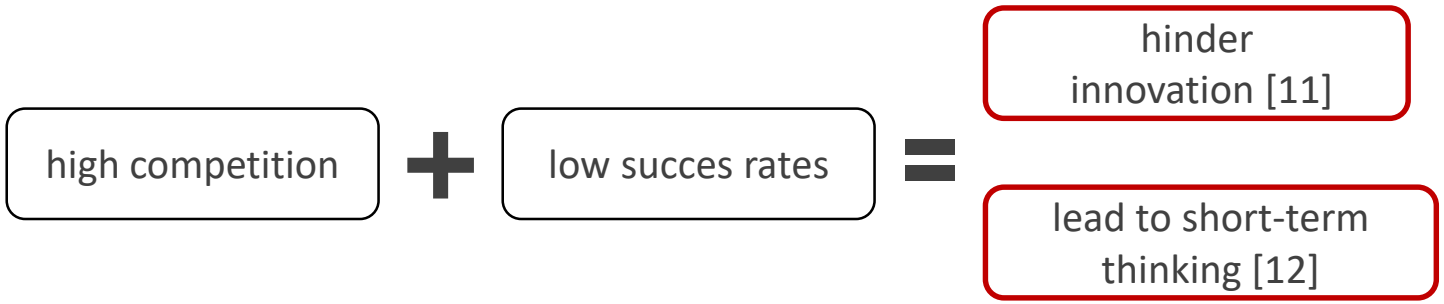
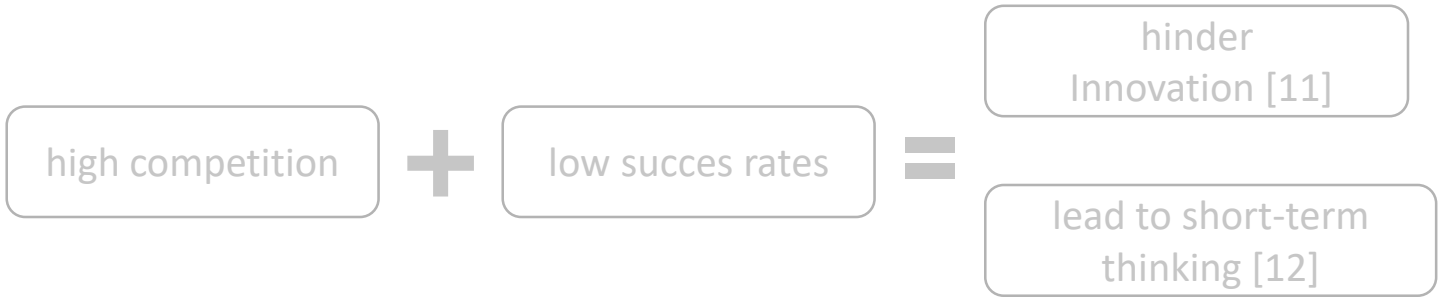
40
50
Akzeptanzquote der Anträge [%]

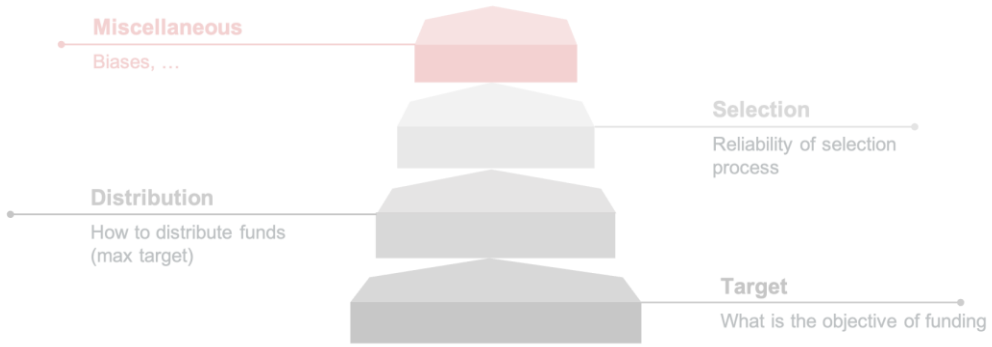
Bias?


high competition
low succes rates
hinder innovation [11]
lead to short-term thinking [12]



Gender Bias?

