



Problems and considerations in the design of bibliometric indicators for national performance based research funding systems

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NIFU

Outline

PRFS = Performance-based Research Funding Systems for institutions

1. Background:

- The proliferation of PRFS in Europe

2. Analytics:

- Evaluation-based versus indicator-based PRFS

3. Ethics:

- How to engage with instruments for New Public Management?

4. Advice:

- Bibliometrics for evaluation-based PRFS: Ten useful guidelines
- Bibliometrics for indicator-based PRFS: Ten problems and considerations

5. Conclusion: The relevance for a network of indicator designers (ENID)

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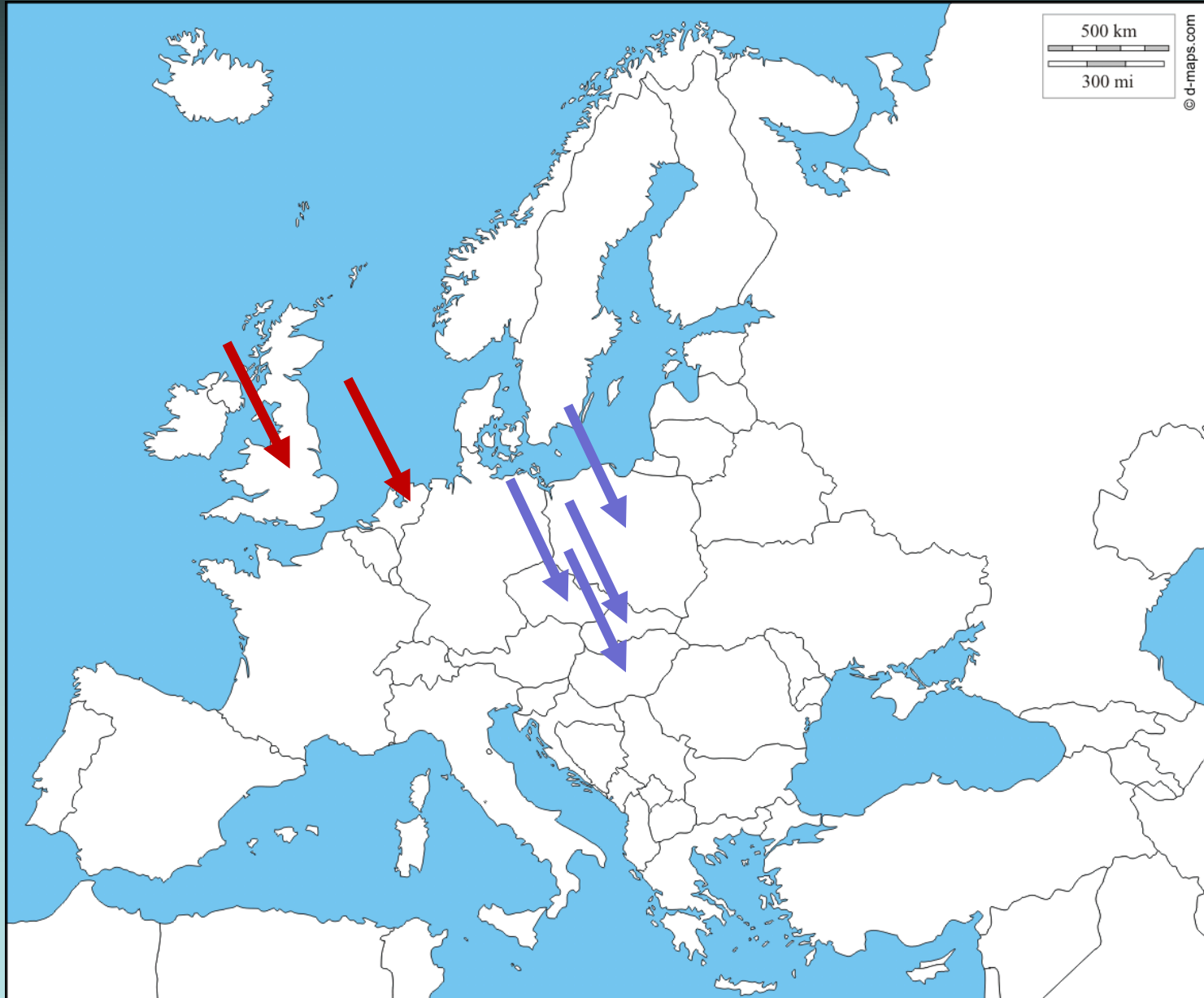
- Bibliometrics for evaluation-based PRFS: Ten useful guidelines
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5. Conclusion: The relevance for a network of indicator designers (ENID)

