

# The problem of positive publication bias

and how to bring about cultural change in science

with regards to failure

Trial and Error Symposium

7 October 2025

**Noémie Aubert Bonn**

Personal thoughts + Findings from research I have been involved in...

1. Focus groups and interviews with different stakeholders



## The problem of positive publication bias

1. What's the problem? (a quick overview)

2. Why does it happen? (some thoughts)

3. What can we do about it? (some hope)

# Personal thoughts + Findings from research I have been involved in...

## 1. Focus groups and interviews with different stakeholders

### Focus groups and interviews

56 stakeholders in the Flemish biomedical science

What is  
**success** in science?

What are the  
**problems** of science?

Who is **responsible**?

PhD candidates



Post Doc



Faculty researchers



Past Researchers



Integrity network



Institution leaders



Policy makers



Research funders



Editors/Publishers



Integrity offices



Lab technicians

Personal thoughts + Findings from research I have been involved in...

1. Focus groups and interviews with different stakeholders
2. Survey with researchers



## The problem of positive publication bias

1. What's the problem? (a quick overview)
2. Why does it happen? (some thoughts)
3. What can we do about it? (some hope)

But first, a bit of intro. What am I doing here..?

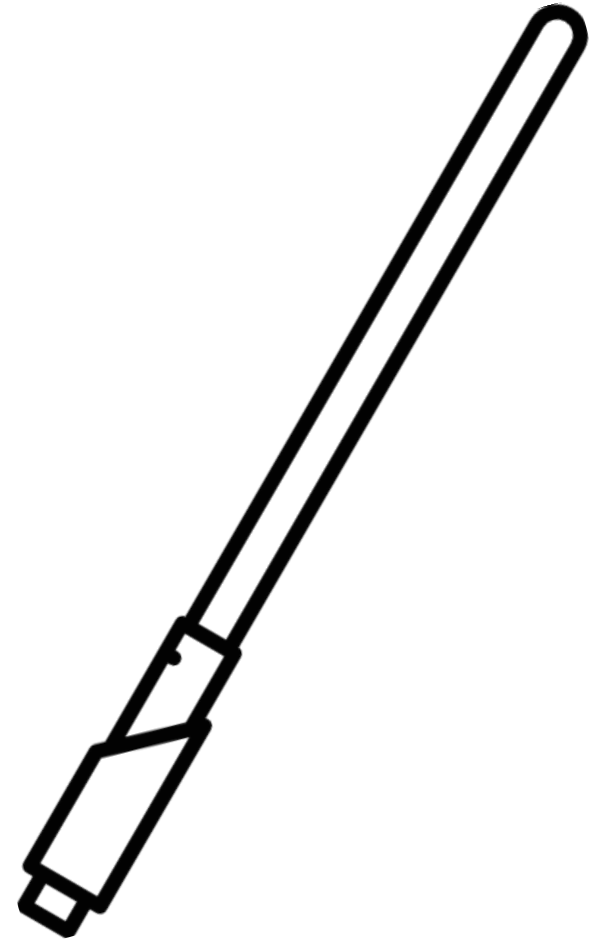
Aspiring researcher in Cognitive Neuroscience (2012)

Strategic networking  
**Publish**  
Media attention  
**Publish**  
Fashionable topics  
**Publish**  
Convincing grant writing  
**Publish**  
High impact factors  
**Publish!**  
**Publish**

**Wait... Is this what it means to be a researcher?**

But first, a bit of intro. What am I doing here..?

Frustrated researcher in Cognitive Neuroscience (2012)



# But first, a bit of intro. What am I doing here..?

researcher doing research on research

*...research integrity*

*...research assessment*

*...research culture(s)*

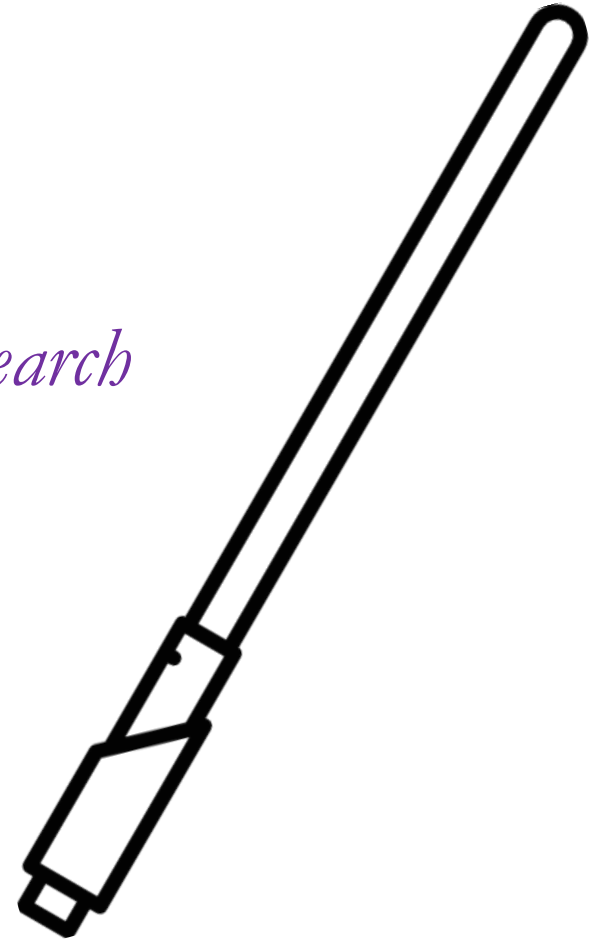
*...open and reproducible research*

*...research careers*

policy advisor (2022-2023)

*...research assessment*

*...research culture*



# The problem of positive publication bias

## 1. What's the problem? (a quick overview)

- Can include:
- *Harking*
  - *P-Hacking*
  - *Spin*
  - *Selective reporting*
  - ...

Visible research

Invisible  
research

**Non publication of  
negative results**

**Non publication of  
mistakes**

**Non publication of  
unimpressive results**

**Non publication of  
unfinished projects**

↗  
User

Visible research

Invisible  
research

Waste of research resources

↗  
User

“

...as a policy maker as I said, we're not funders, but the money starts with us. It's **public money from the taxpayers**, so if a researcher in one country comes to a **negative result and he doesn't have the opportunity to make it publicly available**, then another researcher in another country will do the same, and will **be paid again with the money of taxpayers**. And that's a problem, that's a shame.

Policy maker ”

Visible research

Invisible research

Waste of research resources  
Incomplete/inaccurate research record  
Non-reproducible findings

↗  
User

Comment

Biomedical research: increasing value, reducing waste

Of 1575 reports about cancer prognostic markers published in 2005, 1509 (96%) detailed at least one prognostic variable. However, few have been confirmed by subsequent studies. Economic forces have entered routine practice, but the economic, social, and other (table) factors that have shaped the field have not been understood.

#### SOCIAL SCIENCE

### Publication bias in the social sciences: Unlocking the file drawer

Annie Franco,<sup>1</sup> Neil Malhotra,<sup>2\*</sup> Gabor Simonovits<sup>1</sup>

We studied publication bias in the social sciences by analyzing a known population of conducted studies—221 in total—in which there is a full accounting of what is published and unpublished. We leveraged Time-sharing Experiments in the Social Sciences (TESS), a National Science Foundation-sponsored program in which researchers propose survey-based experiments to be run on representative samples of American adults. Because TESS proposals undergo rigorous peer review, the studies in the sample all exceed a substantial quality threshold. Strong results are 40 percentage points more likely to be published than are null results and 60 percentage points more likely to be written up. We provide direct evidence of publication bias and identify the stage of research production at which publication bias occurs: Authors do not write up and submit null findings.

Publication bias occurs when "publication of study results is based on the direction of the state of knowledge in a field or on a particular topic because null results are largely unobservable

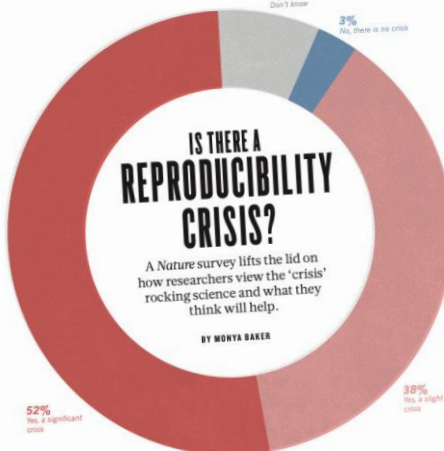
threshold-based measures that outperform comparable companies (such as a company's profitability (7), "terminal" editorial and revision rates to reject authors that have own preferences for null results. A difficult publication prospect of clinical

#### Essay

### Why Most Published Research Findings Are False

John P.A. Ioannidis

Open access, freely available online



ence this problem and hereof.

framework for False  
data have  
that the high  
on (lack of  
search discoveries  
the convenient,  
ery of claiming  
findings solely on  
study assessed by  
significance, typically  
in 0.05. Research  
lately represented  
practices but,  
is a widespread  
research articles

even that  
d research  
re false.

based only on  
findings are defined  
p teaching  
practices, e.g.,  
informative  
or associations  
also very useful  
manipulator, and  
widespread  
target  
generator claim:  
findings,  
remotely the  
ch-finding

is characteristic of the field and can  
vary a lot depending on whether the  
field targets highly likely relationships  
or searches for only one or a few  
relationships among thousands

Scientometrics (2012) 90:891–904  
DOI 10.1007/s11192-011-0494-7

### Negative results are disappearing from most disciplines and countries

Daniele Fanelli

Received: 1 July 2011 / Published online: 11 September 2011  
© Akadémiai Kiadó, Budapest, Hungary 2011

#### Viewpoint

### Avoidable waste in the production and reporting of research evidence

Ken Chalmers, Paul Glasziou

convincing patients have been powerful  
press for those who might otherwise have  
involved in research in treatment evaluation. In  
area, there has been recognition of the need to  
both of these disincentives. In the UK, the  
enquiry concluded that government support  
ed research should be increased, and the  
Institute for Health Research (NIHR) has  
i rapidly to this policy (its funding for clinical  
soon be £80 million a year). In the USA, a bill  
before Congress calls for federal support for  
of treatments independent of industry, and  
4 Spain, independent research on the effects  
being supported with revenue from a tax on  
pharmaceutical company drug promotion.  
is laudable. Irrespective of who sponsors  
his investment should be protected from the  
waste of inadequately producing and  
research. We examine the causes and degree  
curbing at four successive stages: the choice  
questions, the quality of research design,  
ds, the adequacy of research design