- Eine Meta-Analyse ergab keine signifikanten geschlechtsspezifischen Unterschiede [13]



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

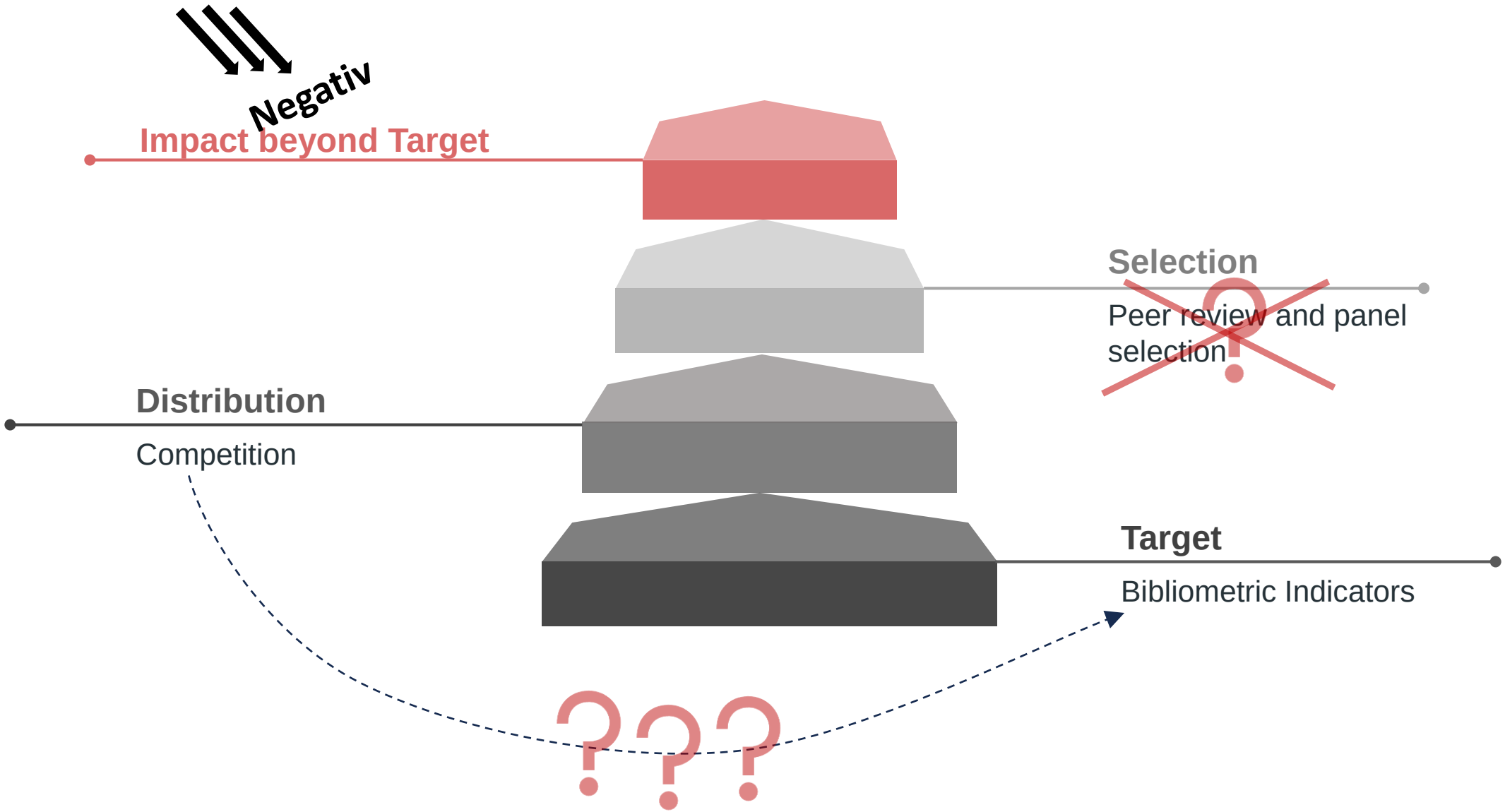
Let's assume you are leading a team of 5 people developing .....

