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Meaningful metrics

The role of bibliometrics in research evaluation

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Vilnius SSH Teaching

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Universiteit Leiden

Overview lecture

- Sketching the scenery …
- The origin of the "***Publish or Perish***" culture
- Context of using/applying research metrics
- Questioning the universality of research metrics
- Infamous bibliometric indicators: JIF and h-index
- Wrapping it all up

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Reactions on the increasing influence of research metrics


The Economist
Britain's angry white men
How to do a nuclear deal with Iran
Investment tips from Nobel economists
Junk bonds are back
The meaning of Sachin Tendulkar
HOW SCIENCE GOES WRONG
99
Einsteinium
OCTOBER 19TH - 25TH 2013


ESA
European Sociological Association


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News Science People in science
Nobel winner declares boycott of top science journals
Randy Schekman says his lab will no longer send papers to Nature, Cell and Science as they distort scientific process
Ian Sample, science correspondent


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


COMMENT
The Leiden Manifesto for research metrics


San Francisco
DORA
Declaration on Research Assessment

The San Francisco DORA Declaration (2012)

- Meeting of the American Society for Cell Biology
- Mainly editors and publishers that called for action.
- Misalignment between contributions to journals, and journal's JIF-values
- Halt the practice of using research metrics (Read: JIF)
  - Correlating JIF to individual's contributions, …
  - … which creates biases and inaccuracies in research assessments
  - JIF not to be used as (partial) substitute measure for quality of the oeuvre of an individual
- Signed by learned societies, individual universities, research institutions, and research councils

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Science in Transition (2013)

- Started in the Netherlands
- Re-establishing the interaction between universities and society
- Issues that ignited SiT are:
  - The flood of scientific publications, becoming simply too much, but incentivized by politico-economic reasoning within academia.
  - Universities turned into PhD factories (PhD = € 70.000,-), as well as Ma factories, with little job perspective in academia.
  - Research agenda building misaligned with needs by academia and society
- Image of universities:
  - What is driving academics, truth or careers ?
  - Myth of disinterested academics, fraud and argument show otherwise !
  - How are scholarly results produced and communicated ?

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http://scienceintransition.nl/en/about-science-in-transition

Nobel laureate bashing publication culture (2013)

- Randy Schekman (Nobel prize in Physiology in 2013) stated “ ***… my lab will no longer send papers to Nature, Cell and Science as they distort the scientific process”***

- Next, he stated ***“… the pressure to publish in "luxury" journals encouraged researchers to cut corners and pursue trendy fields of science”***

- The prestige of appearing in the major journals has led the Chinese Academy of Sciences to pay successful authors the equivalent of $30,000.

- Furthermore, Schekman stated that “ ***…just as Wall Street needs to break the hold of the bonus culture, so science must break the tyranny of the luxury journals”***

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How to define bibliometrics ?

- Quantitative analysis of science and technology, including its' cognitive and organizational structure
- Scientific communication - journal publications
- ***Output*** and ***Impact***, as measured through publications and citations
- Scientists express, through references, a certain degree of influence of others on their own work
- Citations indicate influence or (inter)national visibility

→ Does not equal '***quality***'

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A less neutral approach …

- Bibliometric measures tend to shape what they measure.
- Bibliometrics has some serious shortcomings.
- Better not be used as a stand-alone tool in assessments of research.
- There is a firm academic debate on the *meaning* of references

  (Bornmann & Daniel, 2008).
- Research metrics have seriously contributed to the “Publish or Perish” culture in academia.

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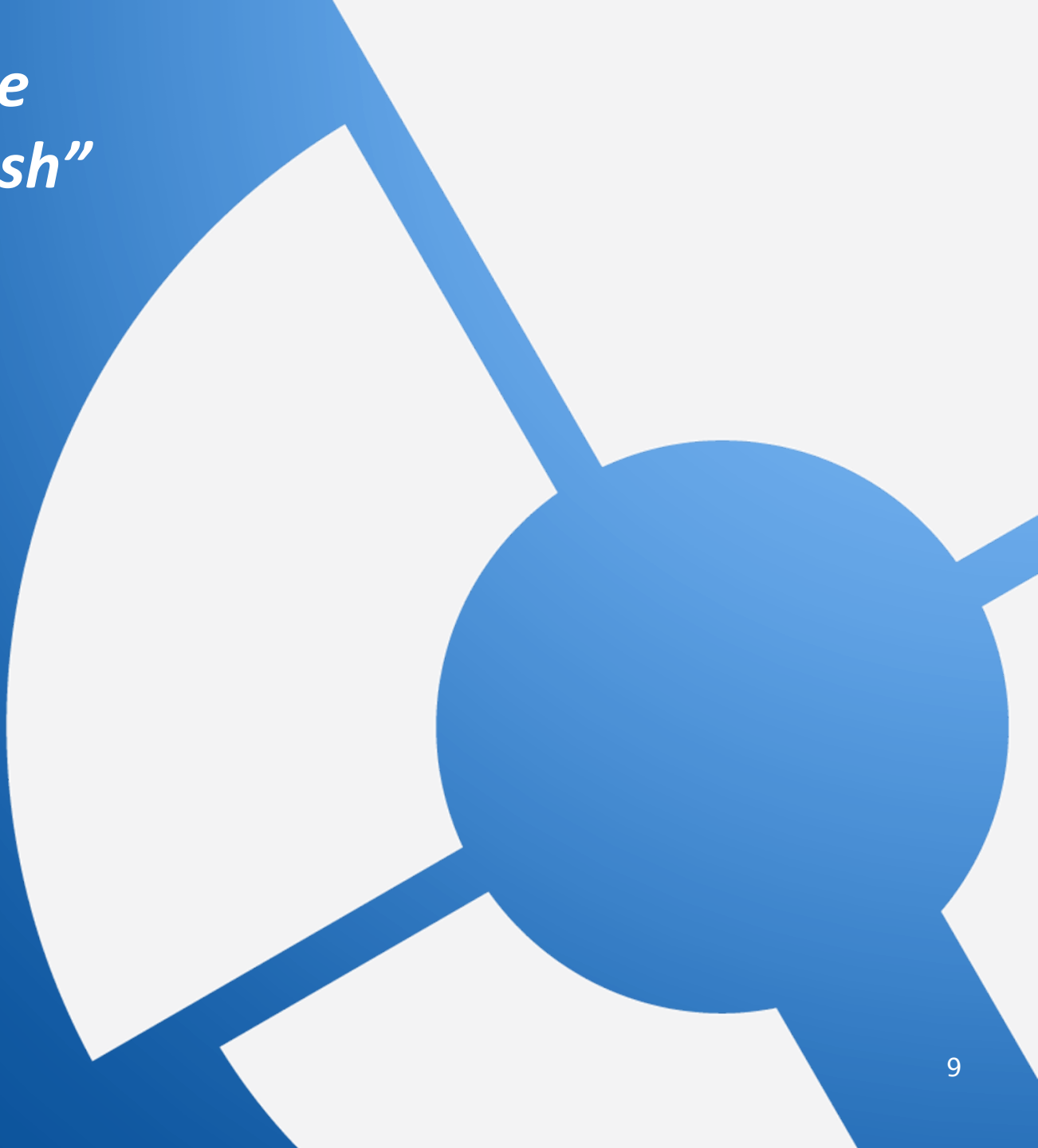
The origin of the "Publish or Perish" culture



Reviewing is part of daily scholarly life

- Very old tradition
  - *From 17th century onwards: peer review central*
  - *Mid-20th century: rise of performance indicators & bibliometrics*
- A regular academic working day consists of:
  - *educational tasks*
  - *research*
  - *clinical tasks*
  - *management and administrative tasks*

Focus on research evaluation

- Reviews relate to:
  - *scientific/scholarly publishing and public appearances*
  - *appointment and promotion*
  - *research grants and proposals*
  - *periodical reviewing of research performance*