PRFS before 2003

Red: Evaluation-based, **Blue:** Indicator-based

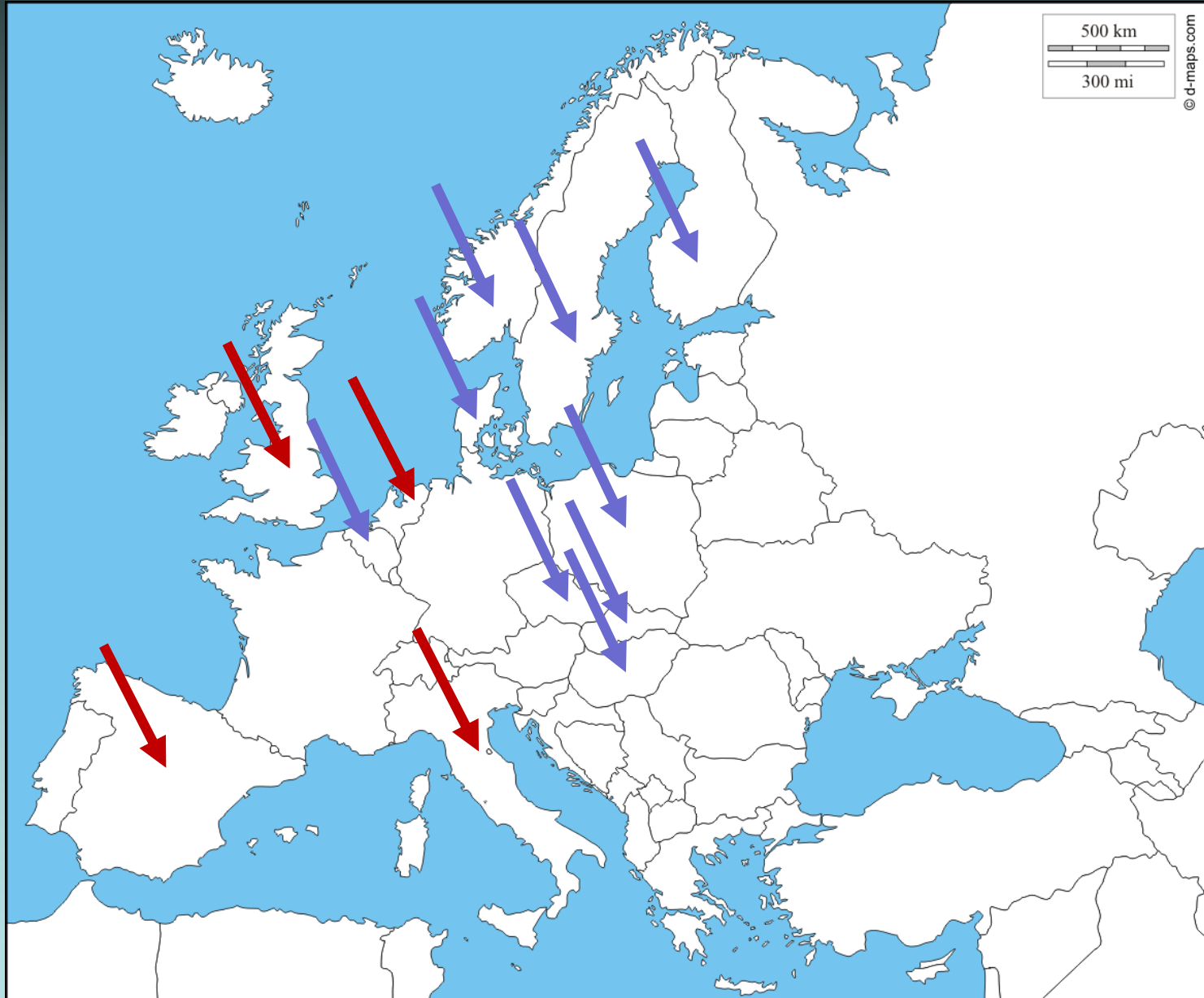
Geuna & Martin, Minerva 2003



PRFS before 2010

Red: Evaluation-based, **Blue:** Indicator-based

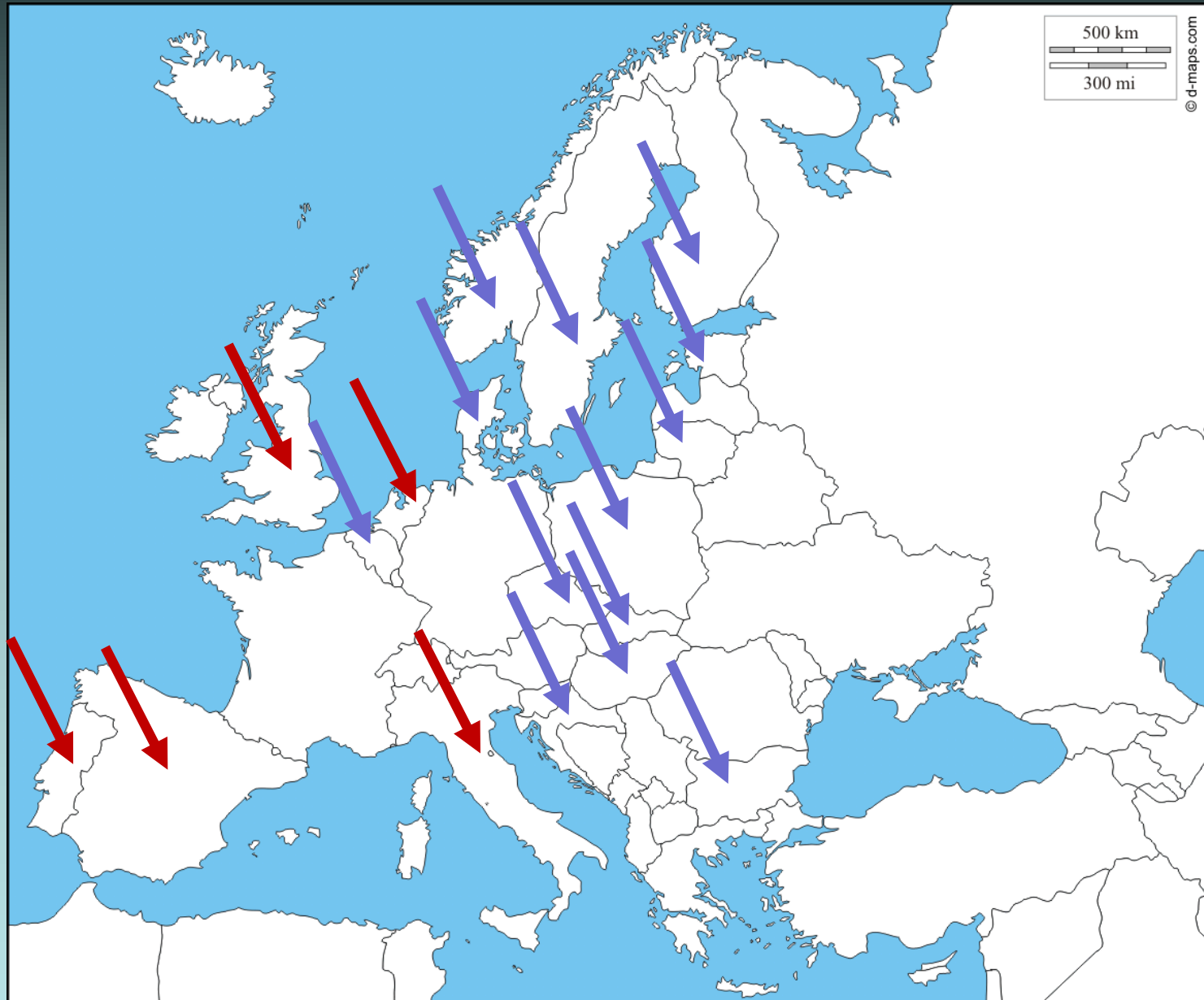
Hicks, Research Policy, 2012



PRFS before 2016

Red: Evaluation-based, **Blue:** Indicator-based

Jonkers & Zacharewicz, European Commision, 2016



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Four examples: United Kingdom

Red: Evaluation-based; **Purposes:** Research evaluation and institutional funding