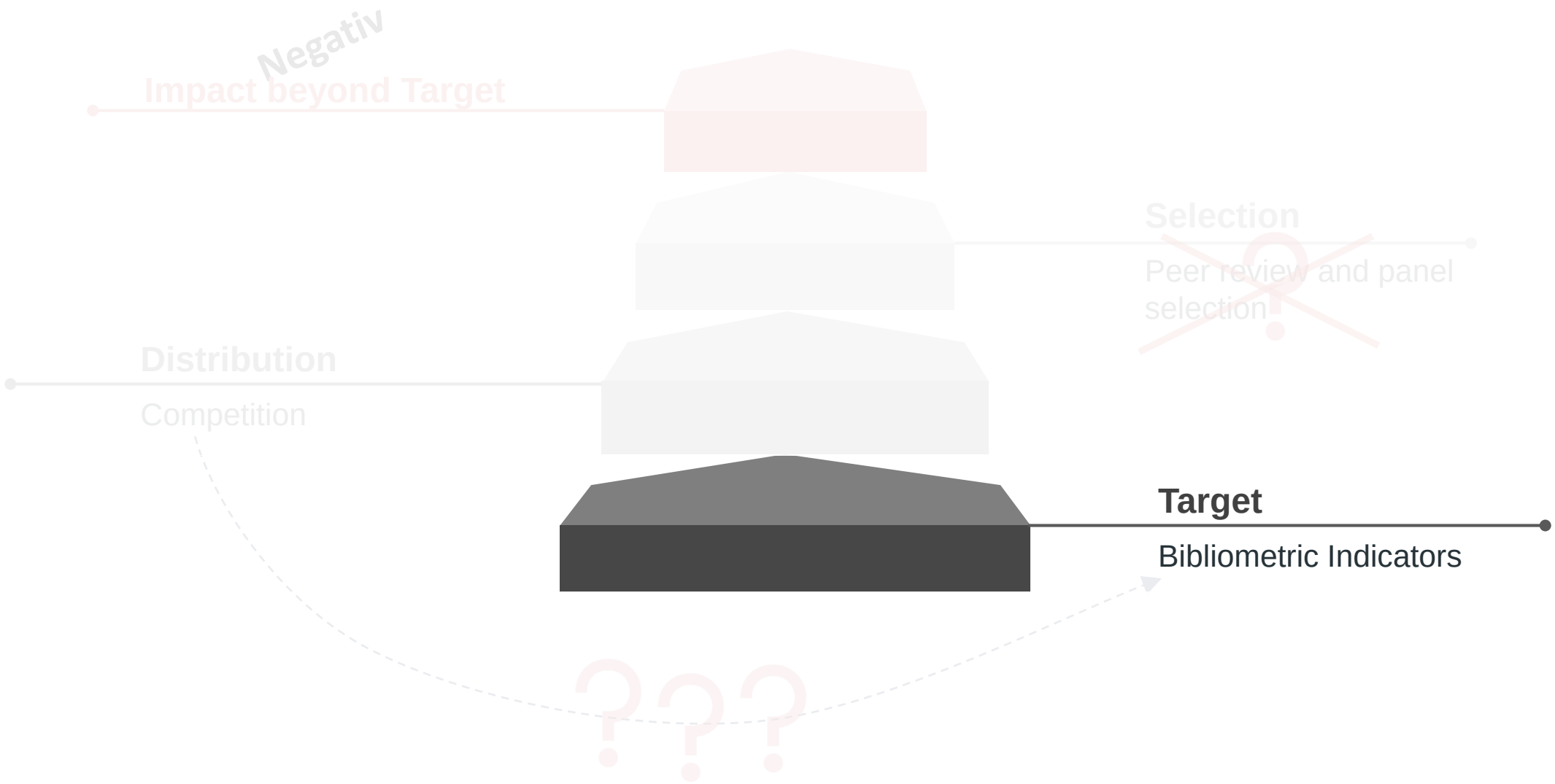
Prof. Zeilinger [iii]