Application of research metrics

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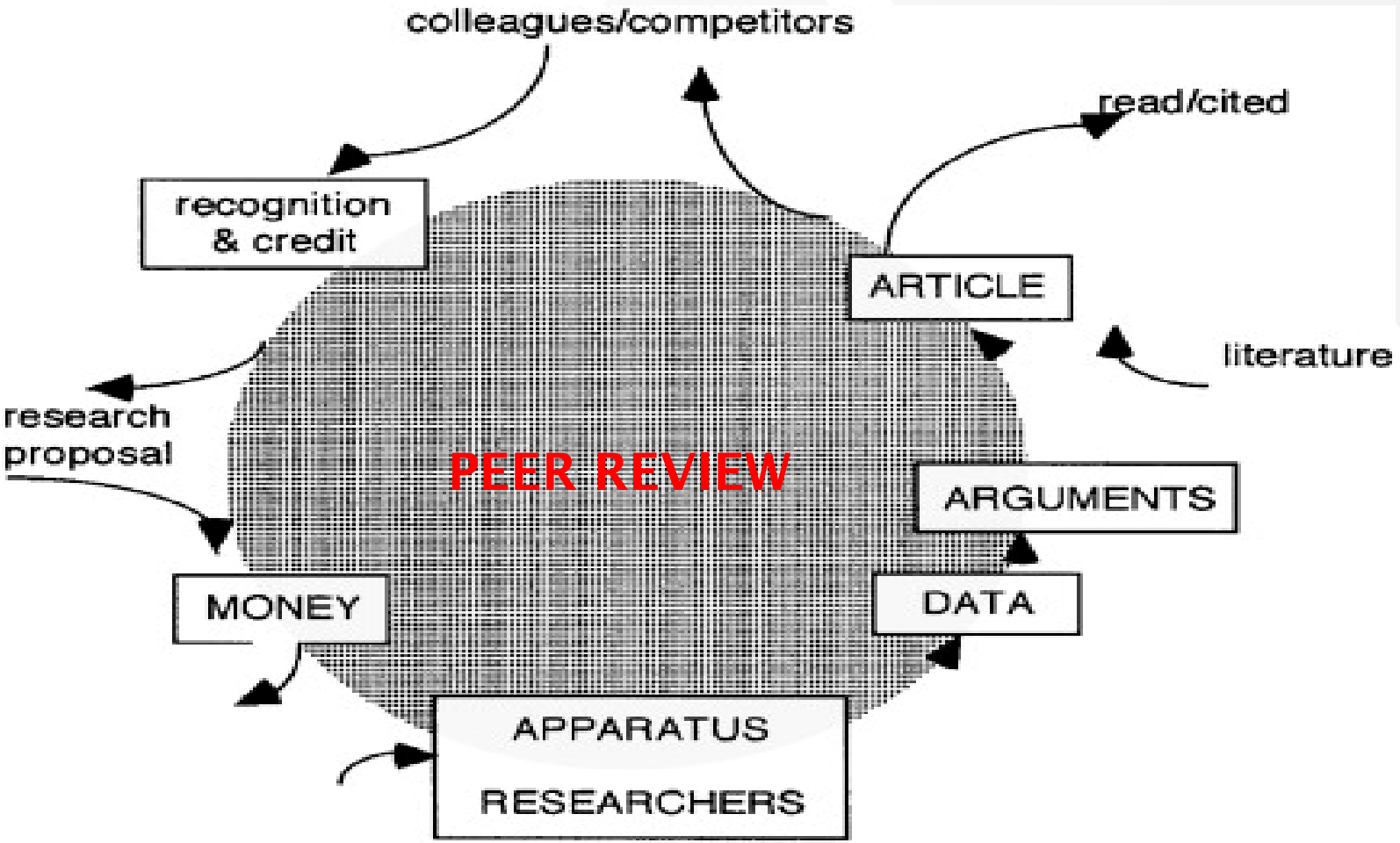
The knowledge production process, aka the Credibility cycle



Credibility cycle (adapted from Latour and Woolgar (1979) & Rip (1990)

1 - Rise of performance indicators & research metrics: External pressure

Need for formalised measures

- ‘Push’ from science policy (from 1970s onwards)
- Independent of peer review
- New Public Management / Neo-liberalism (from ‘80s onwards)
- NPM as the management system derived from private sector

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2 - Rise of performance indicators & research metrics: the context, sociology of science

Adding credibility to the research metrics used

- At first, only ***output*** numbers played a role (1970s/early 1980s)
- Cole brothers indicated the power of citation impact analysis (Cole & Cole, *Science*, 1972)
- Citation scores used to indicate '***quality***' of research output (from late 1980s onwards)

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3 - Rise of performance indicators & research metrics: Internal pressure

Matrix-like structure of science (Whitley, 2002 *)

- Researchers part of international community *(Peer review)*
- But also part of local institutions *(specific management practices, e.g. yearly appraisals, external evaluations)*
- Institute managers not always part of international expert community
- Tighter forms of management *(from the 1990s onwards)*

→ ***Distance between governance and lab/work floor levels***

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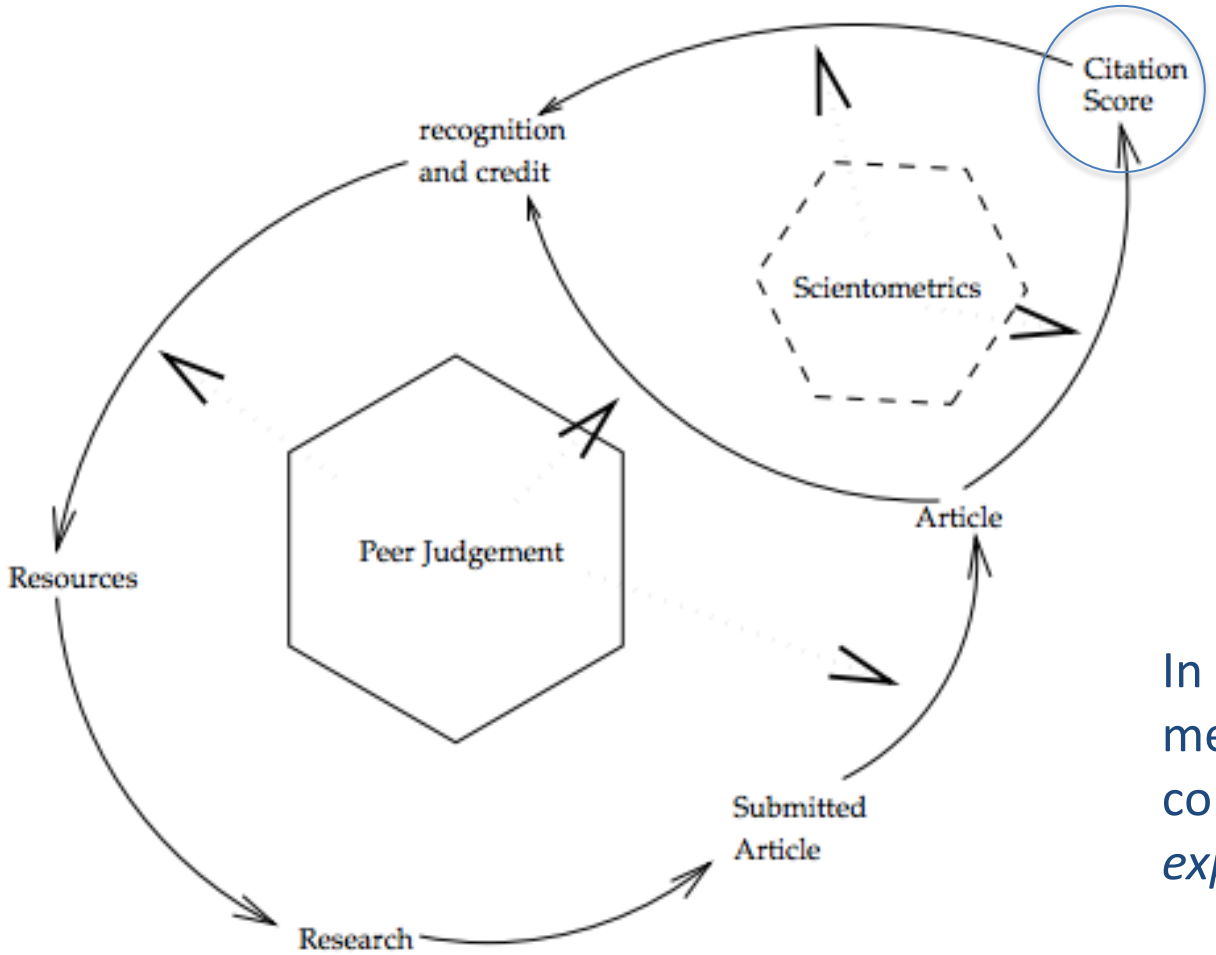
* Richard Whitley, *The social and intellectual organization of the sciences*, 1984,2002