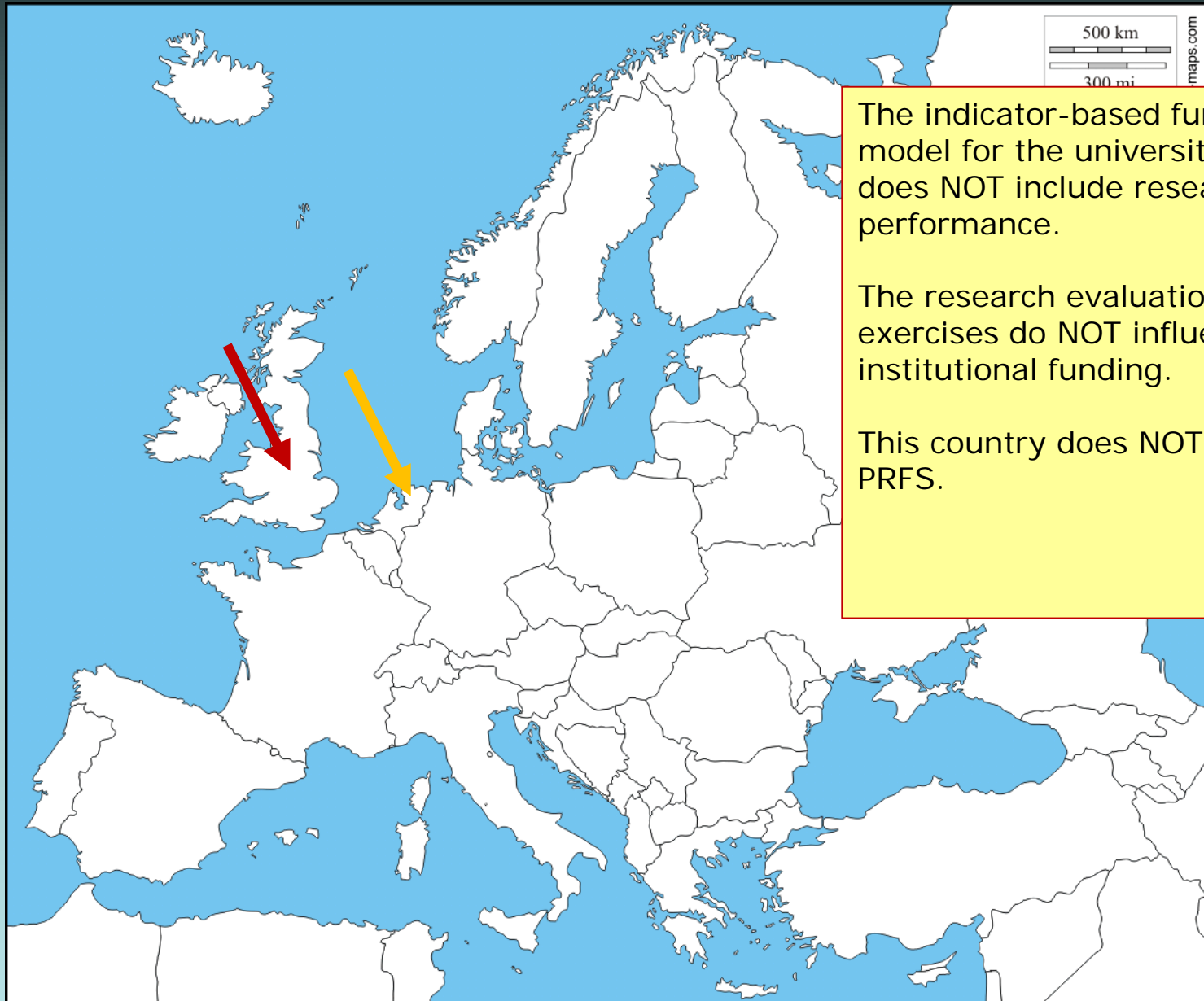
Seven major research assessments since 1986.

Originally, evaluation was the method and funding allocation was the purpose. Now, the method has become an even more important purpose.

The Metric Tide report (Wilsdon et al., 2015):
“Metrics should support, not supplant, expert judgement.”

Four examples: The Netherlands

Purpose: Research evaluation



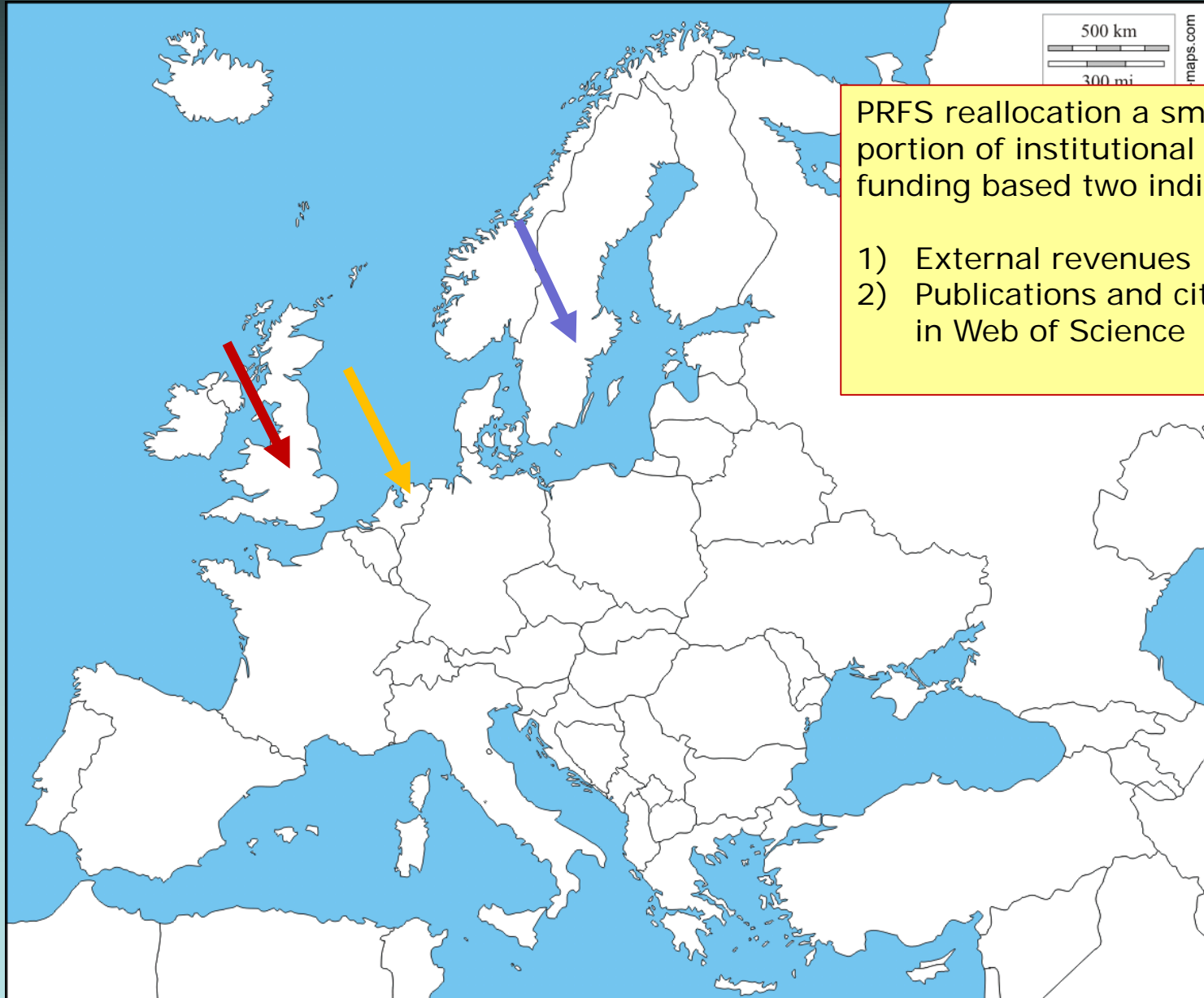
The indicator-based funding model for the universities does NOT include research performance.