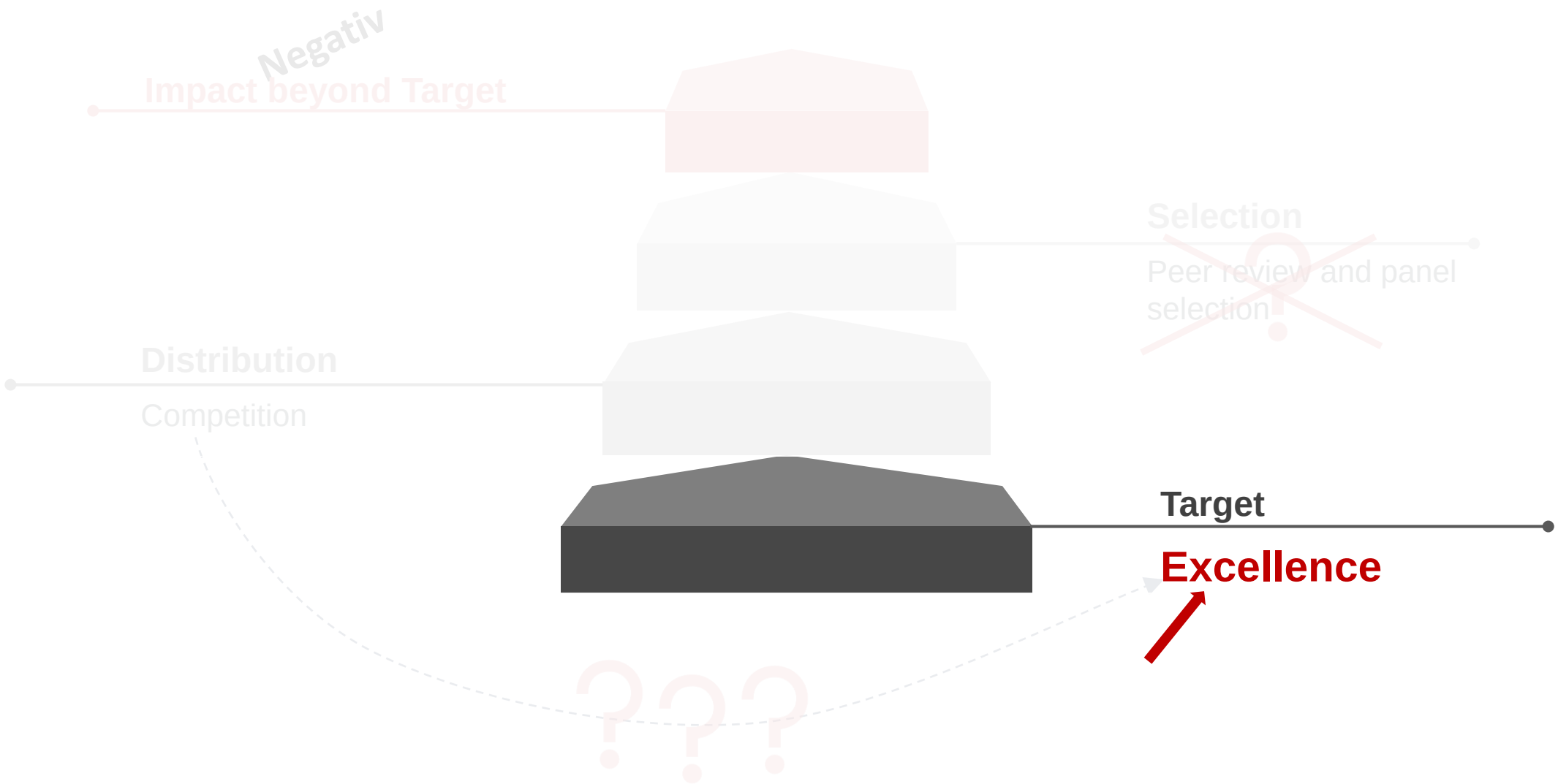
> *[…] wenn wir damals schon das Ziel klar definieren hätten müssen und die Methoden angeben hätte ich niemals den Nobelpreis bekommen.*
>
> *[…] es geht darum das ungewöhnliche zu finden und für das unvorhersehbare offen zu sein…es geht nicht um den nächsten Schritt den man klar definieren kann.*
>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

Prof. Zeilinger [iv]

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


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


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


Negativ
Impact beyond Target
Selection
Peer review and panel selection
Distribution
Competition
Target
Excellence
???

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 [19].*

Excellence: Everyone claims to have it

> *Excellence is a fuzzy notion, a somewhat ambiguous term to which different meanings can be described [19].*