Extended credibility cycle



'***Citation score***' is here sort of a metaphor

In a **direct** sense, we measure real impacts, comparing *actual* and *expected* values

In an **indirect** sense, derivatives such as JIF and h-index, are used …

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NPM and the university as market bureaucracy

- Enterprises were driven by the Anglo-Saxon shareholders model => **maximalization** of profits, aspect of **cutting of costs** !

- Increasingly, universities started to see themselves as private enterprises, with faculties as business units or divisions within these larger enterprises.
  - Intensifying of management practices in universities (in 1990s)

- Some key characteristics of NPM:
  - Strict planning, with target setting, as can be controlled and monitored by quantitative means
  - Accounting coupled to a clear system of rewards and punishments
  - Entry of a new terminology: clients/customers, efficiency, incentives, accounting, etc.

- Other (semi-)public entities affected by NPM:
  - Healthcare system,
  - Secondary education,
  - Civil services e.g. community council settings

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Working of the academic market bureaucracy

- Management operates with *'visible hands'*
- Dealing with clearly defined products
  - *Education with its' supply-demand situation, seeing students as clients on the demand side*

- In research, ***quantity*** is defined by output or products
- Publications are measured as products, in a nominal sense
- Impacts connected to products indicate the ***quality*** of the products
- In the end, we have the ***'countable academic'***

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So then we end up with …

- Focus only on visible/measurable products
- Immaterial products/processes are made invisible
  - *Seminars and informal meetings*
  - *Supervision meetings*
  - *Conference visits, etc.*
- For the outside world, the ***quantity*** and ***quality*** of publications is made visible !
- Important in the academic market bureaucracy, delivery of the ***form***
- Thereby making ***form*** more important than the ***contents***
- ***Outside*** has become more important than ***Inside***

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So far, we can say ….

- Witness a penetration of research metrics in academic life over last 20-30 years
- Stimulation of neoliberal market thinking in academia
  - active stimulation of competition, both internally and externally
- Increasing influence of audit and performance measures.
  - university rankings as league tables/performance grids
- Prioritizing of research over education in building academic careers
  - struggle for external funding, its' relation to teaching
- '*Metricization* of academia' *(Burrows, 2012*

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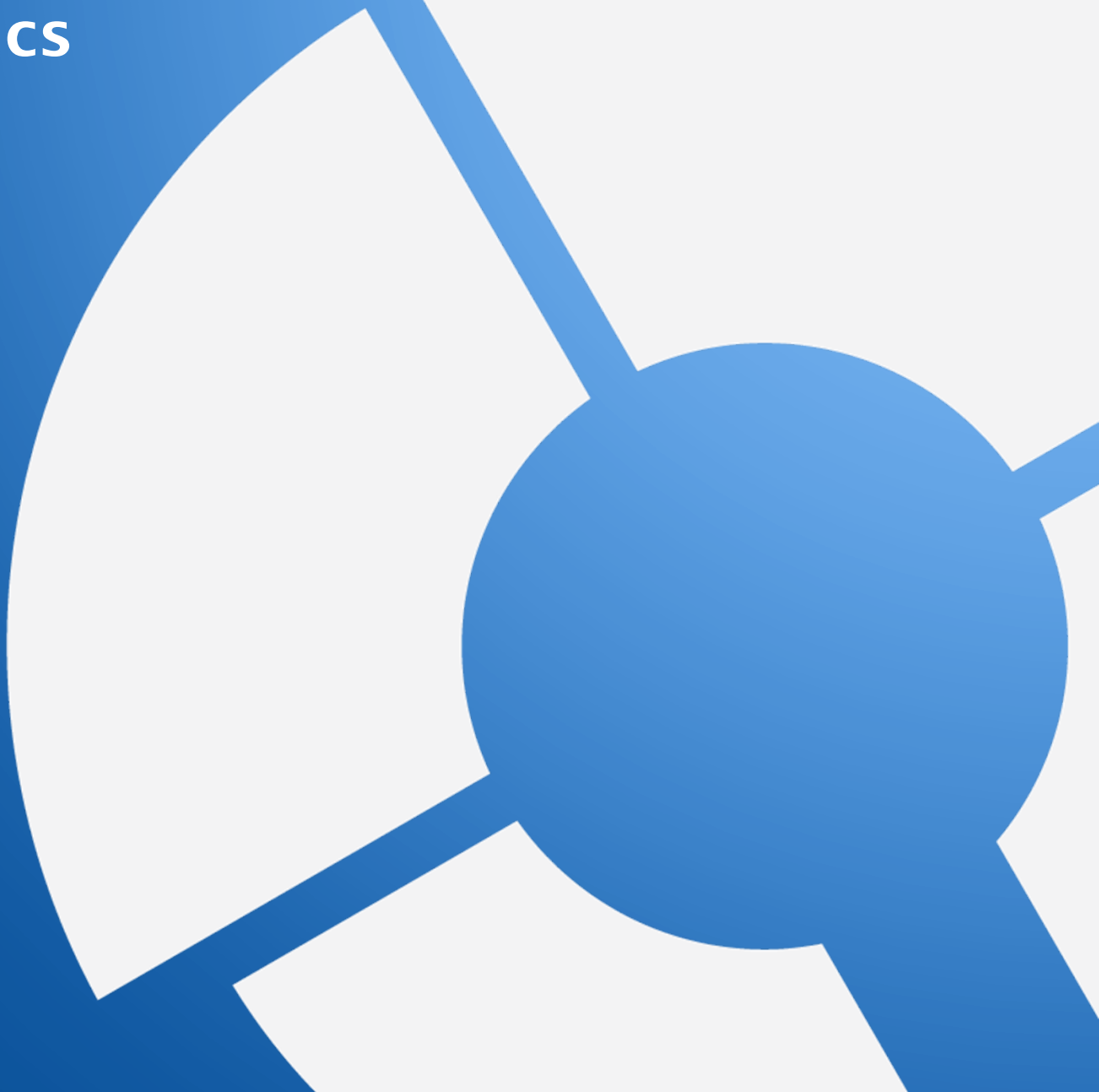
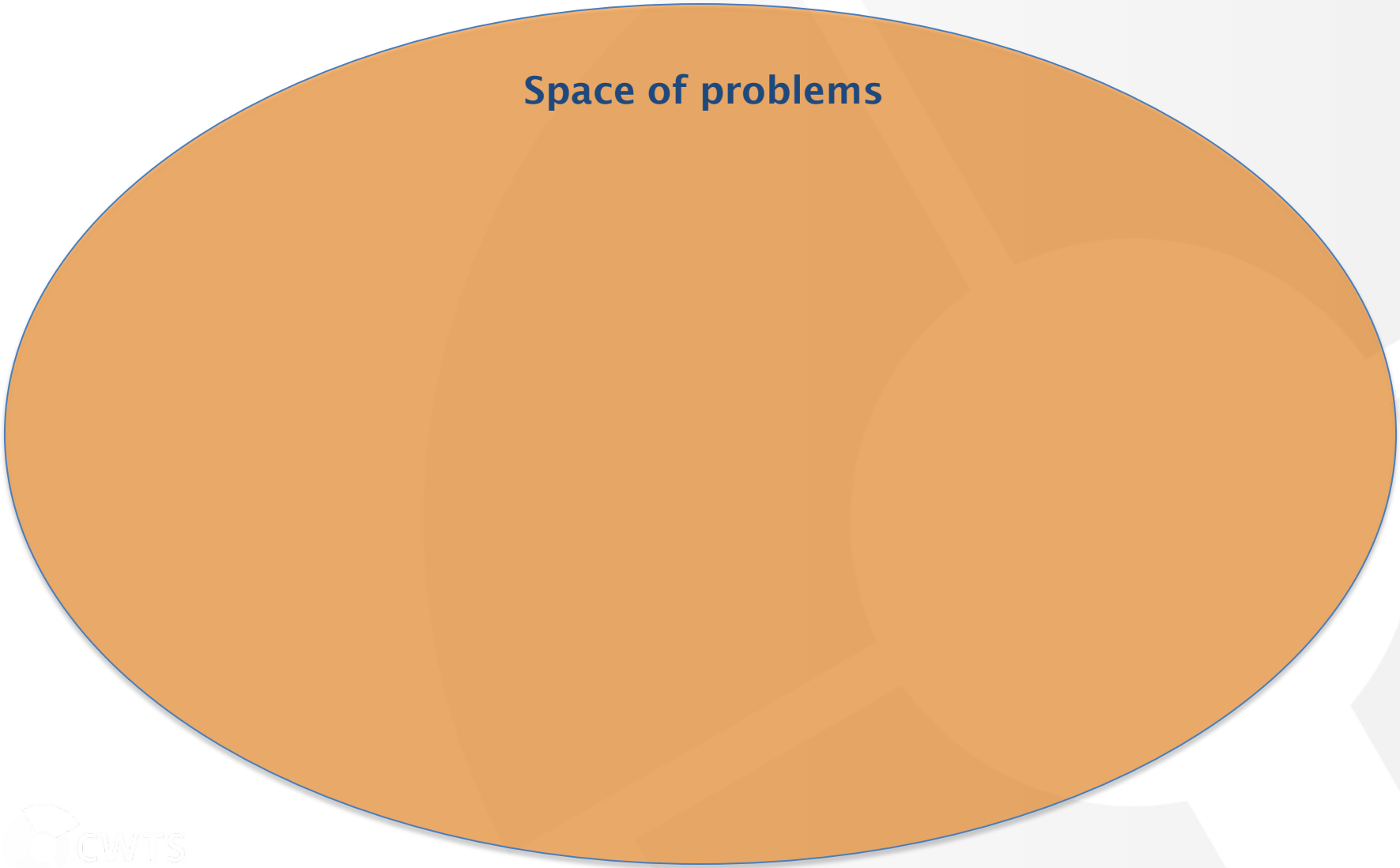
Roger Burrows*, Living with the H-index ? Metric assemblages in the contemporary academy*. Sociological Review, 2012, 60 (2), 355-372c