Visible research

Invisible  
research

**Waste of research resources**  
**Incomplete/inaccurate research record**  
**Non-reproducible findings**  
**Unawareness of risks**

↗  
User



House of Commons  
Science and Technology  
Committee

**Research integrity:  
clinical trials  
transparency**

**Tenth Report of Session 2017–19**

Report, together with formal minutes relating  
to the report

Ordered by the House of Commons  
to be printed 23 October 2018



Committees

[UK Parliament](#) > [Business](#) > [Committees](#) > [Science and Technology Committee \(Commons\)](#) > [Research integrity](#) > [Inquiry](#)

**Failing to publish data from clinical trials  
presents risk to human health**

30 October 2018

**+ AllTrials**

Visible research

Invisible  
research

**Waste of research resources**  
**Incomplete/inaccurate research record**  
**Non-reproducible findings**  
**Unawareness of risks**  
**Disrespect of participants**

↗  
User

“ I think you should really communicate the efforts of yourself that have been funded by the university, or the **efforts of participants who have been participating...**

Researcher ”

Visible research

Invisible  
research

“...every result is a good result, even when it's negative. And we **need those negative results as well to find the right direction** in some kind of topics of research.

Policy maker ”

Waste of resources

Incomplete

Non-representative

Unethical

Disrespect of participants

Missed opportunities

“ Sometimes the negative result **can be very interesting** [...] we have stories of [projects] that [were] a complete failure, but **we did learn something about it**, and ten years later in another project in totally completely other application **we used that, that knowledge from ten years ago.** ”

Funder

Visible research

Invisible  
research

**Waste of research resources**  
**Incomplete/inaccurate research record**  
**Non-reproducible findings**  
**Unawareness of risks**  
**Disrespect of participants**  
**Missed opportunities**  
**Unrealistic portrayal of  
research (and  
researchers)**

↗  
User

# The problem of positive publication bias

1. What's the problem? (a quick overview)

2. Why does it happen? (some thoughts)

“ People get **afraid**, people **don't want to make a mistake**. They make mistakes, of course, but they **do not talk about it**, because there is **no open atmosphere to talk about your mistakes**. And of course, if you work in healthcare you talk about human life, so it's understandable that you don't want to talk about your mistakes. **In academia**, that's not understandable. I don't understand why... Well of course you can understand this. But **it's not justifiable**. It's understandable, but it's not justifiable. Because if there is... **If one place in our world should be a place where people are free to make mistakes**, even though we pay them a lot, and we hope they don't make mistakes, **then it's that place**. [i.e., academia]

Past researcher (Researcher who left academia)

”

Publication  
models

Assessment  
models

So... why does it happen?

Culture

# Publication models

“ ...when the results are for example that an intervention doesn't work or something, I think that's a very valuable insight too, because then you can also say to the clinical field, well you don't have to try that because we studied it and it doesn't work. But a result like that is **not sexy enough to publish**. So often you submit your paper, and **you're four journals further when you get an acceptance...** ”

PhD Student

“ **30%** of the experiments really come out well, and **this is the stuff we publish**. And 70% doesn't work.

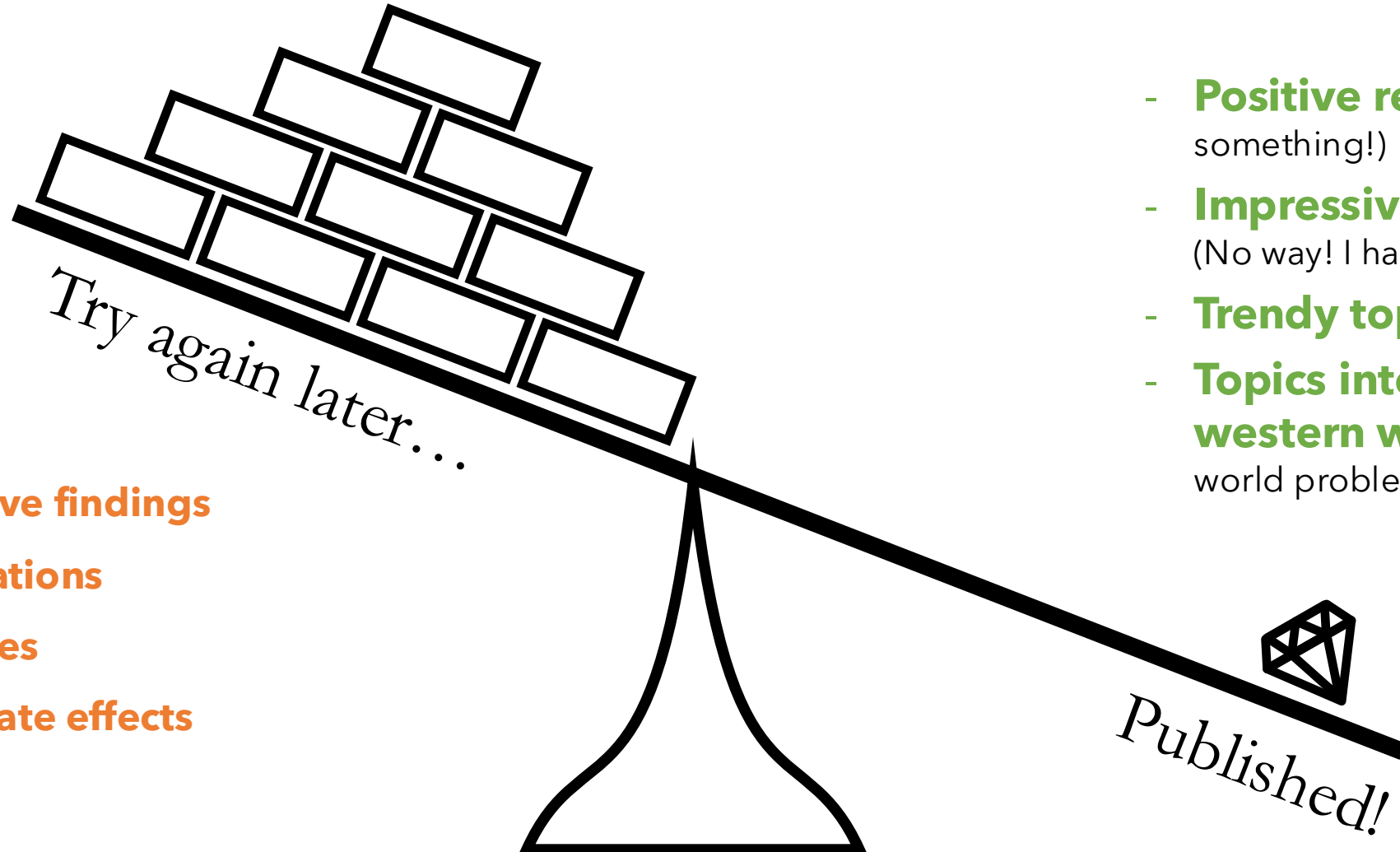
Institution leader ”

“ Negative data are never published. [...] You don't get away with those data. **You never get them published**, sometimes it's even hard to get them in a PhD

Institution leader ”

# Publication models

**In the Pay-per-read model, to survive financially, journals need to attract readers who will subscribe to their journals**



- **Negative findings**
- **Replications**
- **Mistakes**
- **Moderate effects**
- ...

- **Positive results** (We found something!)
- **Impressive / surprising results** (No way! I have to read this!)
- **Trendy topics** (Ehm... like AI?)
- **Topics interesting to 'north-western world'** (...not long-lasting world problematics)

# Publication models

**But now that we (largely) moved to Open Access models, why isn't this changing?**

It partly is...

...but OA Journals are (still) valued by citation-based metrics like the **Journal Impact Factor**.

- **Negative findings**
- **Replications**
- **Mistakes**
- **Moderate effects**
- ...

**Essential lessons,**  
but **less likely to be cited by many**

- **Positive results** (We found something!)
- **Impressive / surprising results** (No way! I have to read this!)
- **Trendy topics** (Ehm... like AI?)
- **Topics interesting to 'north-western world'** (...not long-lasting world problematics)

**Likely to be cited by many** as grounds for continued research

# Publication models

**But despite this, journal publishers and editors do say that they would publish negative results... they just don't receive them.**

“ [We] **created a journal dedicated to negative results** in [a specific field of research]. Two years later, [we] closed it. **No submission, whatsoever. No submission!** Why? I don't know. I would suspect, but that's my personal view, that there is still not enough emphasis, rewards, incentives, given to publish.

Editor/Publisher

”

“ ...the **negative results are for me the most positive publication**, but **since the five years that I am an editor I have never seen one negative result.**

Institution leader (and editor)

”

“ ...we often get paper which are spam, you know when it's **actually a negative trial where the primary outcome wasn't met** but then they just hide that somewhere [...] and we as **editors can actually force them – and that's actually what we often do – to present it truly**, honestly, you know, this is a negative...

Editor/Publisher

”

Publication  
models



**Assessment  
models**

So... why does it happen?