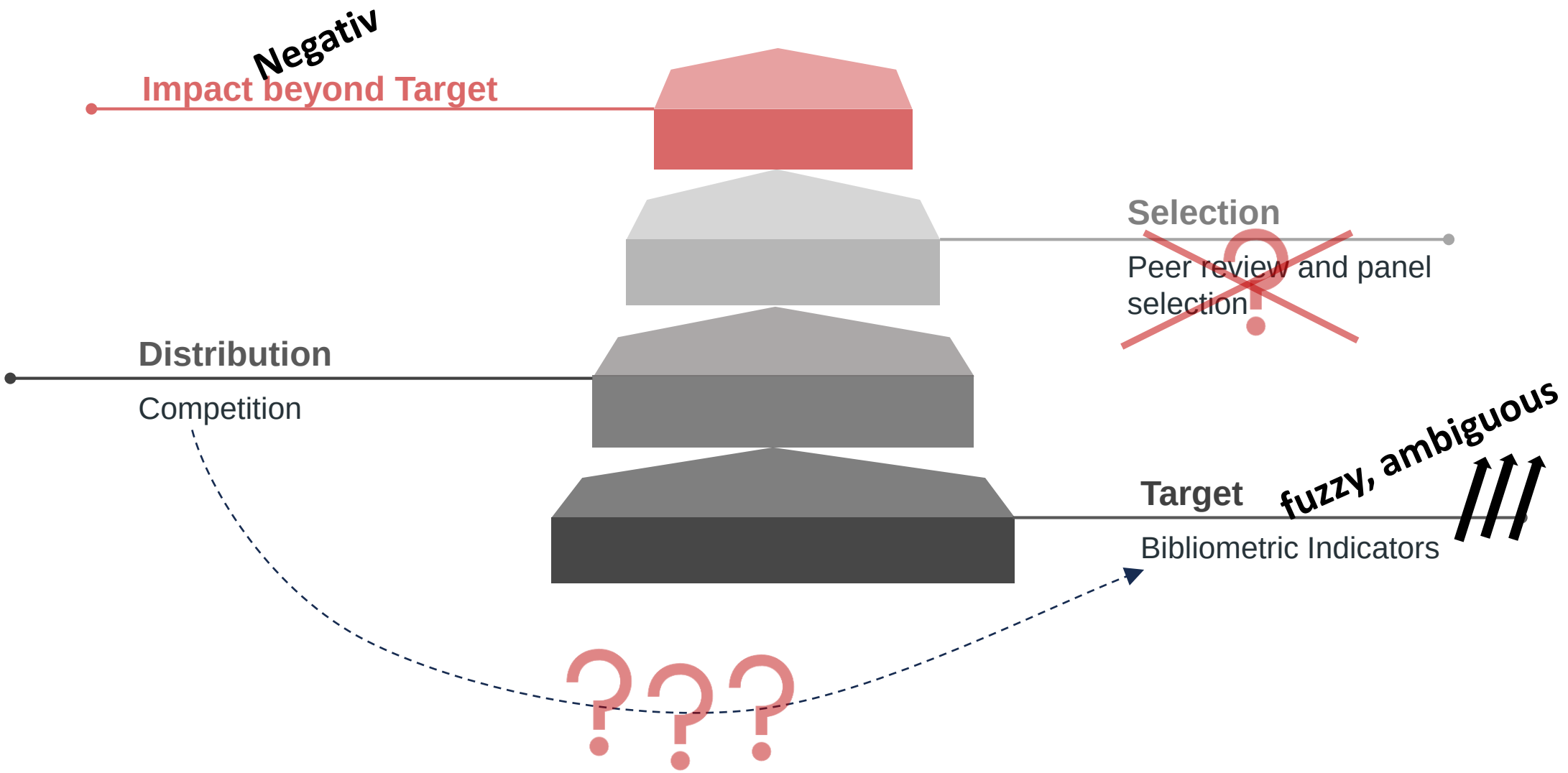
> *Excellence is a rationalizing myth [20].*