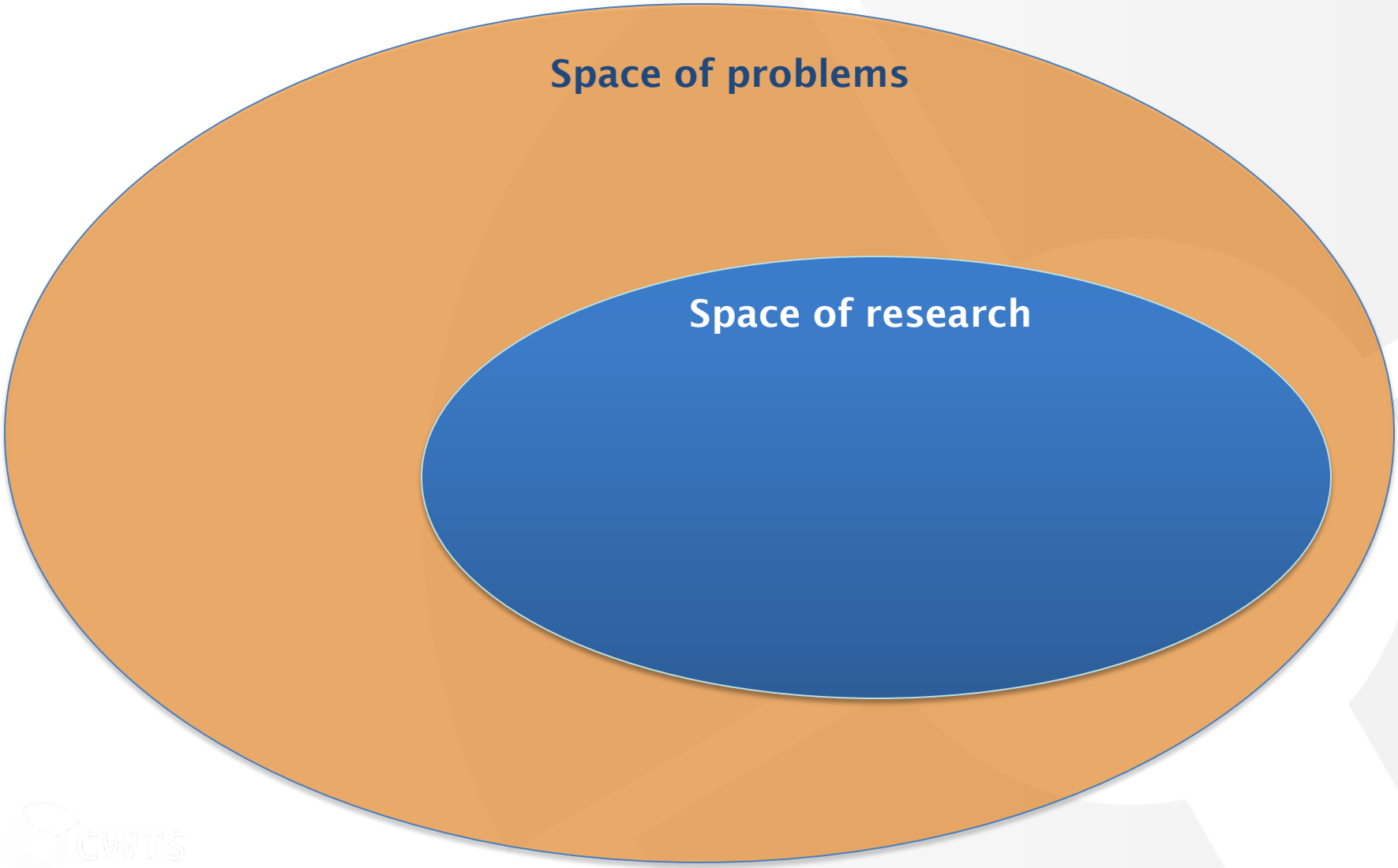
Context of using/applying research metrics