The research evaluation exercises do NOT influence institutional funding.

This country does NOT have a PRFS.

Four examples: Sweden 2009-2014

Blue: Indicator-based Purpose: Institutional funding

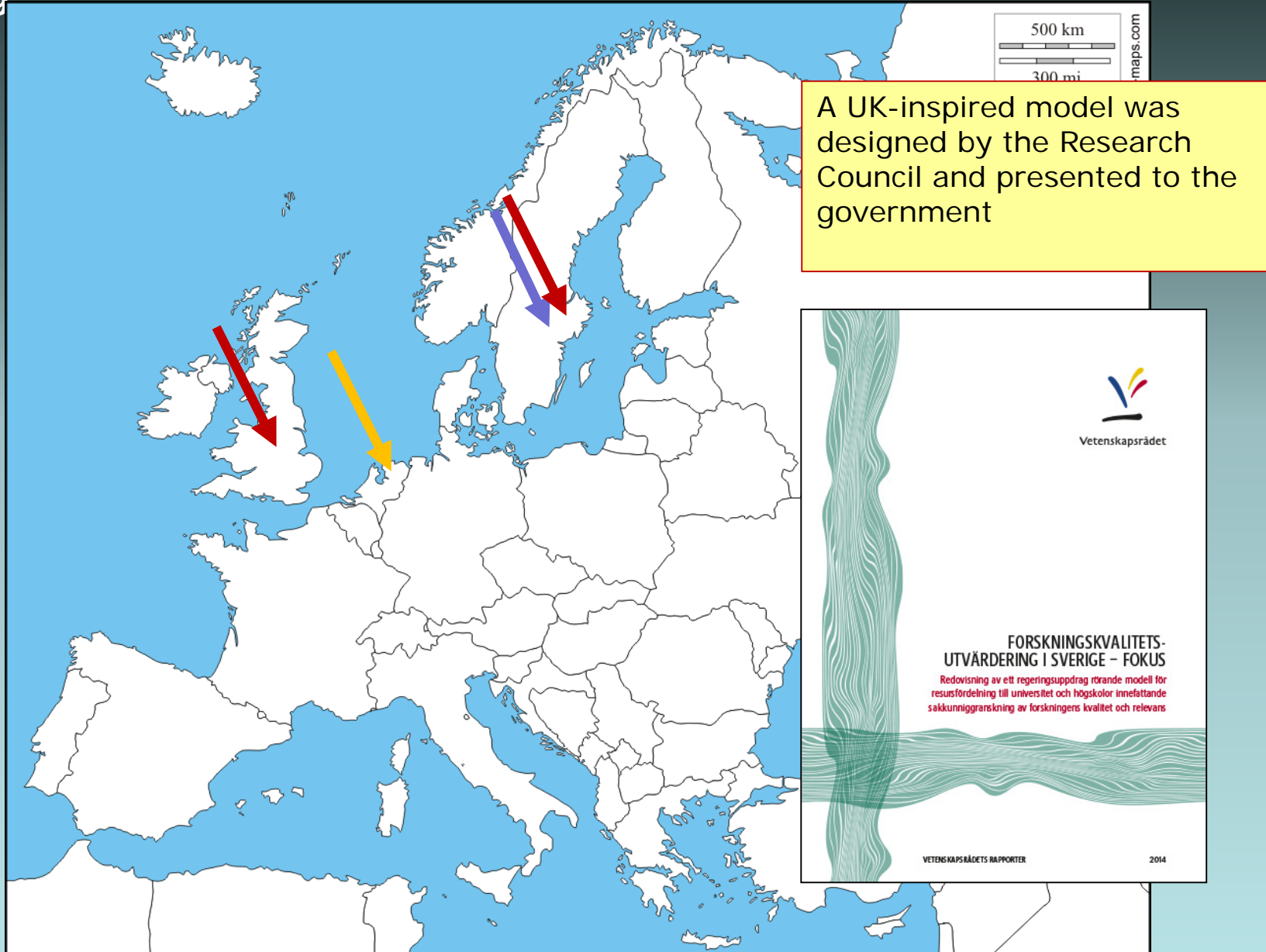


PRFS reallocation a small portion of institutional funding based two indicators:

- 1) External revenues
- 2) Publications and citations in Web of Science

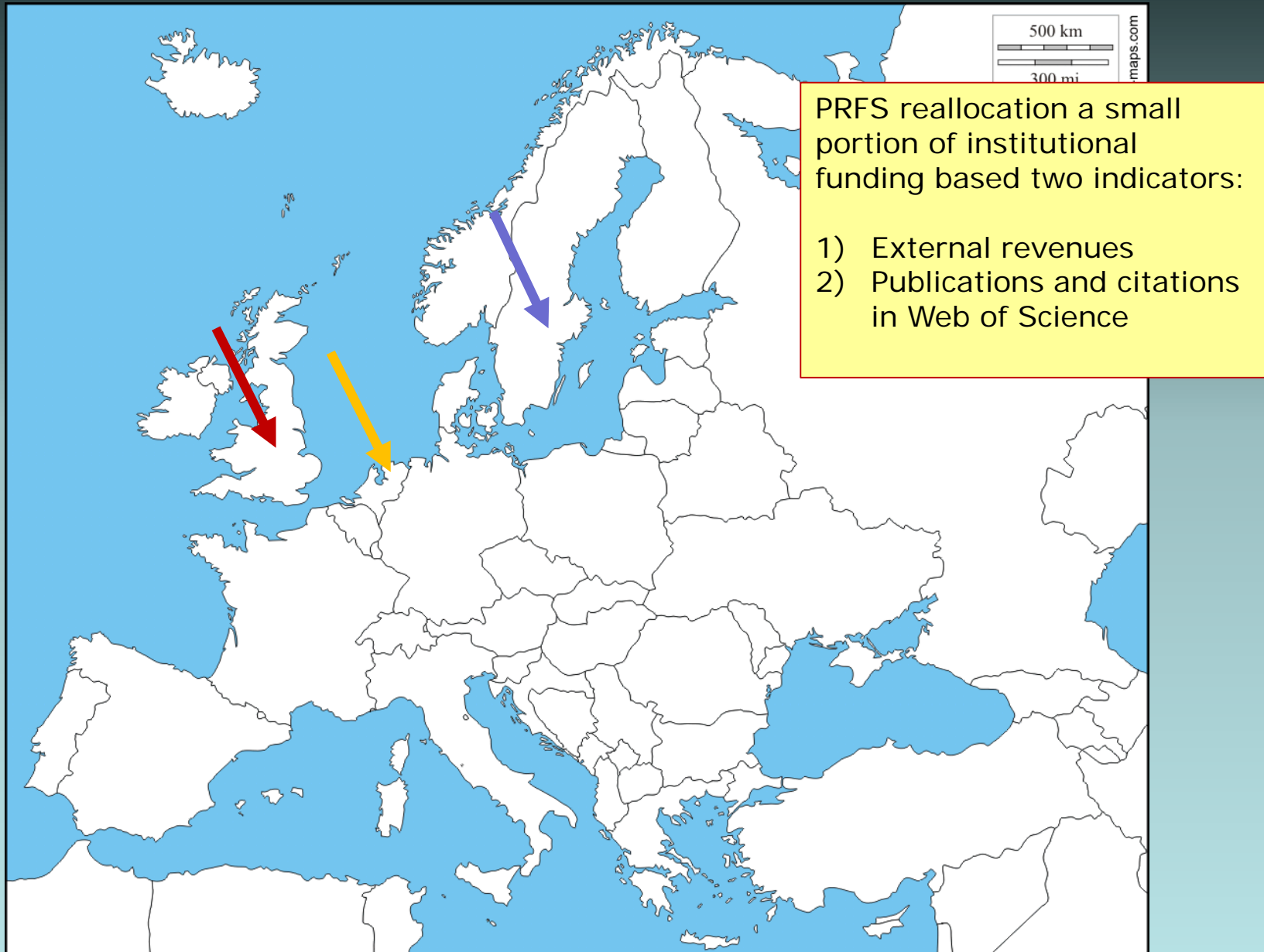
Four examples: Sweden in 2014: A report to the government

Red: Evaluation-based **Purposes:** Research evaluation and institutional funding

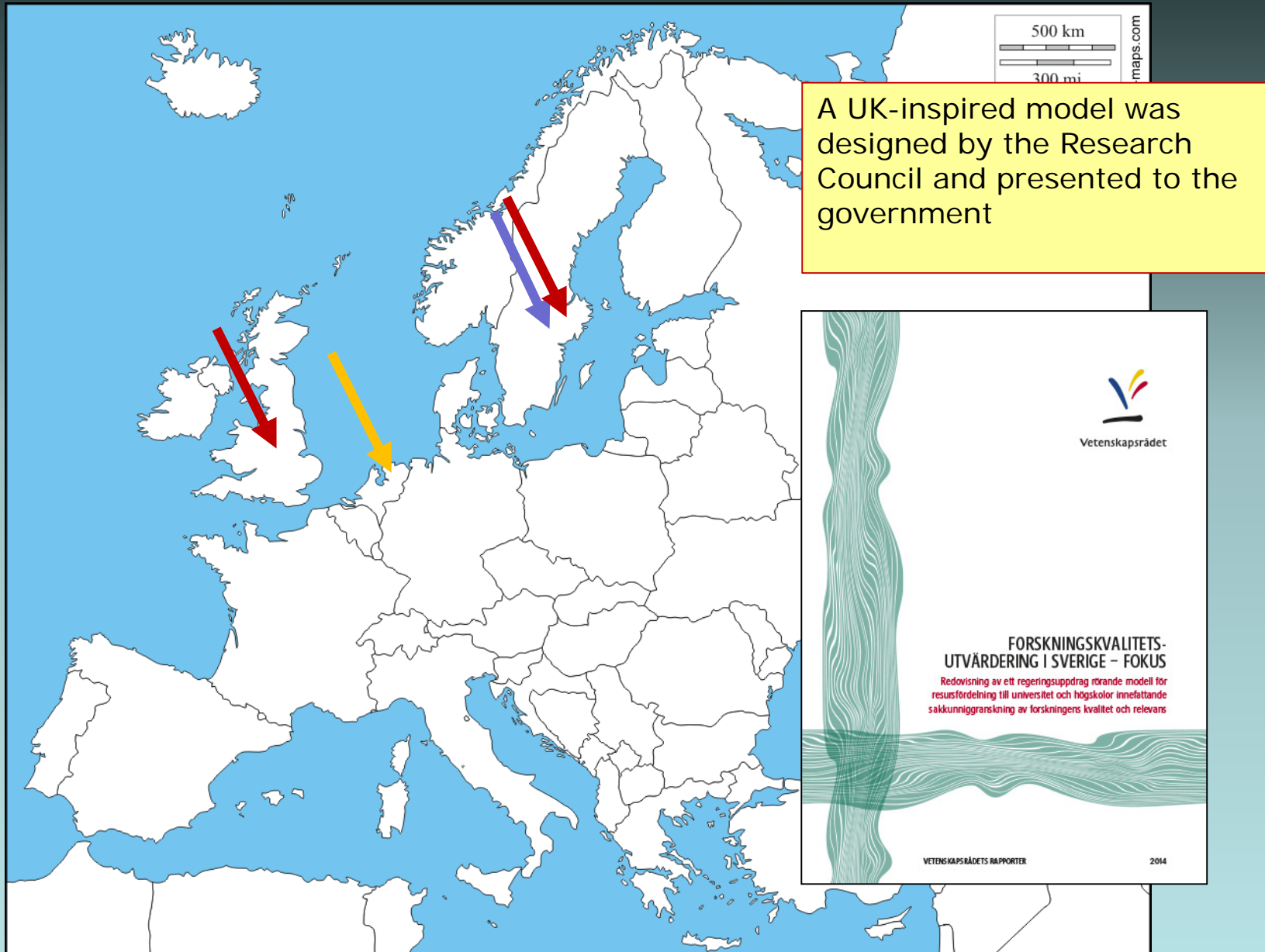


Four examples: Sweden in 2016: FOKUS not implemented

Blue: Indicator-based Purpose: Institutional funding



Four examples: Sweden in 2016: The report was not implemented
Blue: Indicator-based **Purpose:** Institutional funding