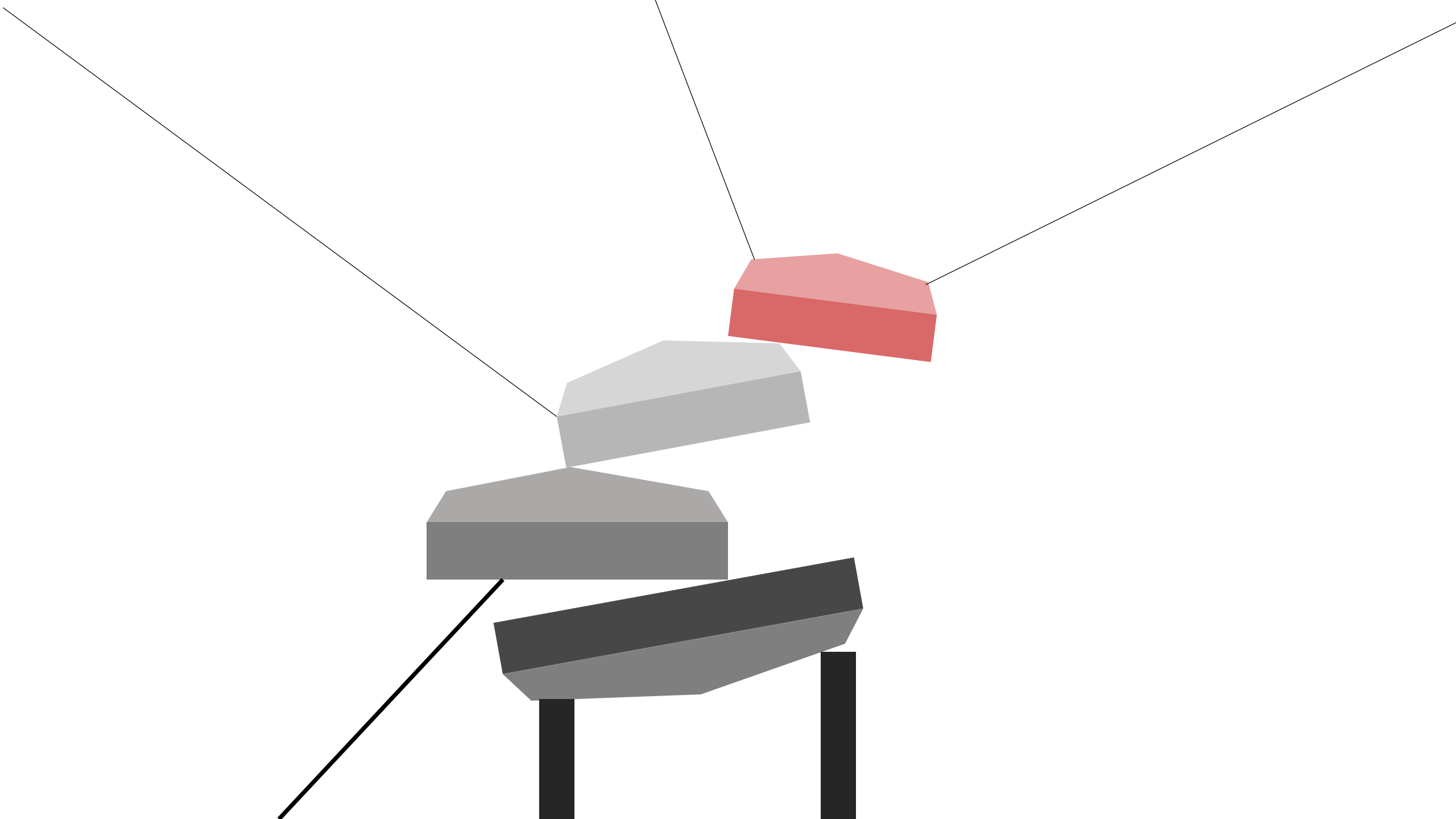
Excellence: Everyone claims to have it

> *Excellence is a fuzzy notion, a somewhat ambiguous term to which different meanings can be described [19].*

> *Excellence is a rationalizing myth [20].*

> *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 [21].*


Negativ
Impact beyond Target
Selection
Peer review and panel selection
Distribution
Competition
Target
fuzzy, ambiguous
Bibliometric Indicators
???



Holzweg 1

Emotional and ideologically colored discussions

Holzweg 1

Emotional and ideologically colored discussions

- Funding agencies: want to continue

Holzweg 1

Emotional and ideologically colored discussions

- Funding agencies: want to continue
- Policymakers: would have to admit mistakes

Holzweg 1

Emotional and ideologically colored discussions

- Funding agencies: want to continue
- Policymakers: would have to admit mistakes
- As scientists (I secretly hope) that we are not at our best when pressed for time, struggling for limited funds, and constantly uncertain about our careers and futures.

Holzweg 1

Emotional and ideologically colored discussions

- Funding agencies: want to continue
- Policymakers: would have to admit mistakes
- As scientists (I secretly hope) that we are not at our best when pressed for time, struggling for limited funds, and constantly uncertain about our careers and futures.

Plus: This is and will not be a win-win situation

Holzweg 2

People are skeptical of science ... so we have to ... and we should not do ... and not say ....

[…] Conclusion

We need to talk about excellence

[meta science, indeces, manager]

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 excellence

[meta science, indeces, manager]

We need to talk about competition

[traditionally part of science?]

We need to talk about the research landscape

[FH, non-academic research, applied research]

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

[vs. Fair weather science]

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

[vs. Fair weather science]

Change the distribution process or accept chance

[lottery, 2-stage]

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

[...] end