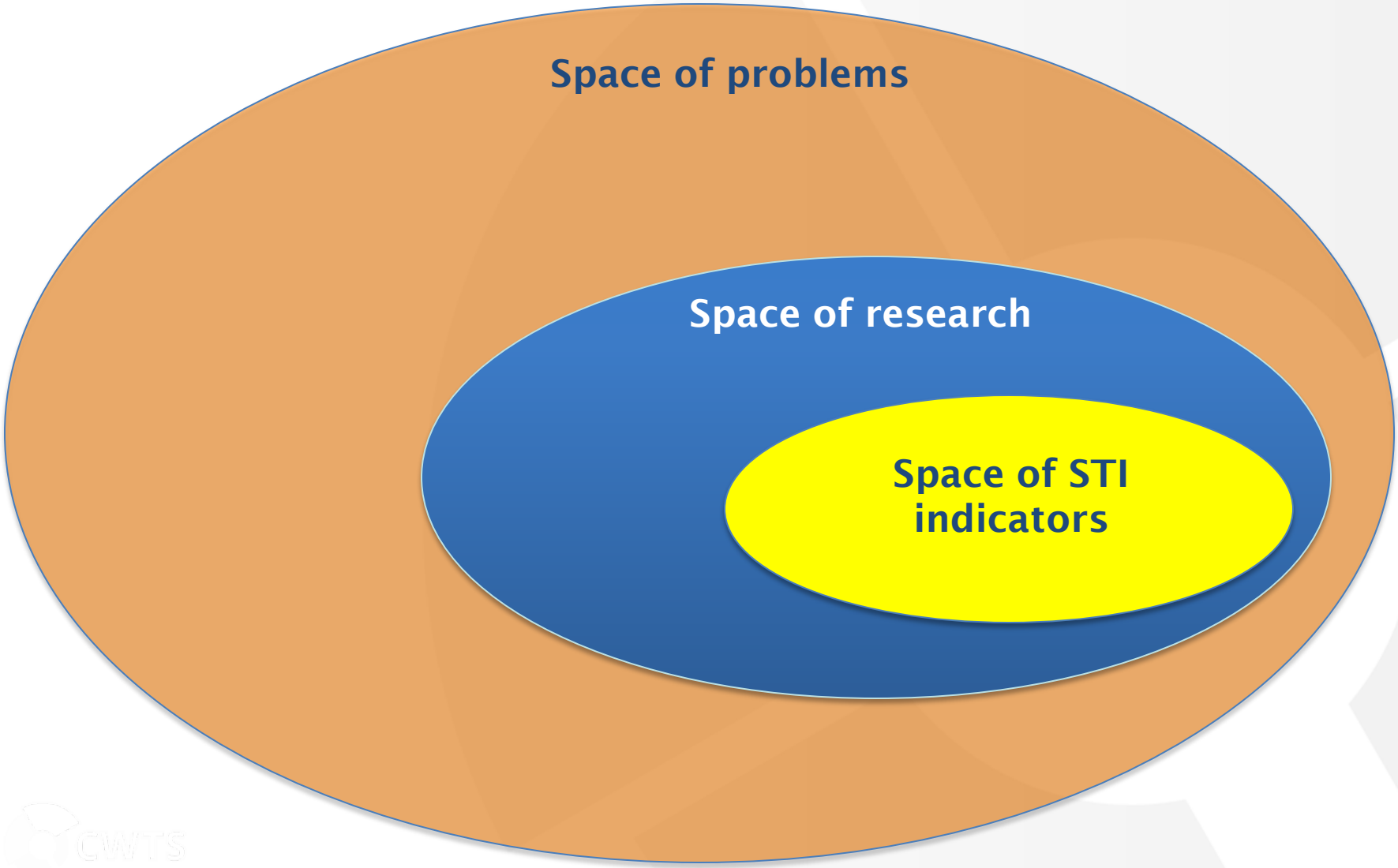
Problems, research and indicators



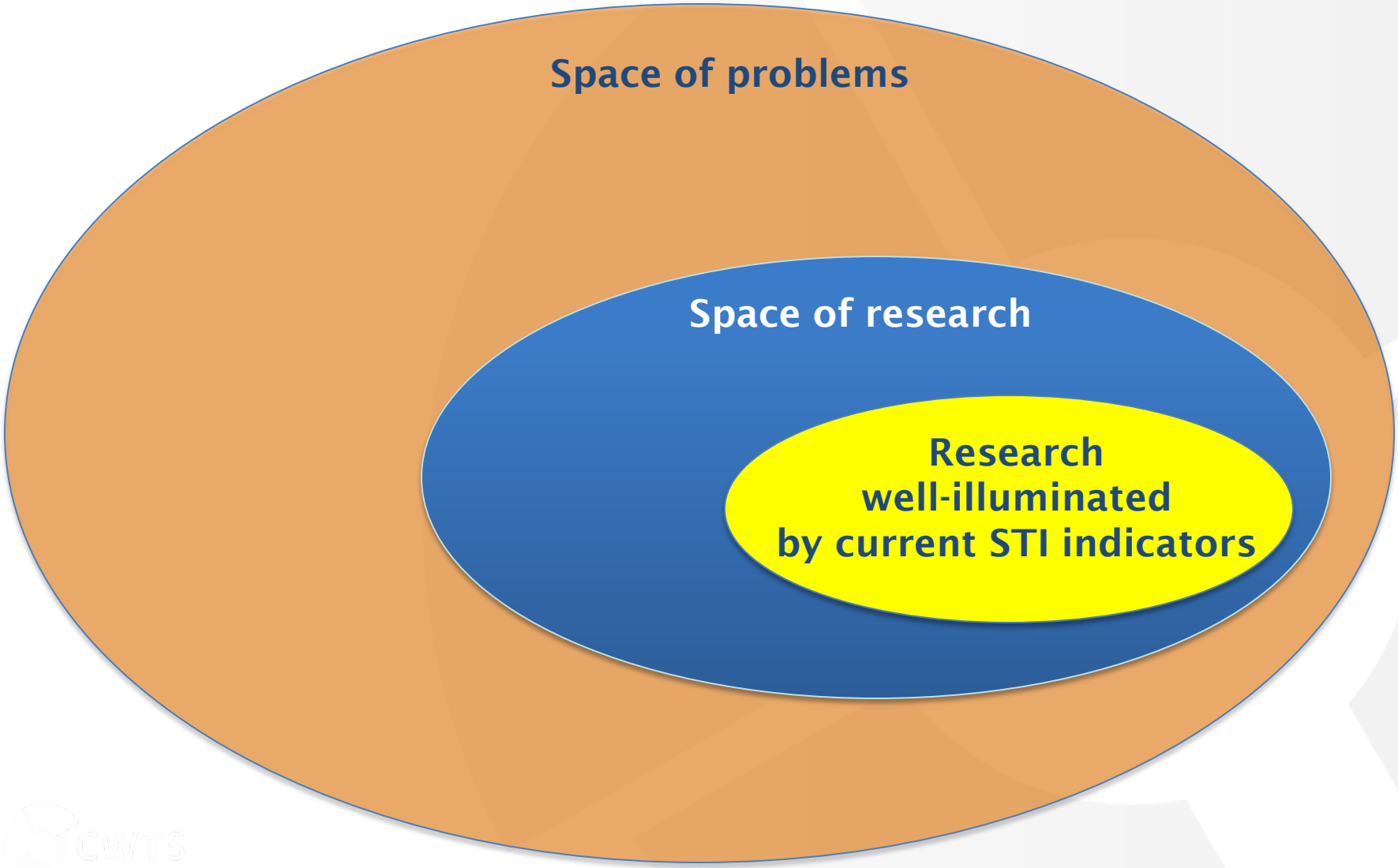
Problems, research and indicators



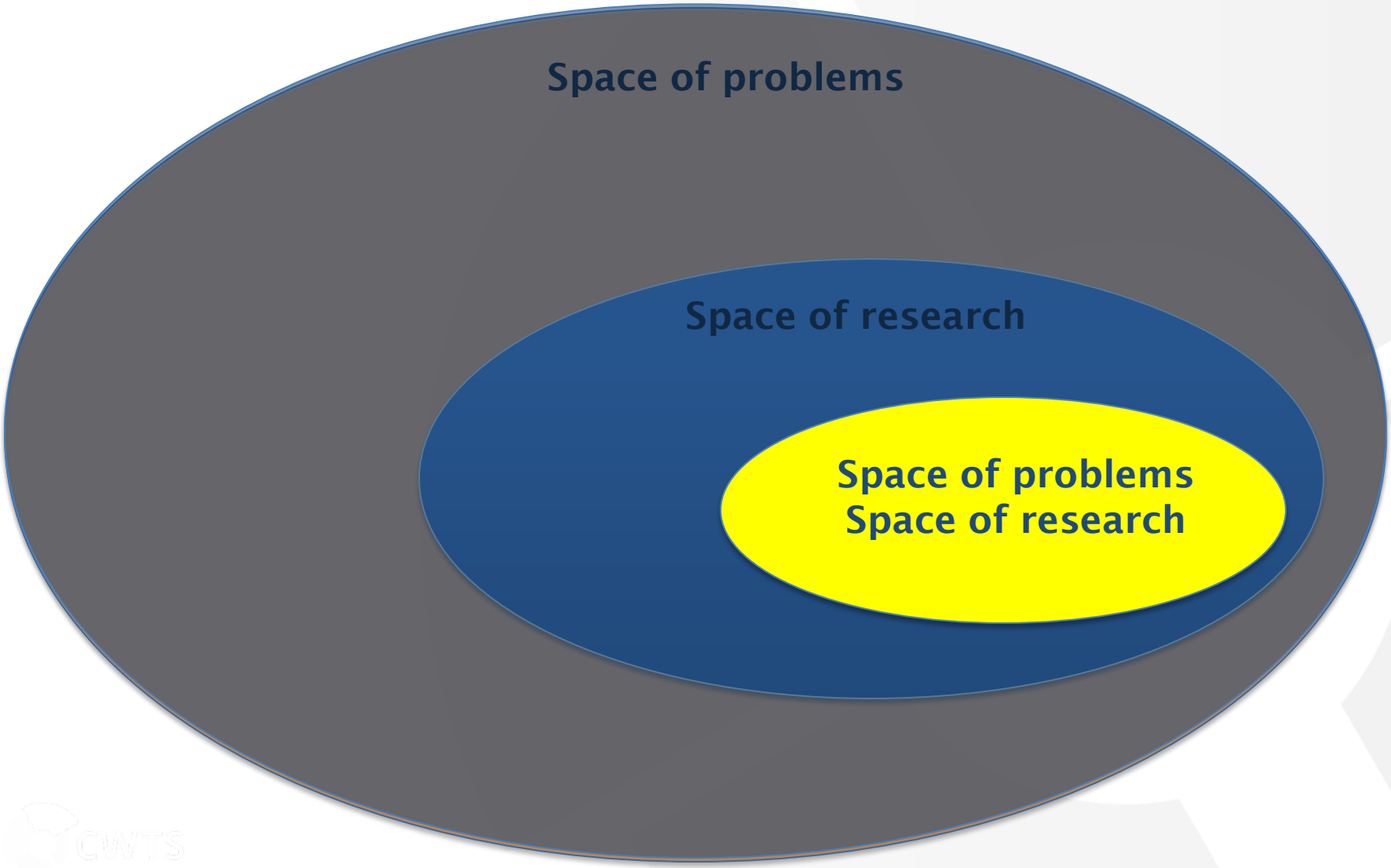
Problems, research and indicators