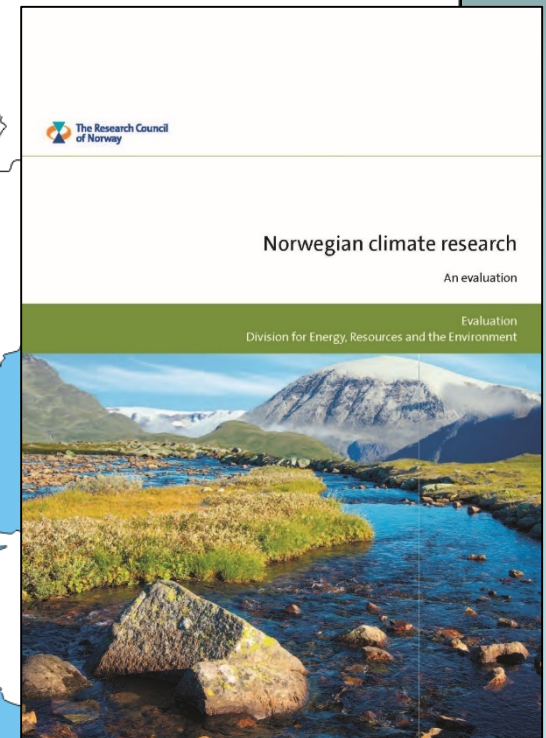
Four examples: Norway since the 1990'ies

Red: Evaluation-based **Purpose:** Research evaluation, not funding



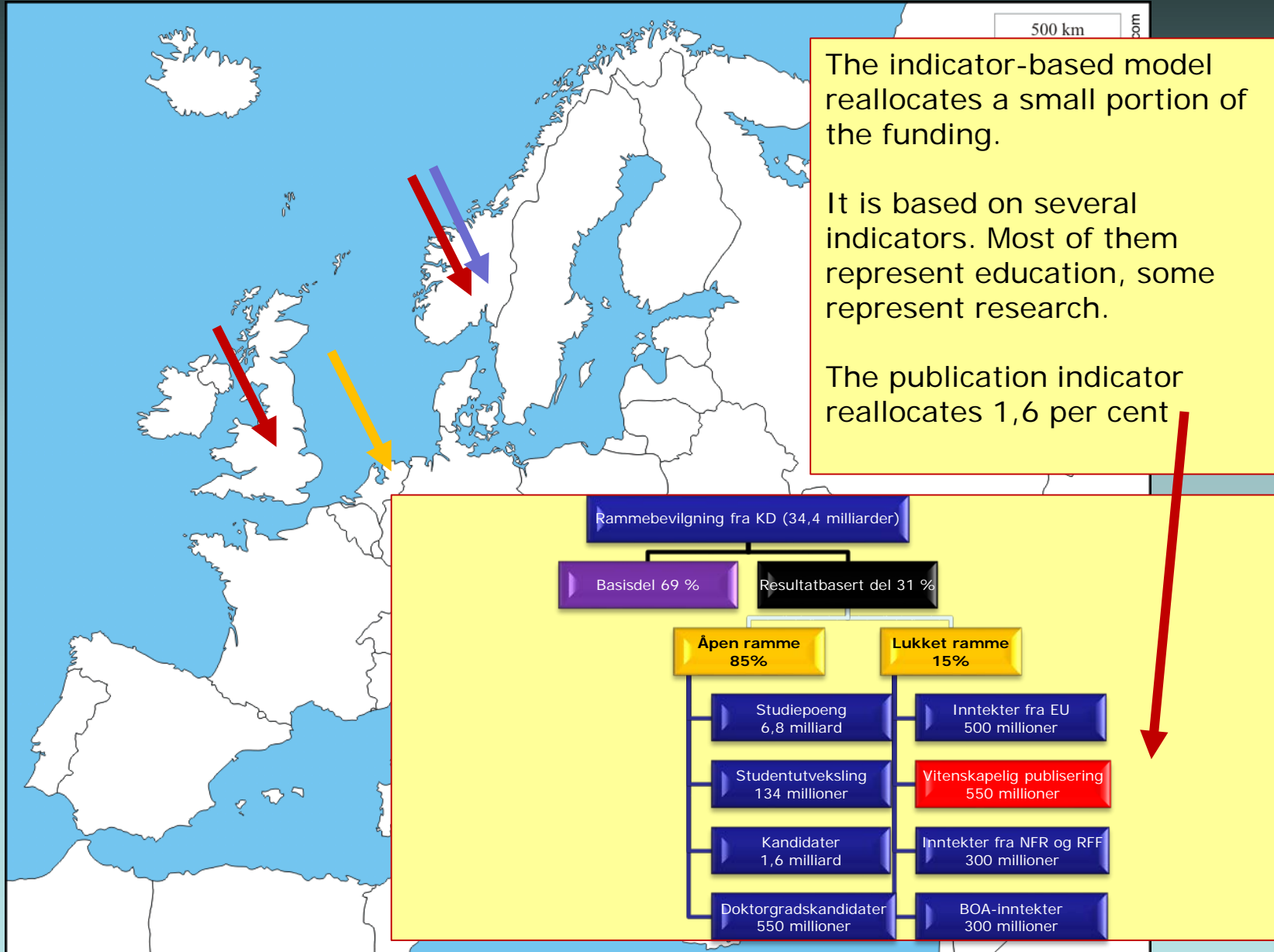
National research assessments inspired by the UK are performed by intervals.

Like in the Netherlands, they do not influence funding.