Research  
institutions

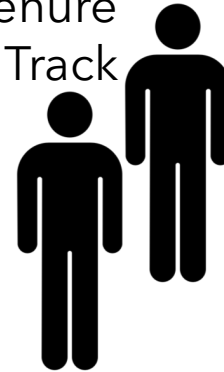
PhD Student



PostDoc

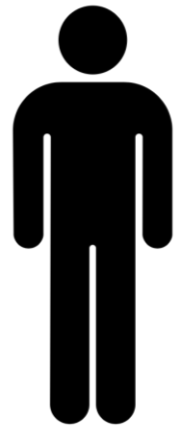


Tenure  
Track

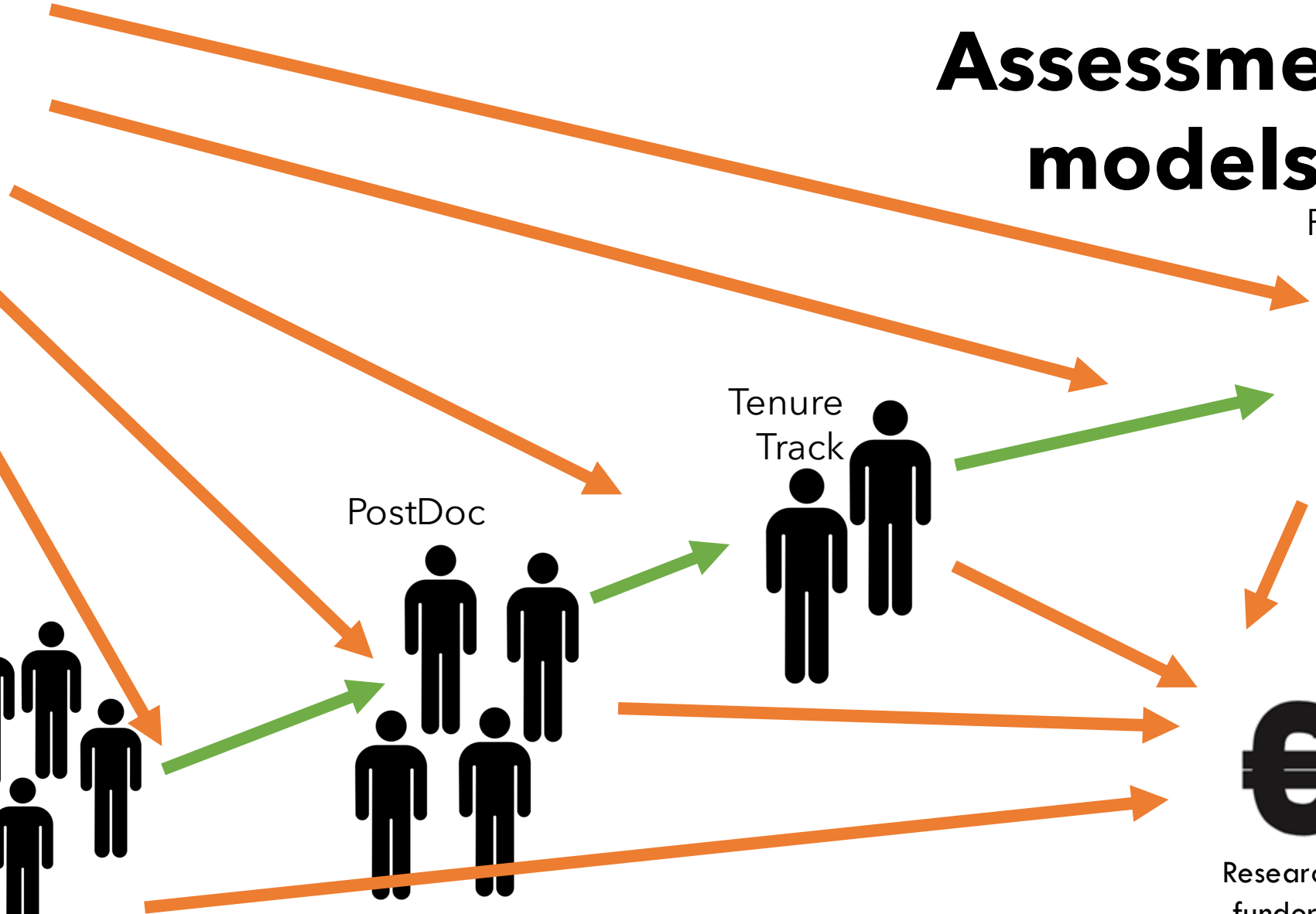


# Assessment models

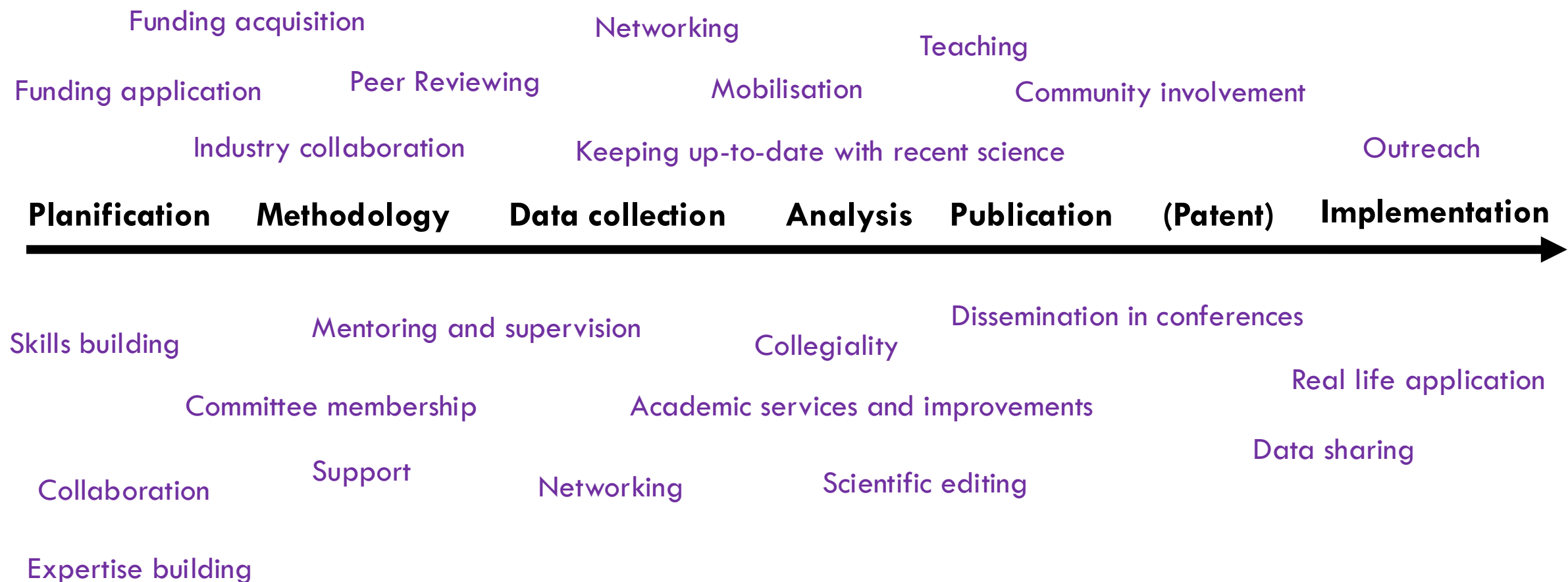
Professor



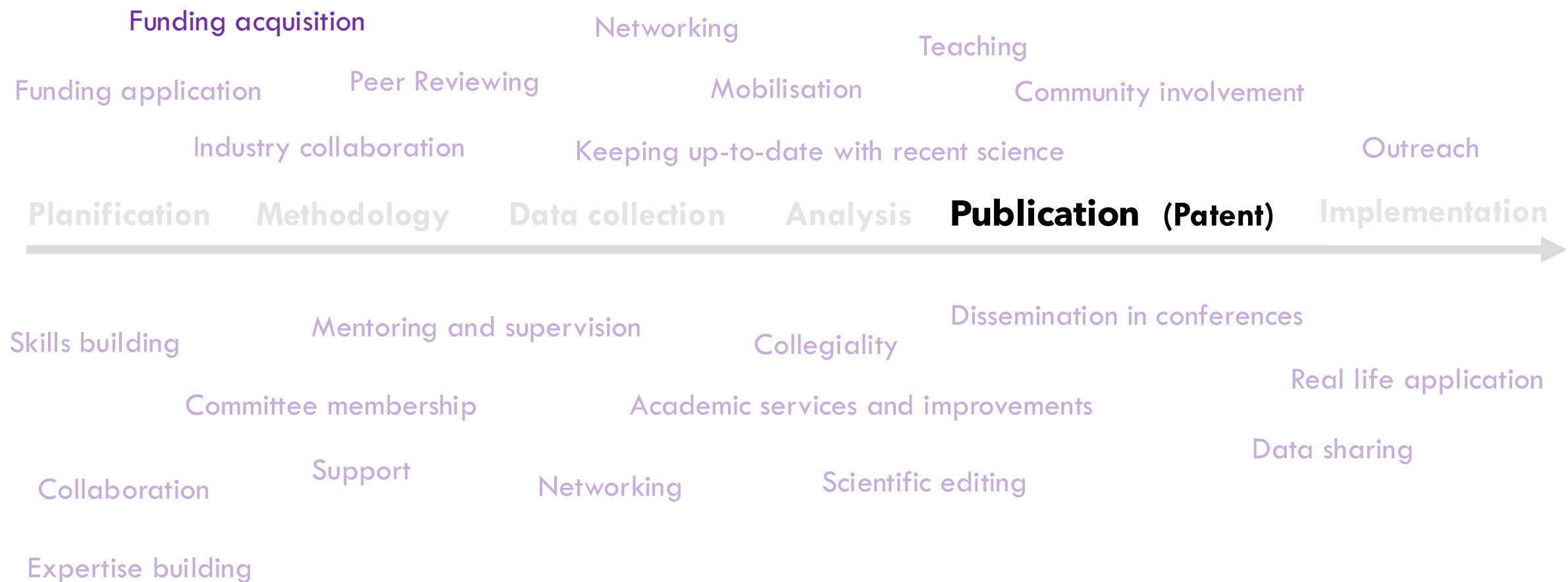
Research  
funders



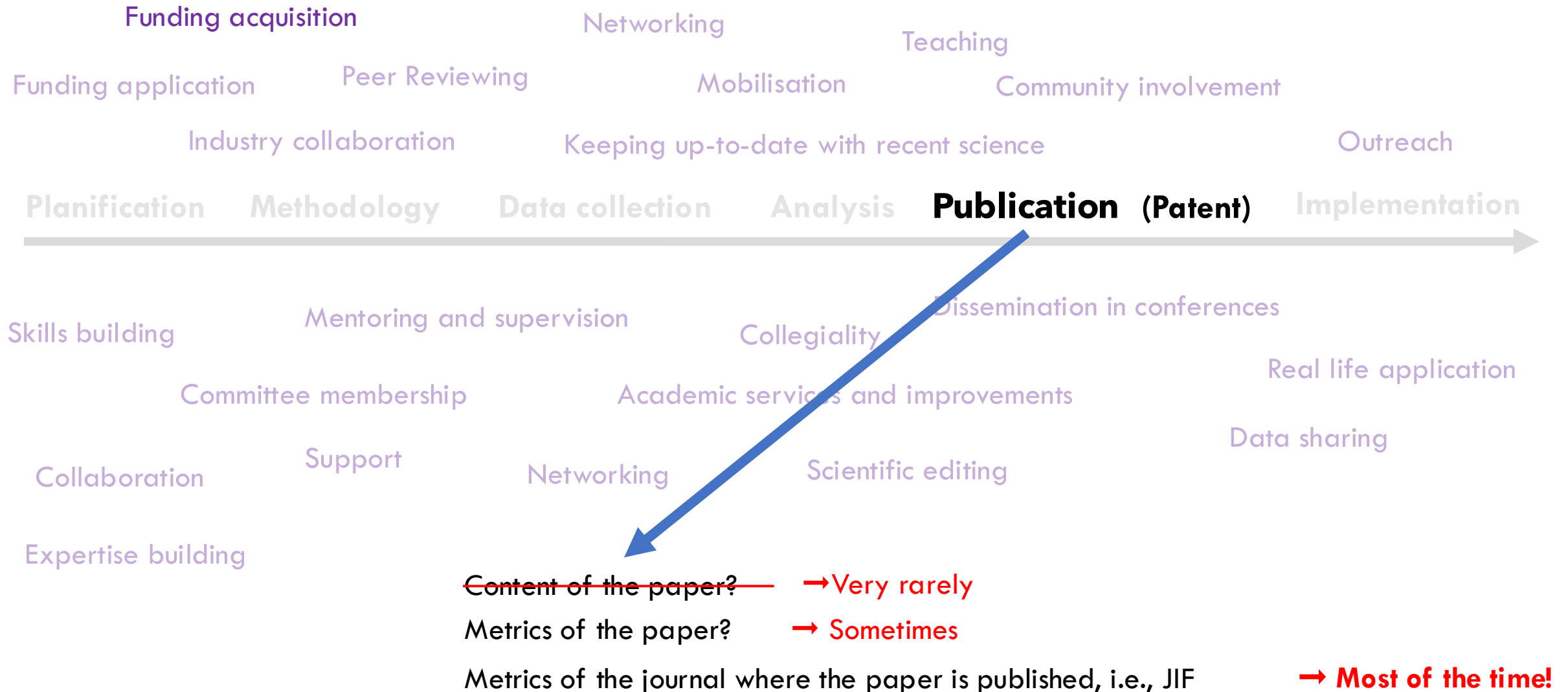
# Which areas of researcher's work are recognised in their career?



# Which areas of researcher's work are recognised in their career?



# Which areas of researcher's work are recognised in their career?



## **This is something we also found this in a small scale survey with researchers**

126 respondents

Mostly from Flemish research institutions

18 statements of potential indicators for success

Publishing papers is...

Publishing in high impact journals is...

Publishing commentaries or editorials is...

Publishing more papers than others is...

Publishing open access is...

Peer reviewing is...

Replicating past research is...

Publishing findings that did not work (i.e., negative findings) is...

Sharing your full data and detailed methods is...

Reviewing raw data from students and collaborators is...

Conducting research with a high risk of failure is...

Connecting with renowned researchers is...

Collaborating across borders, disciplines, and sectors is...

Getting cited in scientific literature is...

Having your papers read and downloaded is...

Having public outreach (e.g., social media, news, etc.) is...

Having your results used or implemented in practice is...

Having luck is...