Streetlight effect of STI indicators



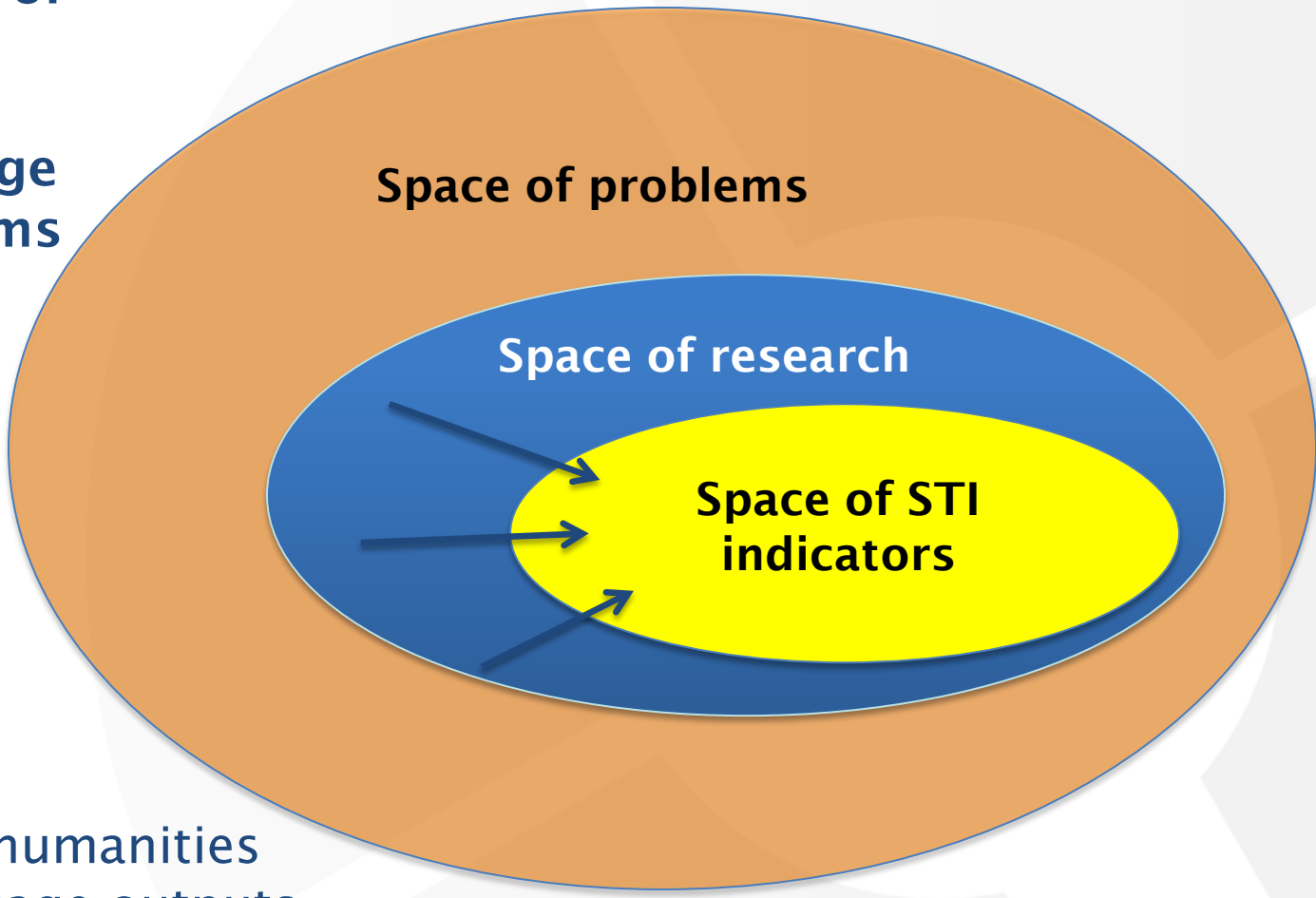
Streetlight effect in indicators: mistaking light with “problems”



Questions dealt with by research under the streetlight will be better rewarded.