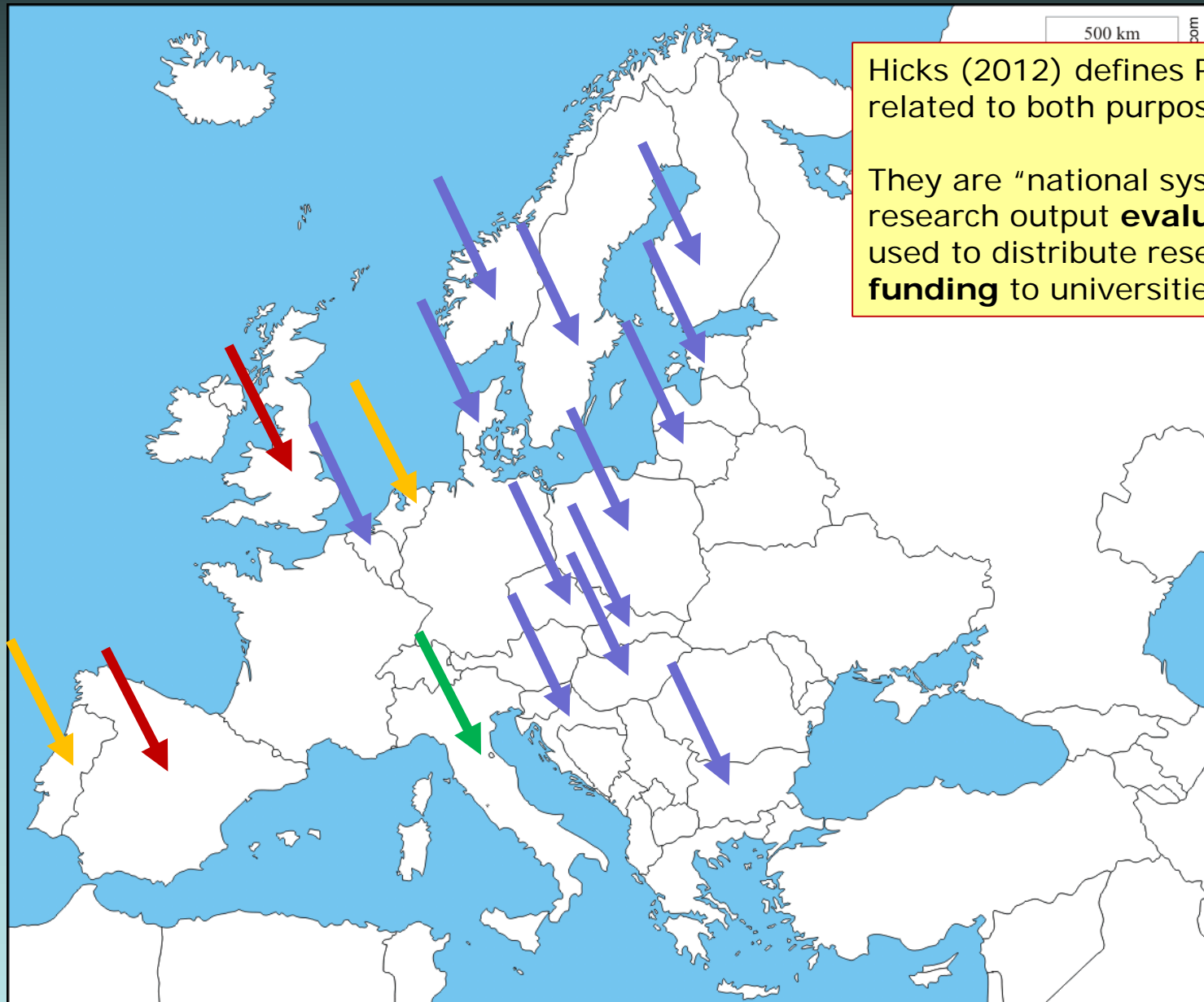


Four examples: Norway since 2002

Blue: Indicator-based Purpose: Institutional funding, not evaluation



The two purposes of PRFS may have different emphasis: Research evaluation **and** funding



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Best practice or mutual learning?

The Metric Tide report
(Wilsdon et al., 2015):
“Metrics should support, not
supplant, expert judgement.”



Best practice or mutual learning?

PRFS need to be examined in their national contexts to understand their motivations and design. While research is mostly international, research funding is mostly national. Country differences in the design of a PRFS and its motivations should be expected and respected.

The Metric Tide report
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“Metrics should support, not supplant, expert judgement.”

The Metric Tide

Report of the Independent Review
of the Role of Metrics in Research
Assessment and Management

July 2015

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MLE on Performance-based Research Funding Systems

Performance-based Research Funding Systems (PRFS) are one of the mechanisms through which countries try to increase the performance of their public sector research systems. The nature of these systems – based on peer reviews, metrics or a combination of both – varies considerably among countries. The MLE will provide a learning opportunity for countries willing to better understand the advantages and drawbacks of various options, improve ongoing PRFS and deepen the assessments of the impact of different systems.

Date 

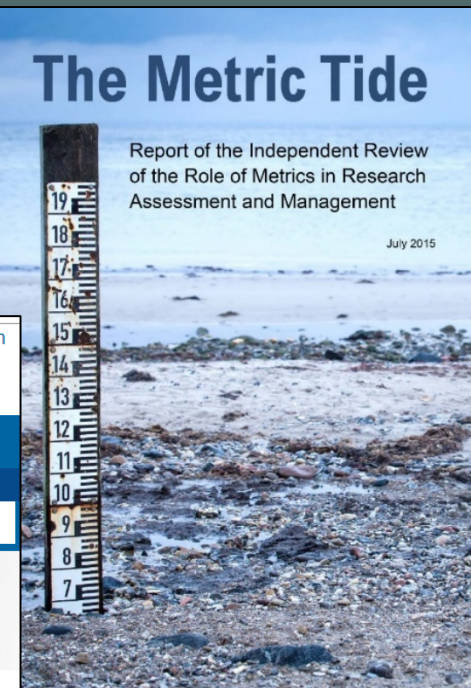
Exercise type 

Geo coverage 

12 January 2017 to 11 September 2017

Mutual learning

Austria Croatia Cyprus Czech Republic Estonia Italy Armenia Moldova Norway
Portugal Slovenia Spain Sweden Turkey



The motivations differ among countries and are context-specific. They cannot be reduced to a general wish to implement NPM

PRFS need to be examined in their national contexts to understand their motivations and design. While research is mostly international, research funding is mostly national. Country differences in the design of a PRFS and its **motivations** should be expected and respected.