## Publishing in high impact journals is...

...in advancing my career

...in advancing science

...to my  
personal satisfaction

essential

☐☐☐

important

☐☐☐

irrelevant

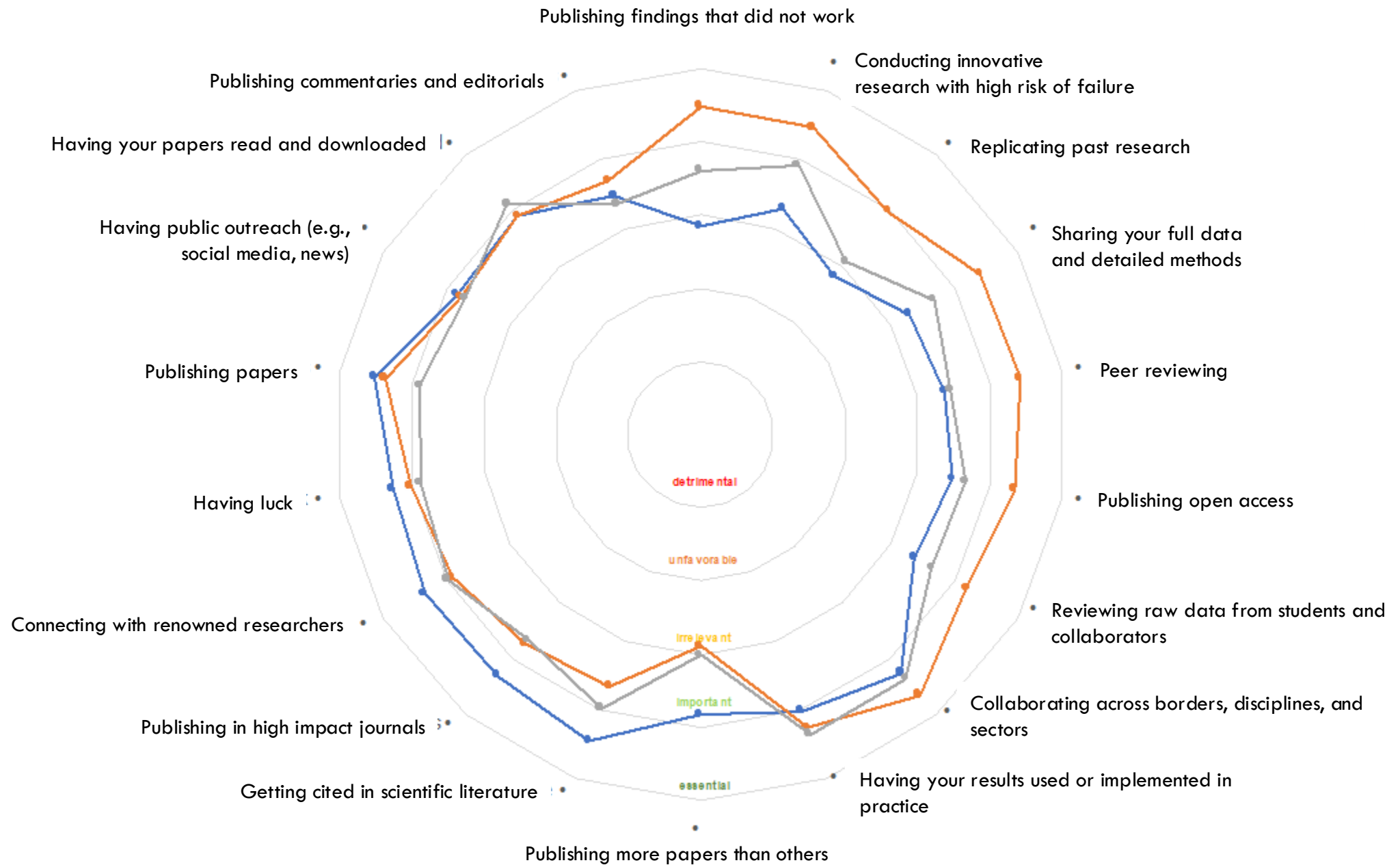
☐☐☐

unfavorable

☐☐☐

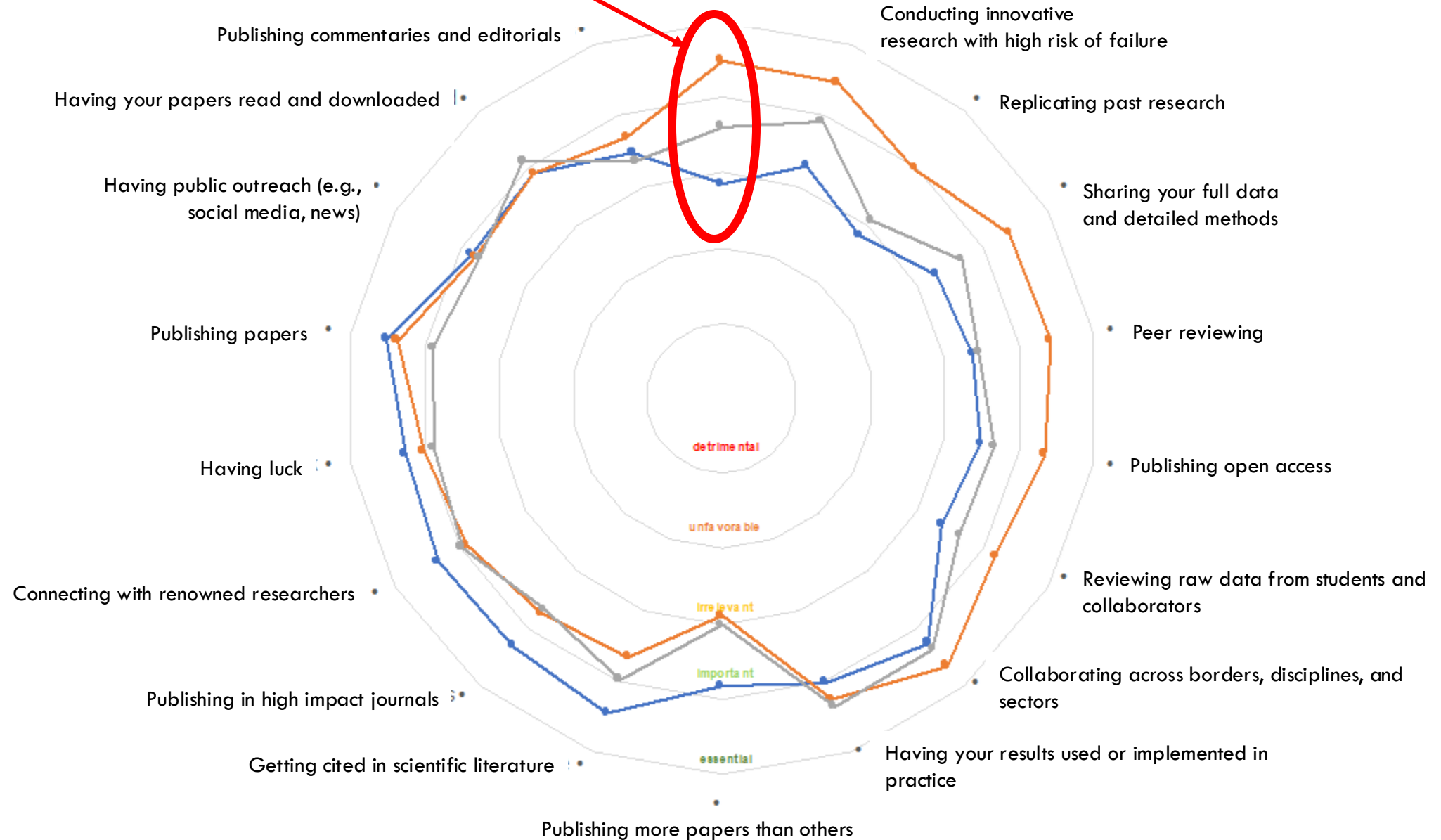
detrimental

☐☐☐



Biggest difference between value for research and value for career!

Publishing findings that did not work



Biggest difference between value for research and value for career!

Publishing findings that did not work

Conducting innovative research with high risk of failure

Replicating past research

Sharing your full data and detailed methods

Peer reviewing

Publishing open access

Reviewing raw data from students and collaborators

Collaborating across borders, disciplines, and sectors

Having your results used or implemented in practice

Publishing more papers than others

Getting cited in scientific literature

Publishing in high impact journals

Connecting with renowned researchers

Having luck

Publishing papers

Having public outreach (e.g., social media, news)

Having your papers read and downloaded

Publishing commentaries and editorials

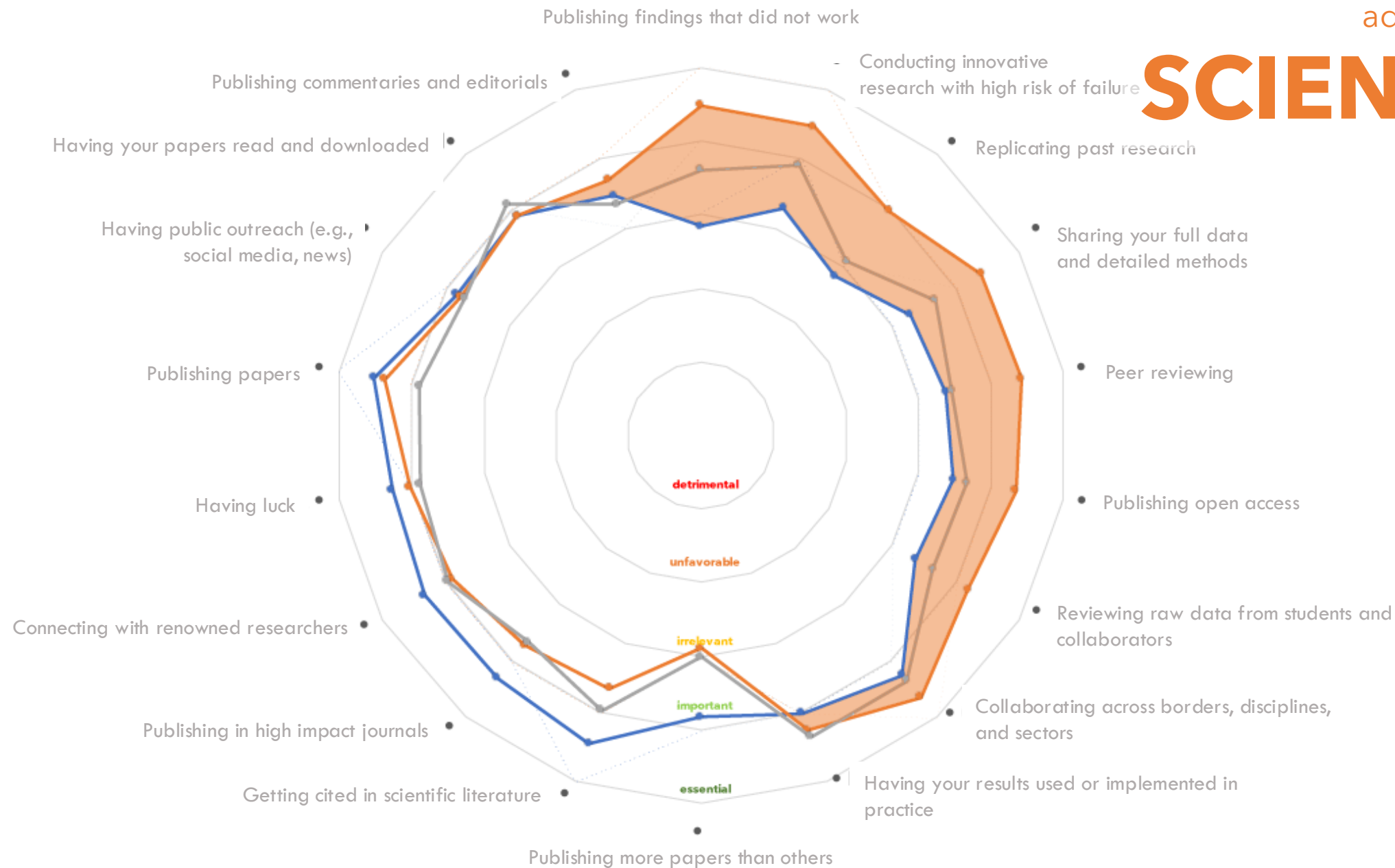
deleterious

unfavorable

irrelevant

important

essential



advancing

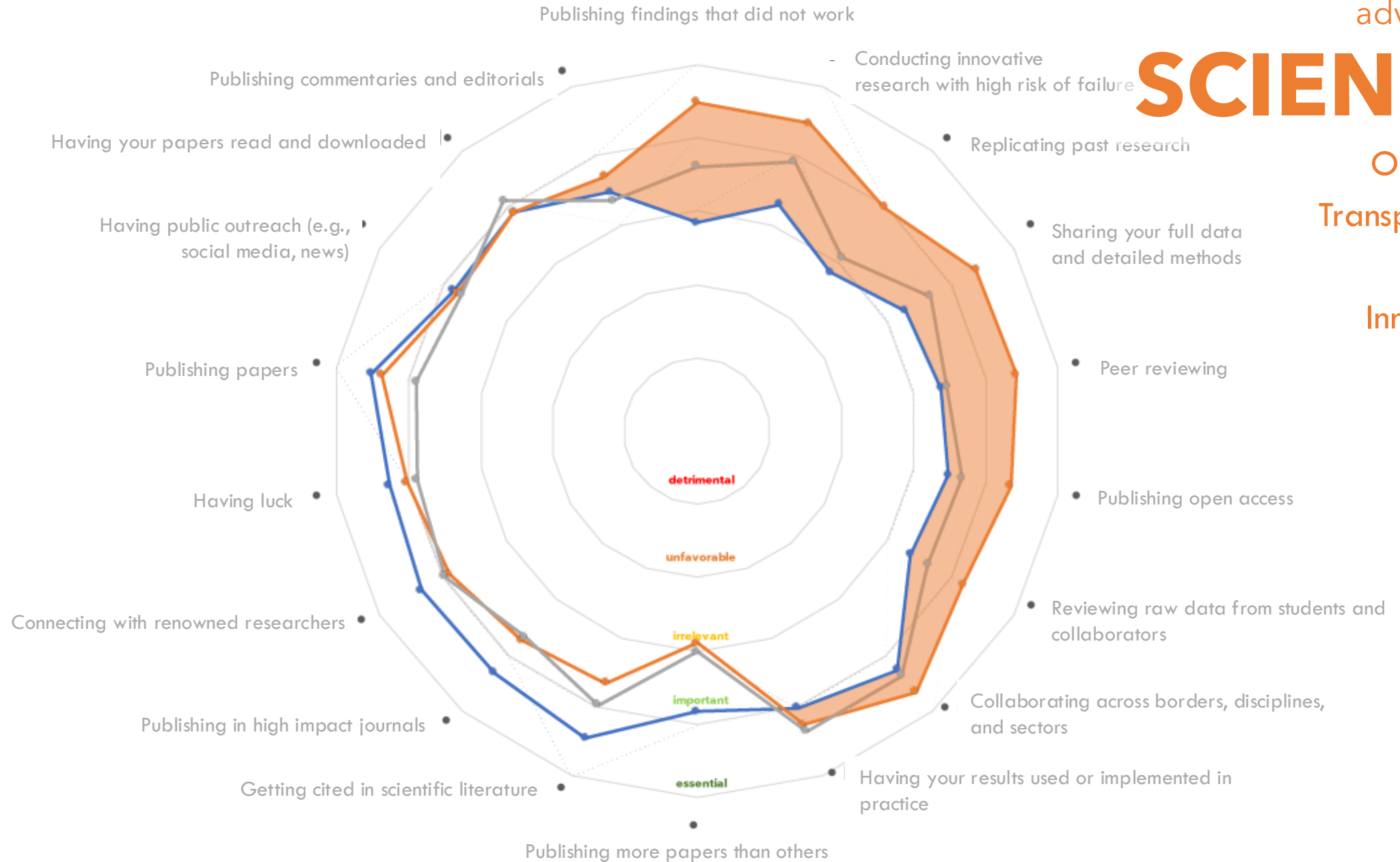
# SCIENCE

Openness

Transparency

Quality

Innovation



advancing

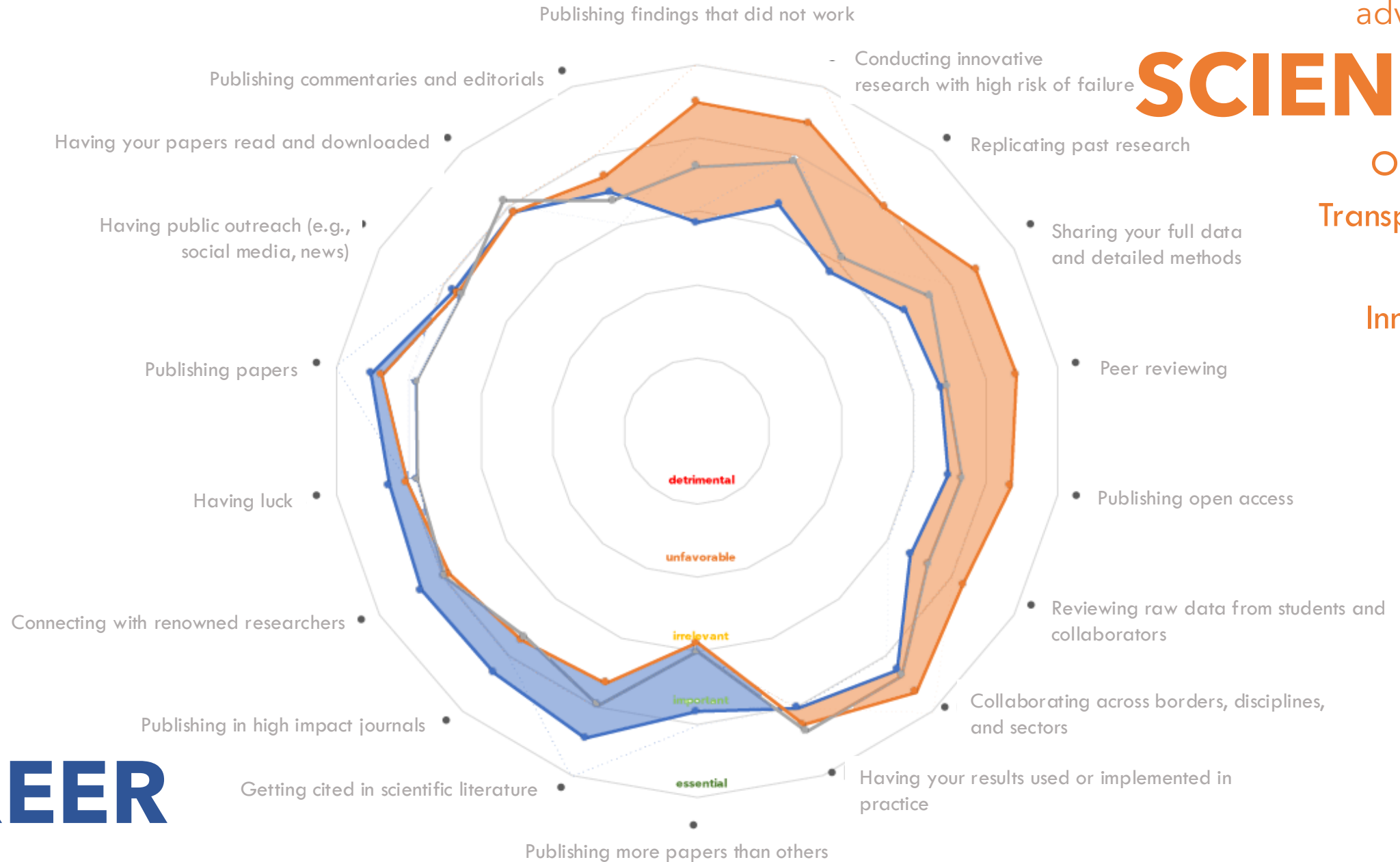
**SCIENCE**

Openness

Transparency

Quality

Innovation



advancing

**CAREER**

advancing  
**SCIENCE**

Openness  
Transparency  
Quality  
Innovation

## What about their personal satisfaction?



Luck  
Prestige  
Status  
Competition  
advancing  
**CAREER**

(Pssst, that's just a different way to visualise the same data from the previous slide...)



**= Assessment models influence research cultures**

Publication  
models



**Assessment  
models**

So... why does it happen?



**Culture**



“ There are initiatives that are doing that like the Wellcome Trust in England is doing that, if they fund you you will always show your data even if they are negative. **But the only issue is: will people ever look at those?** ”

Researcher

“ ...if you would publish, **no one would be interested to read that.** ”

Institution leader ”

**Researchers  
don't like  
failure!**

“ I did a lot of work and I was really willing to work hard and to get there, but **because of all the negative results in the end I was frustrated.** ”

Research technician (past researcher),,

# Culture

What is **success** in science?

“ [Success is] this combination of **working hard**,  
doing the **right thing**, and being **lucky** ”  
Researcher

# Culture



Good luck

Bad luck



“ [Success is] this combination of **working hard**,  
doing the **right thing**, and being **lucky** ”  
Researcher

Doing the right thing

~~Lazy~~



# Good luck

Positive results, breakthrough, supportive network, topic that boom in fashion

**Brings success regardless of hard work**

“ I was very **lucky** that I was at the right time in the right place, and **we had a breakthrough** ”  
Institution leader (talking about research career)

“ We know that ground breaking research has to do also a lot with **serendipity**, and with unexpected outcomes. ”

# Bad luck



g the right thing



## Good luck

Positive results, breakthrough, supportive network, topic that boom in fashion