Effects of PRFS depend on their design and implementation

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Assessing publications through a bibliometric indicator: The case of comprehensive evaluation of scientific units in Poland

Emanuel Kulczycki ✉


Research Evaluation, Volume 26, Issue 1, 1 January 2017, Pages 41–52,
<https://doi.org/10.1093/reseval/rvw023>
Published: 09 January 2017

Volume 26, Issue 1
January 2017

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What happens when national research funding is linked to differentiated publication counts? A comparison of the Australian and Norwegian publication-based funding models

Jesper W. Schneider ✉, Kaare Aagaard, Carter W. Bloch

Research Evaluation, Volume 25, Issue 3, 1 July 2016, Pages 244–256,
<https://doi.org/10.1093/reseval/rvv036>
Published: 08 December 2015

Volume 25, Issue 3
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The “Leiden Manifesto”

Bibliometrics for evaluation-based PRFS: Ten useful guidelines

1. Quantitative indicators cannot replace the judgment of expert assessors, but they can be used to help support them.
2. Evaluation of research activity has to adapt to the mission and objectives of the institution, individual or group being evaluated.
3. Indicators need to be developed that reflect the impact of research activities locally and regionally, and those that are developed in languages other than English.
4. The data collection and analysis processes have to be open, transparent and simple.
5. Those evaluated have to be able to verify the analysis of the indicators being used for the evaluation and, if they disagree, request re-evaluation.
6. The differences existing in terms of impact in different fields of research have to be taken into account when producing indicators.
7. Individual evaluation of researchers has to be based on qualitative assessment of their portfolio. Indicators cannot be used without taking into account the researcher's context.
8. False precision and misplaced concreteness must be avoided.
9. The effects of certain indicators as incentives for certain activities and disincentives for others must be taken into account.
10. The indicators have to be reviewed and updated regularly.

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Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 1

- Bibliometrics is not 'objective'.
- The idea that one indicator based on one particular data source might solve the problem or promote the best research should be regarded as subjective as long as it is not tested and discussed.
- The available data sources and indicators for bibliometrics may be problematic already at the outset if the aim is to give a balanced representation of performances in all areas of research and all types of research organizations.
- Main consideration: To avoid power games in the design process. Background:

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 2

- The viable solution will probably not come from a single desktop.
- Design the PRFS in dialogue between the funder and the funded organizations.
- Represent all areas of research in the process.
- Make use of (commercially) independent bibliometric expertise
- Main consideration: Participation and transparency.

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 3

- The effects of a PRFS may be strong even with a limited economic influence.
- Main considerations: The perceived importance of the bibliometric indicators and their effects as incentives will partly depend on their economic influence, partly on other incentives in the research system, by which they can be strengthened.

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 4

- Data sources and indicators define what counts.
- Available data sources such as WoS or Scopus represent definitions and delimitations.
- If data are not defined by a chosen data source, an explicit definition is needed along with a set of reporting instructions and some monitoring of the reporting practices.
- Main considerations: data quality; disinterested data production; incentives for internationalisation; costs; comprehensiveness; balanced representation of all fields; the representation of national language publishing.

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 5

- Indicators must be defined.
- Both publication, collaboration and citation indicators may be used in PRFS designs.
- The main considerations are connected to the dimensions of performances that the different indicators represent, and whether they are available and valid across all fields.

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 6

- Field normalization or balances are needed.
- The well-established field normalization methods for citation indicators need to be supplemented with a balanced representation of productivity across fields.
- This can be solved in the design of the indicators, or with balances in the funding formula itself, or by separating field-specific streams of funding.
- Main considerations: Institutions with different profiles of specialization, e.g. a technical university versus a general university, need to be treated equally. The funding mechanism should be acceptable across fields.

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 7

- Counting methods can create biases.
- How to count publications with multiple authors and affiliations is an often-overlooked problem in the design of bibliometric indicators for PRFS.
- Main considerations: to balance the indicators across subfields with different co-authorship practices, and to incentivize collaboration without stimulating the inclusion of authors with minimal contributions.

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 8

- Weighing of publication types can be necessary.
- If more than one type of publication (e.g. journal articles) is included in the indicators, such as peer reviewed conference papers, book chapters and monographs, these must be weighed against each other.
- Main considerations: to balance the indicators across subfields with different publication practices, and to incentivize a favourable development of those practices.

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 9

- Ranking of publication channels.
- Publications of the same type may be given different weights depending on where they are published. This can be done by using journal impact factors, journal 'quartiles", the delimitation of certain respected data sources, or panel evaluation of publication channels.
- Main considerations: to incentivise internationalisation or publishing in certain important publication channels; to balance between research quality and research productivity; to provide legitimate incentives that do not discriminate national language publishing in the social sciences and humanities; to respect the DORA declaration.

Bibliometrics for indicator-based PRFS:

Ten problems and considerations: 10

- Bibliometric indicators designed for the macro level (institutions) are often not adequate at the level of research groups or individuals.
- Applications at the micro level should instead follow the ten principles of the *Leiden Manifesto*.

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PRFS designs are dynamic, responding to evaluations, critique and policy changes



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DOI: <http://dx.doi.org/10.4995/STI2016.2016.xxxx>

A bibliometric indicator with a balanced representation of all fields

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Abstract

As research in progress, we present two studies aimed at redesigning the bibliometric indicator of the “Norwegian Model” as response to an evaluation in 2013. The indicator is supposed to give a balanced representation of all fields, also those that are constructed as “peripheral” in traditional bibliometrics because of limited coverage in databases. The first study deals with balancing between different field-dependent co-authorship practices in the indicator, the other with the possible addition of a measurement of citation impact that could be applicable across all fields.

Keywords

Bibliometric indicators; productivity; citation impact; co-authorship; fractionalization; publication patterns; evaluation; the Norwegian model.

Submission type: Research in progress paper.

Relevant track: Data infrastructure for research metrics.

Conclusion: The relevance for a network of indicator designers (ENID)



- PRFS designs are embedded in national contexts and policies
- They may do harm, or they may have other effects, depending on how they are designed and implemented
- A manifesto does not seem possible in this case
- Reflexivity, criticism and academic distance to practice is already abundant
- Engagement of independent experts is needed

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Bibliometrics: The Leiden Manifesto for research metrics

[Diana Hicks](#), [Paul Wouters](#), [Ludo Waltman](#), [Sarah de Rijcke](#) & [Ismael Rafofs](#)

22 April 2015

Use these ten principles to guide research evaluation, urge Diana Hicks, Paul Wouters and colleagues.

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Subject terms: [Careers](#) • [Research management](#) • [Publishing](#)




Illustration by David Parkins

Data are increasingly used to govern science. Research evaluations that were once bespoke and performed by peers are now routine and reliant on metrics¹. The problem is that evaluation is now led by the data rather than by judgement. Metrics have proliferated: usually well intentioned, not always well informed, often ill applied. We risk damaging the system with the very tools designed to improve it, as evaluation is increasingly implemented by organizations without knowledge of, or advice on, good practice and interpretation.