**Brings success regardless of hard work**



## Bad luck

Negative results, loss of primacy of discovery, bad supervision

**Reduces success regardless of hard work**

“ I see somebody here in [another department], she is **working so, so hard**. She's really nice, she helps other people, but **she doesn't have any luck. All her experiments they are not working**. And she **really don't deserve it**, that's what I think. And she has all the qualifications to be a good researcher, but in the end, **it's also a part of luck**. PhD student ”

“ Some people have, are **unlucky** that **everything is negative**. You can't predict it. Technician,, ”



## Good luck

Positive results, breakthrough, supportive network, topic that boom in fashion

**Brings success  
of hard work**

“ it's still a **'taboo'** I would say, just to come open with the fact within research **"I made a mistake"**

Researcher ”

“ I have also fired two. One because he did **really a big mistake** which could be considered as **involuntary scientific fraud**.

Institution leader ”

~~NOT~~  
**Doing the right thing**

Mistakes, errors

**Reduces success  
"justifiably"...**

## Bad luck



Negative results, loss of primacy of discovery, bad supervision

**Reduces success  
regardless of hard work**

“ People get **afraid**, people don't want to make a mistake. They make mistakes, of course, but they do not talk about it, because there is **no open atmosphere to talk about your mistakes**.

Past researcher ”



## Good luck

Positive results, breakthrough, supportive network, topic that boom in fashion

**Brings success regardless of hard work**

**There is a need to  
rebalance what  
brings SUCCESS!**

SHOULD NOT REDUCE  
SUCCESS but promote  
learning!

Change is **too slow**,  
and **must happen** to  
promote a culture of  
transparency, integrity,  
and honesty

~~NOT~~  
Doing the right thing

Mistakes, errors

**Reduces success  
"justifiably"...**

## Bad luck



Negative results, loss of primacy of discovery, bad supervision

**Reduces success  
regardless of hard work**

SHOULD NOT REDUCE  
SUCCESS but lead to it!

Change is  
**happening**, but it  
needs to continue

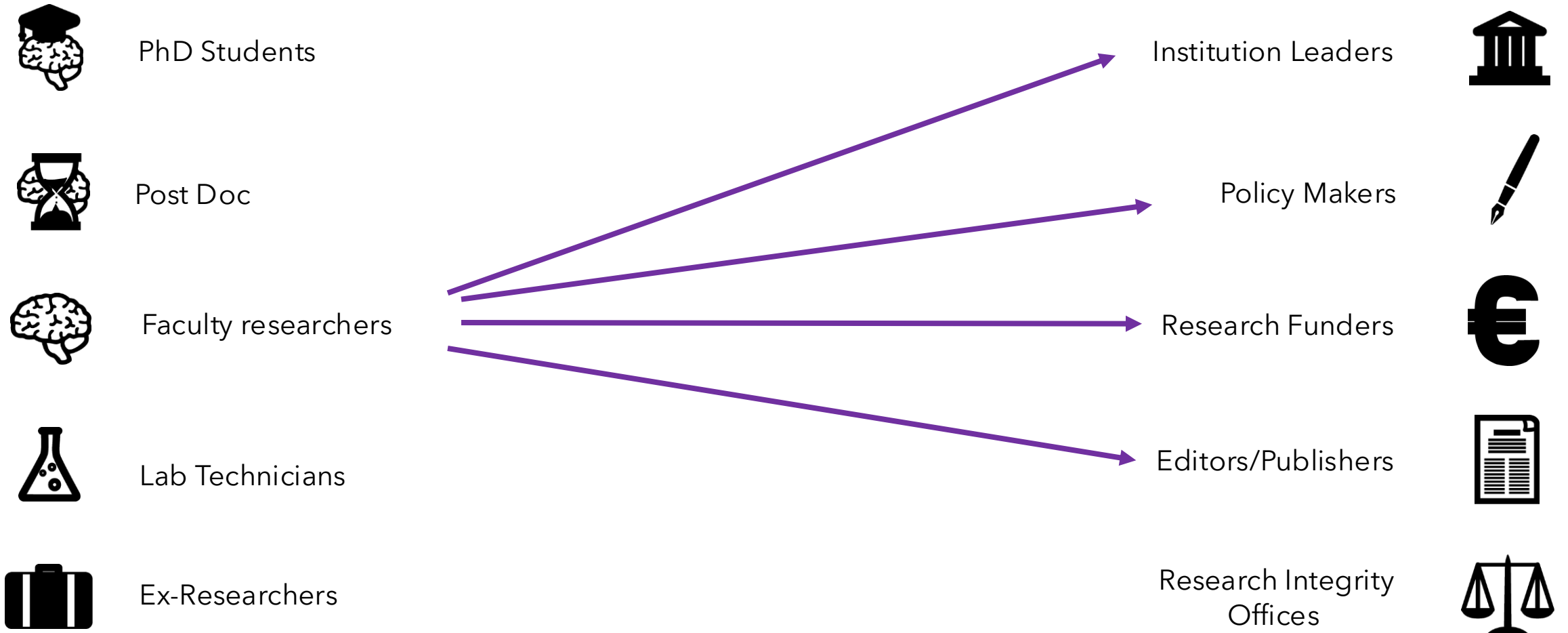
# The problem of positive publication bias

1. What's the problem? (a quick overview)

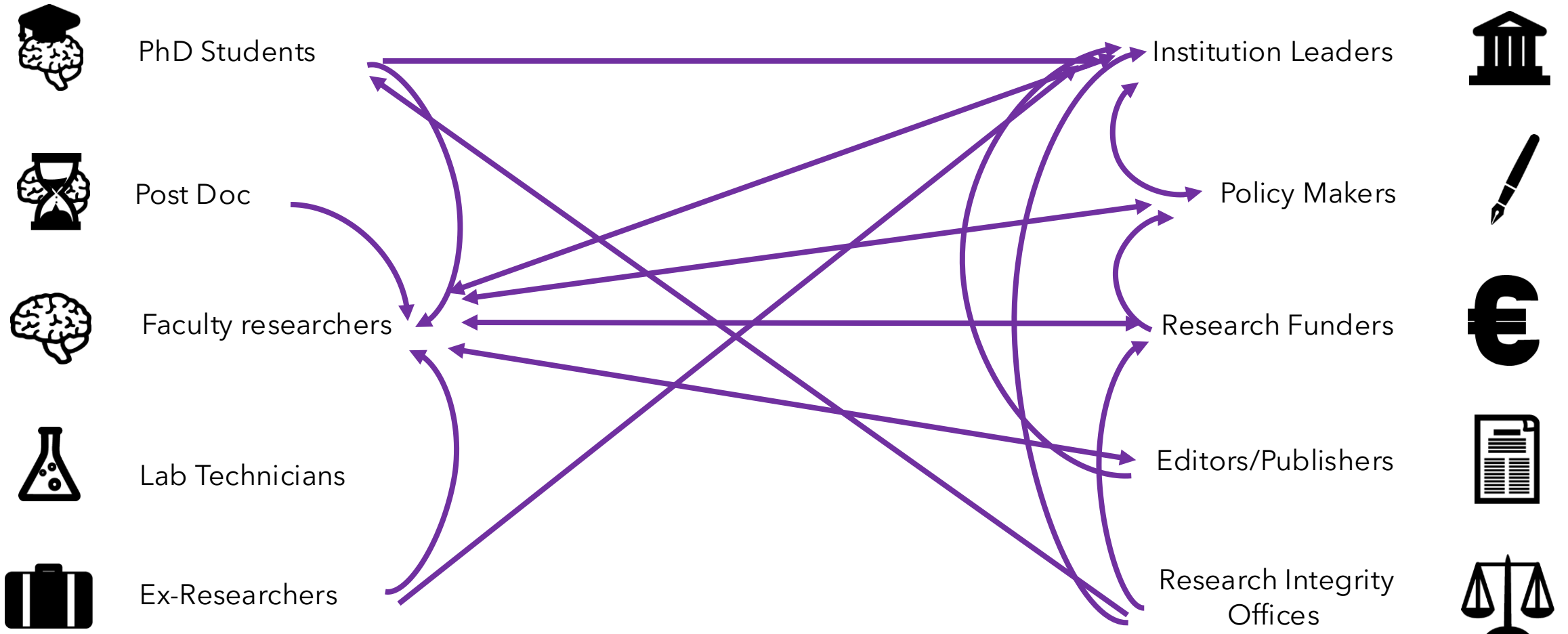
2. Why does it happen? (some thoughts)

3. What can we do about it? (some hope)

# Who has a **responsibility** in solving the problem...?



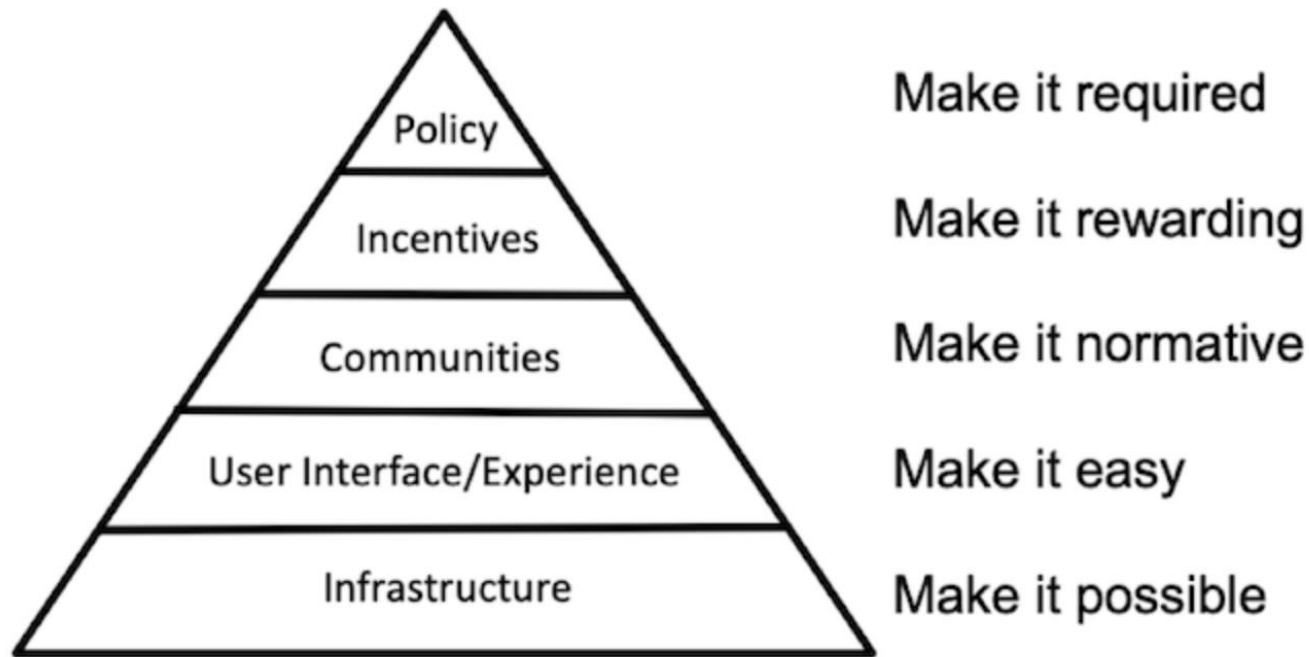
# Who has a **responsibility** in solving the problem...?



What we need is a real **culture change**

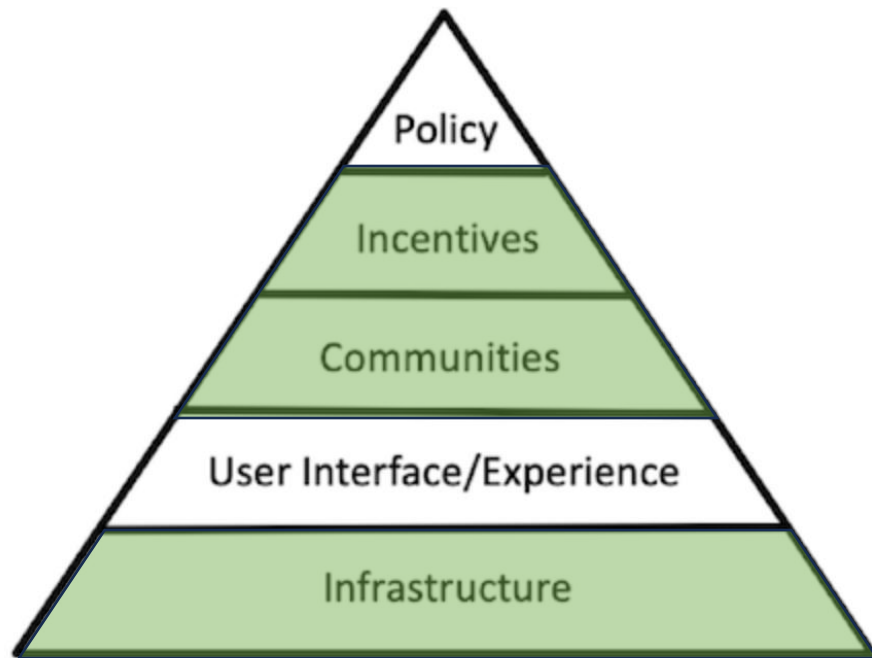
# How to bring about cultural change in science?

Strategy for Culture Change  
Brian Nosek



# How to bring about cultural change in science?

## Strategy for Culture Change Brian Nosek



Make it required

Make it rewarding

Make it normative

Make it easy

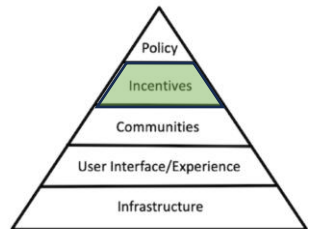
Make it possible

Could mean mandating pre-registration and registered reports, Making negative result reporting a requirement as part of PhD completion, making dedicated paper sections to address negative results and mistakes ...

Could mean providing adequate venues for publication (i.e., Journal of Trial and Error!), organising dedicated events where these are discussed ...

# How to bring about cultural change in science?

Rethink research assessments





Reformscape

CRT

RoRI Working Paper No.3  
The changing role of  
funders in responsible  
research assessment:  
progress, obstacles and the way ahead  
Stephen Curry, Sarah de Rijcke, Anna Hatch, Dorsamy (Ganssen)  
Pillay, Inge van der Weijden and James Wilsdon  
November 2020

Produced in partnership with:  
DORA UK Research and Innovation NRF

Policy Brief  
Towards Responsible  
Research Career Assessment

MARIE CURIE

NEW HORIZON

World view  
To fix research assessment,  
swap slogans for definitions

Fewer numbers,  
better science

Research Assessment in  
the Transition to Open  
Science  
2019 EUA Open Science and Access  
Survey Results

INFORMING RESEARCH CHOICES: INDICATORS  
The Expert Panel on Science  
Performance and Research Funding

Towards a reform of the  
research assessment system

Responsible  
Research  
Assessment

University Association and Science Europe  
to Improve Scholarly Research Assessment

HARNESSING THE METRIC TIDE:  
Indicators, infrastructures and progress  
responsible research assessment

RoRI  
RESEARCH ON RESEARCH  
INSTITUTE

FOLEC  
Latin American Forum for  
Research Assessment  
CLACSO

The Leiden Manifesto  
for research metrics

The Hong Kong Principles for assessing  
researchers: Fostering research integrity

RECOMMENDATIONS  
ON RESEARCH  
ASSESSMENT  
PROCESSES

Next-generation metrics:  
Responsible metrics and evaluation for open  
science

AGORRA  
A global observatory of responsible research assessment

The Metric Tide  
Report of the Independent Review  
of the Role of Metrics in Research  
Assessment and Management  
July 2015

Centrality of researchers in  
reforming research assessment  
Routes to improve research by aligning  
rewards with Open Science practices

LSE Impact Blog

Better, fairer, more meaningful research evaluation - in seven  
headlines

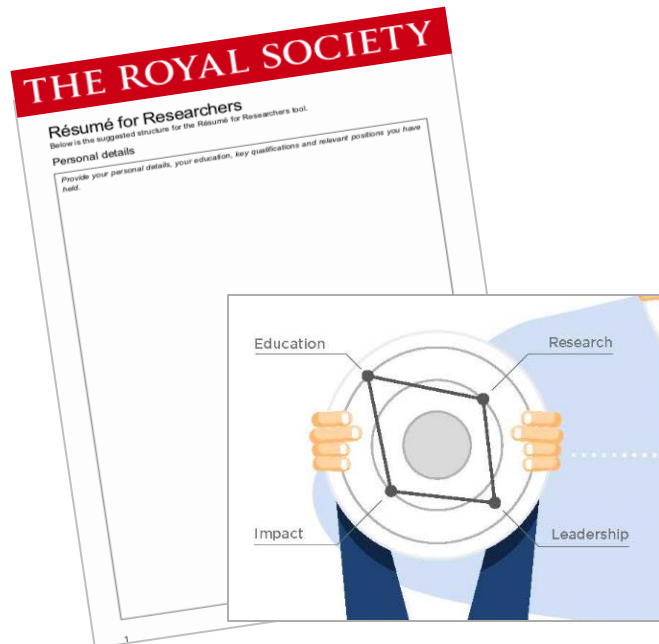
Why we need to reimagine how we do  
research



# How to bring about cultural change in science?

## Rethink research assessments

Look beyond research  
outputs



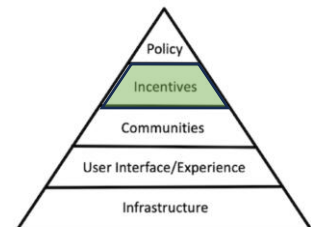
Value the skills  
developed in the  
research process

Quality > Quantity

Explicitly value failure,  
error, and negative  
results

*Tell us about what you  
learnt from a mistake...*

...start this very early  
in research careers  
(< Masters, PhD)



# How to bring about cultural change in science?

Rethink research assessments

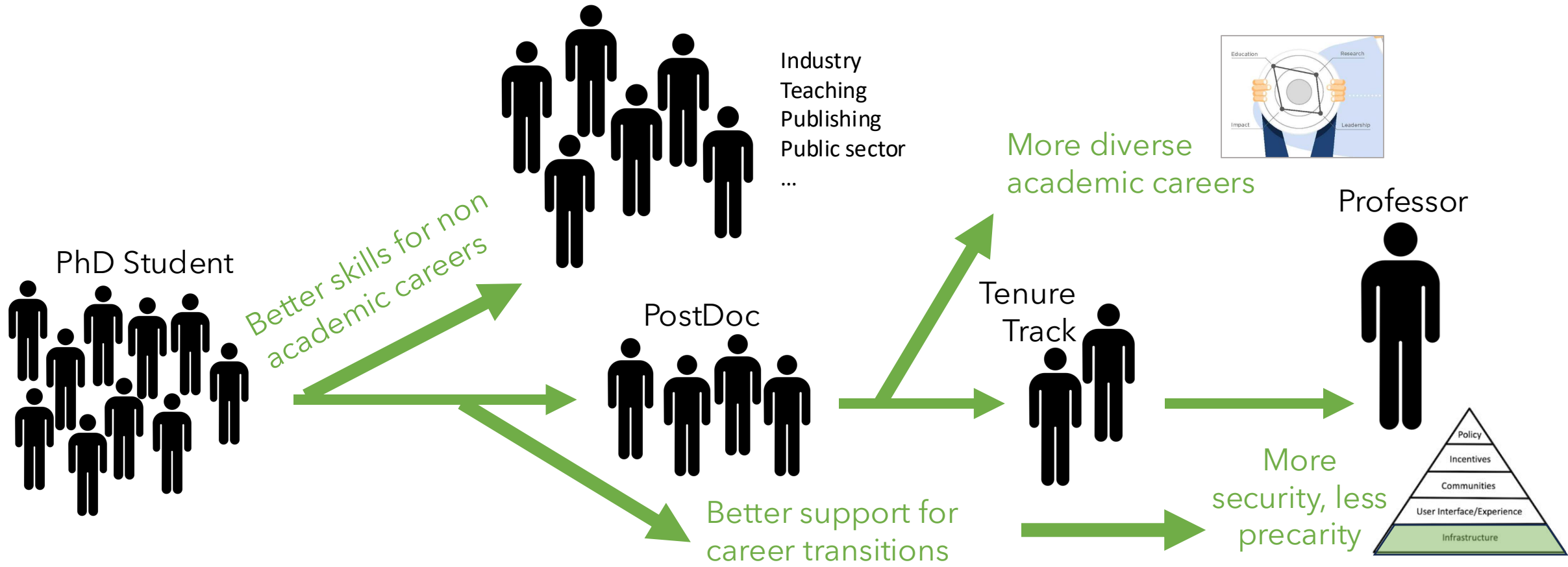
Rethink research careers



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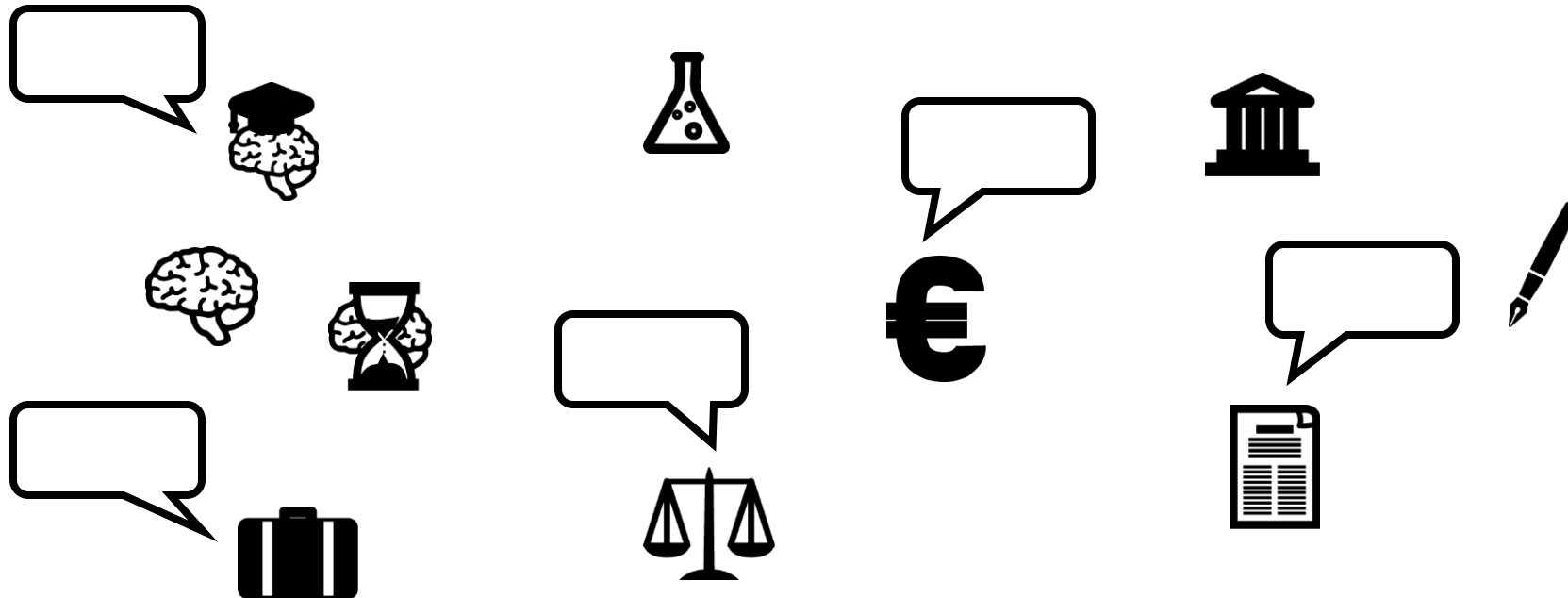


# How to bring about cultural change in science?

Rethink research assessments

Rethink research careers

Create dialogue between stakeholders



# How to bring about cultural change in science?

Rethink research assessments

Rethink research careers

Create dialogue between stakeholders

## Take part in the change!

**You already do!**



# How else can you take part?



**Break the taboo** – Talk about your mistakes and failures, encourage others to be open and unashamed about theirs



**Make your work transparent** – Pre-register, add sections for negative results, describe errors and explain what they taught you, publish with J of T&E ;)



**Become an ambassador for change** – Organise events at your institution (engage with T&E?)



**Change expectations** – Help shape what good research means, what you show interest in



**“...every result is a good result ,,”**

Small action Small action  
Small action Small action  
Small action Small action Small action  
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Small action Small action Small action  
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Small action  
Small action Small action  
Small action Small action  
Small action Small action

**= True difference**

# UHASSELT

KNOWLEDGE IN ACTION

MANCHESTER  
1824

The University of Manchester

# CultureBase

Consulting

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