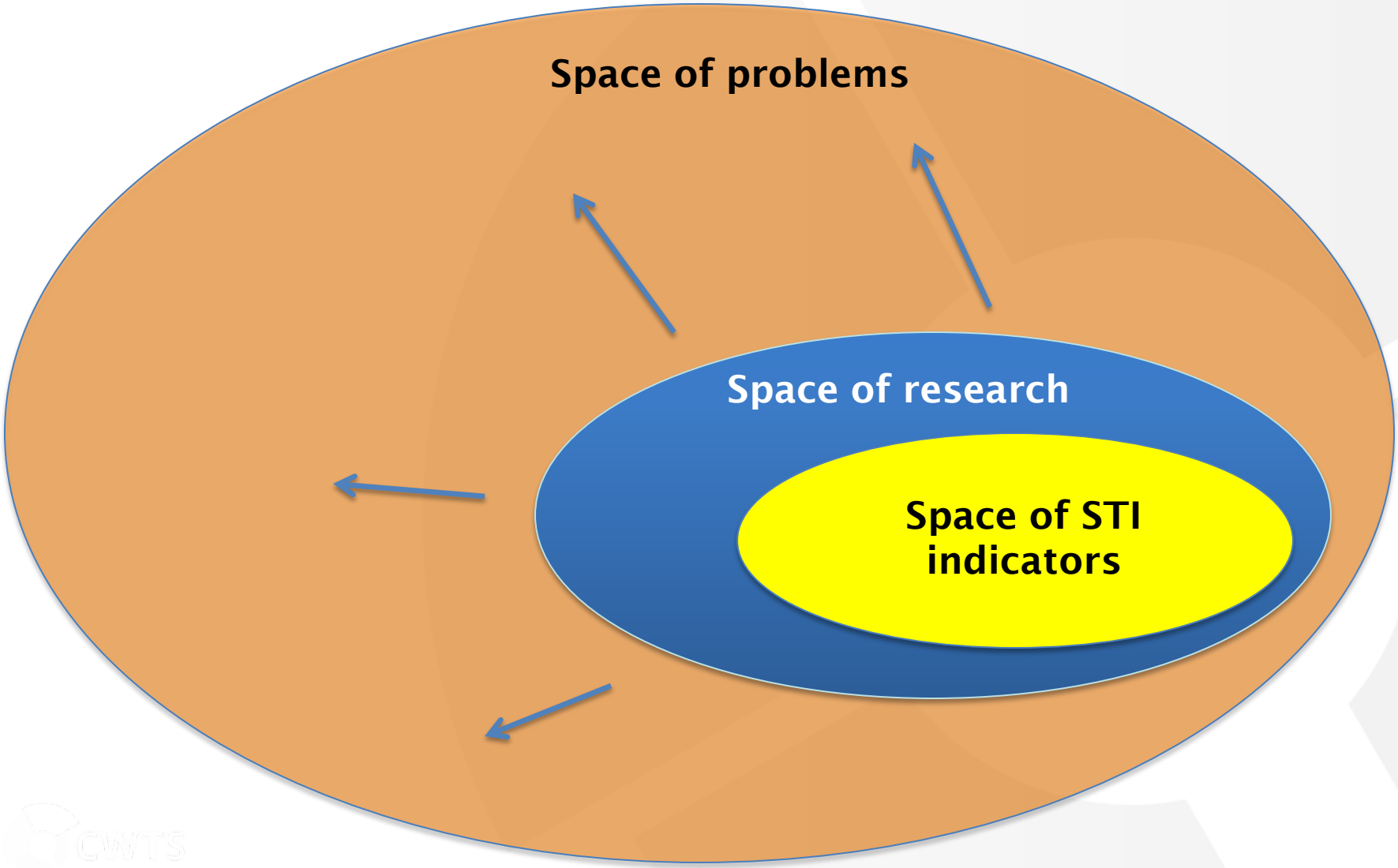
Reduced diversity of research efforts …

… reduced coverage of societal problems and needs

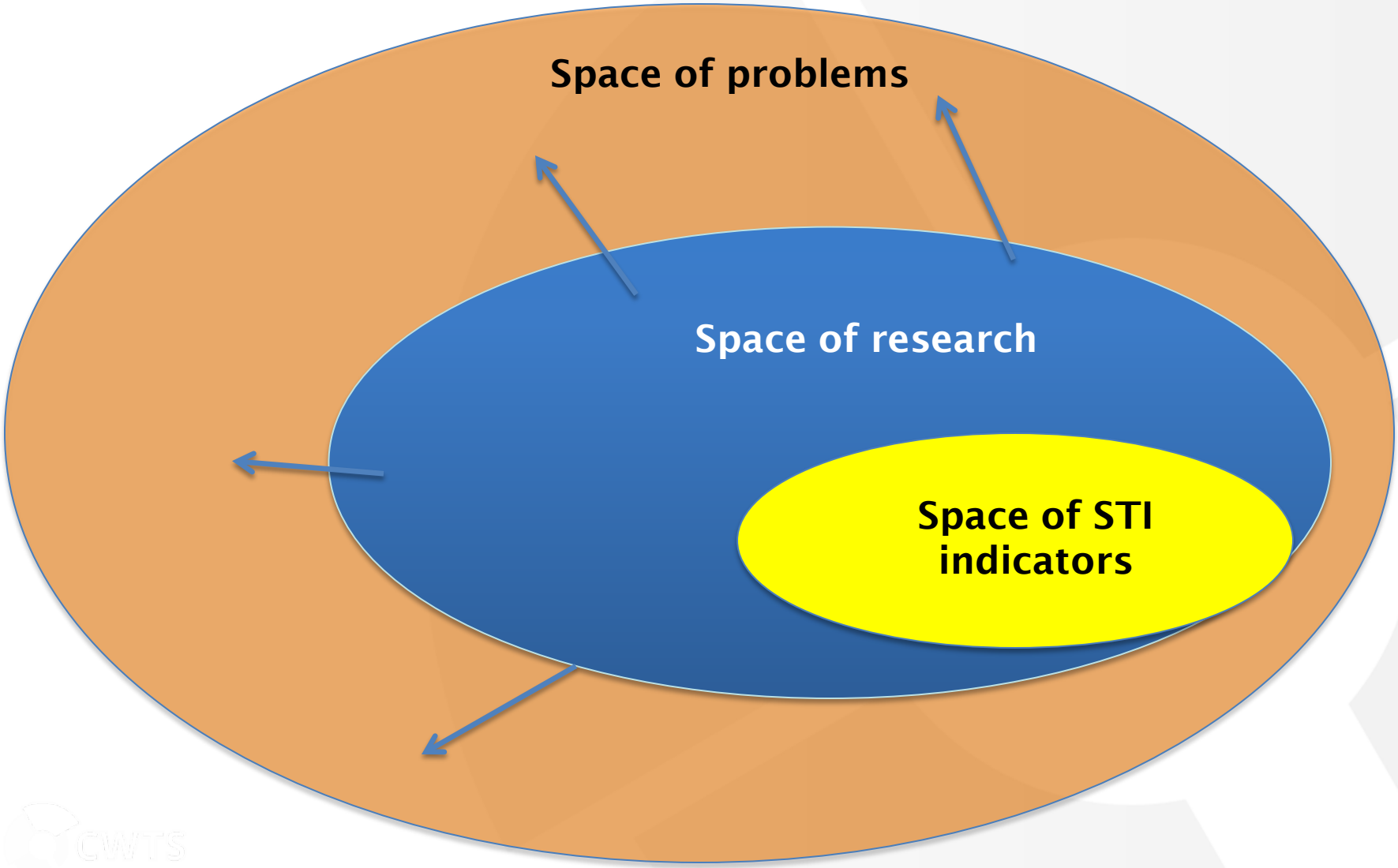


So what about:

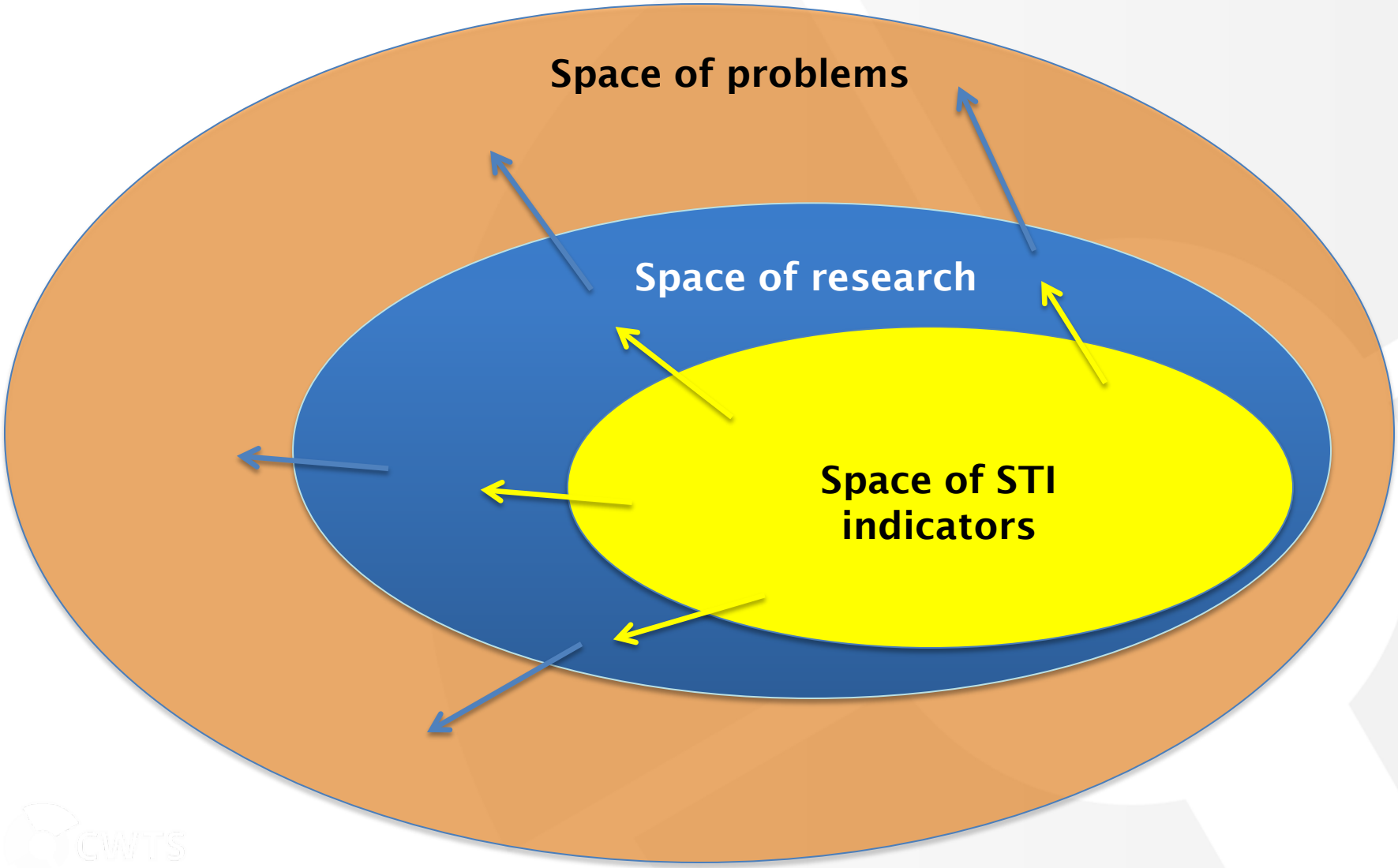
- Social sciences & humanities
- Non-English language outputs
- Topics outside the mainstream ?


Space of problems
Space of research
Space of STI indicators

This is the move we should facilitate:



… after which the STI indicators can potentially expand their outreach as well !



With respect to context, we can say ….

- Research metrics seriously suffer from what is commonly denoted as “the street light effect”
- Various assessment systems try to expand the reach of assessments, such as the REF in the UK, the SEP in the Netherlands
  - By inclusion of other elements, such as societal relevance
- More recent are attempts to even expand further on those national systems
  - QRiH in the Netherlands, or ‘Evaluative Inquiry’ concept *(Fochler & de Rijcke)*

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THIS IS WHERE YOU LOST YOUR WALLET?
NO, I LOST IT IN THE PARK. BUT THIS IS WHERE THE LIGHT IS.

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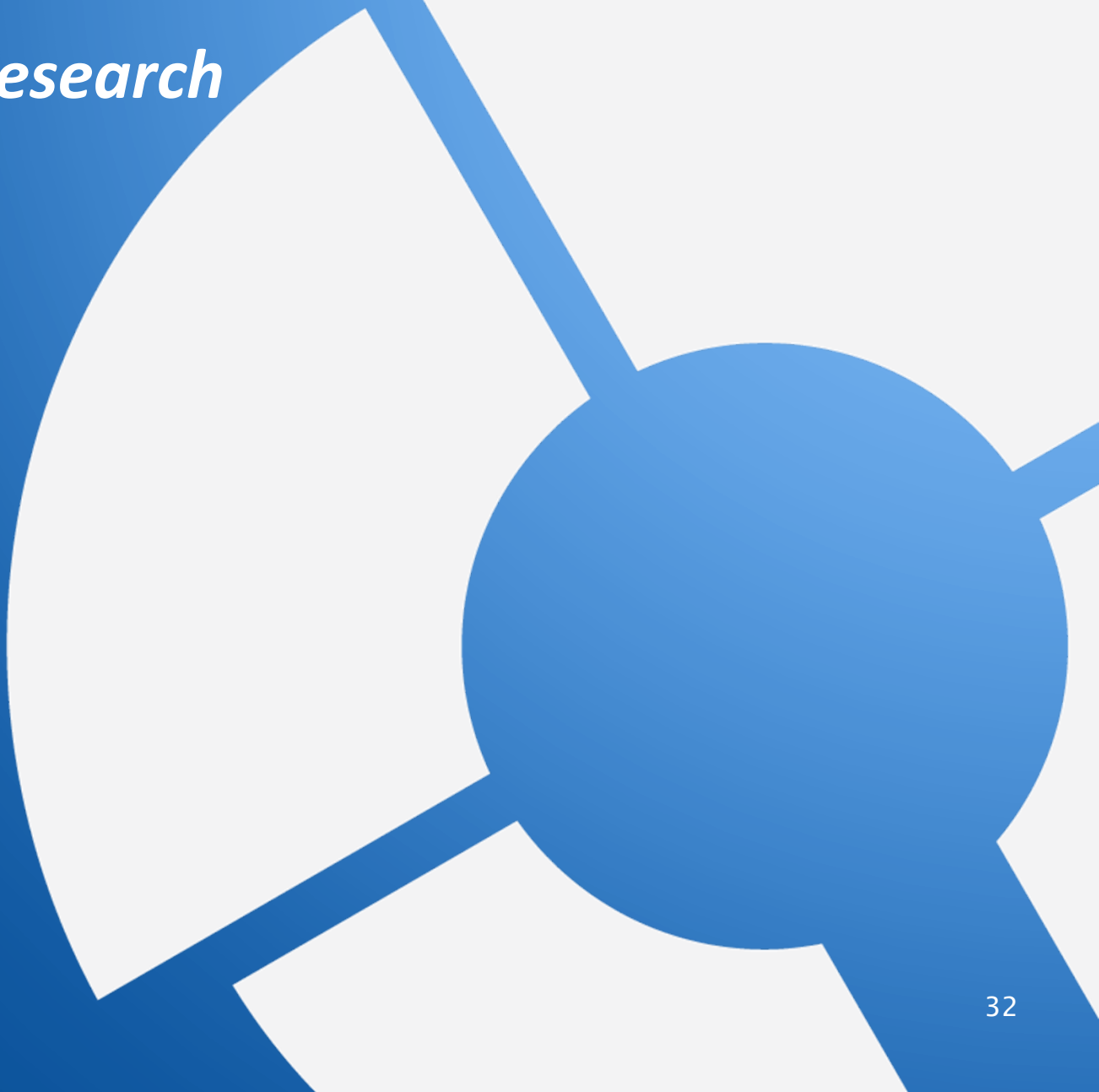
Questioning the universality of research metrics



Introduction

- How do we deal with the increasing demand for research metrics by research management ?
- Not all scholarly outputs are equally well covered in the bibliometric databases
- Coverage in relation to creation and usage of research metrics => ***problematic !!!***
- Mostly focused on outputs from STEM domains
- Coverage analyses contextualize the research metrics
  - Internal coverage analysis: starts from within WoS
  - External coverage analysis: starts from an outside datset

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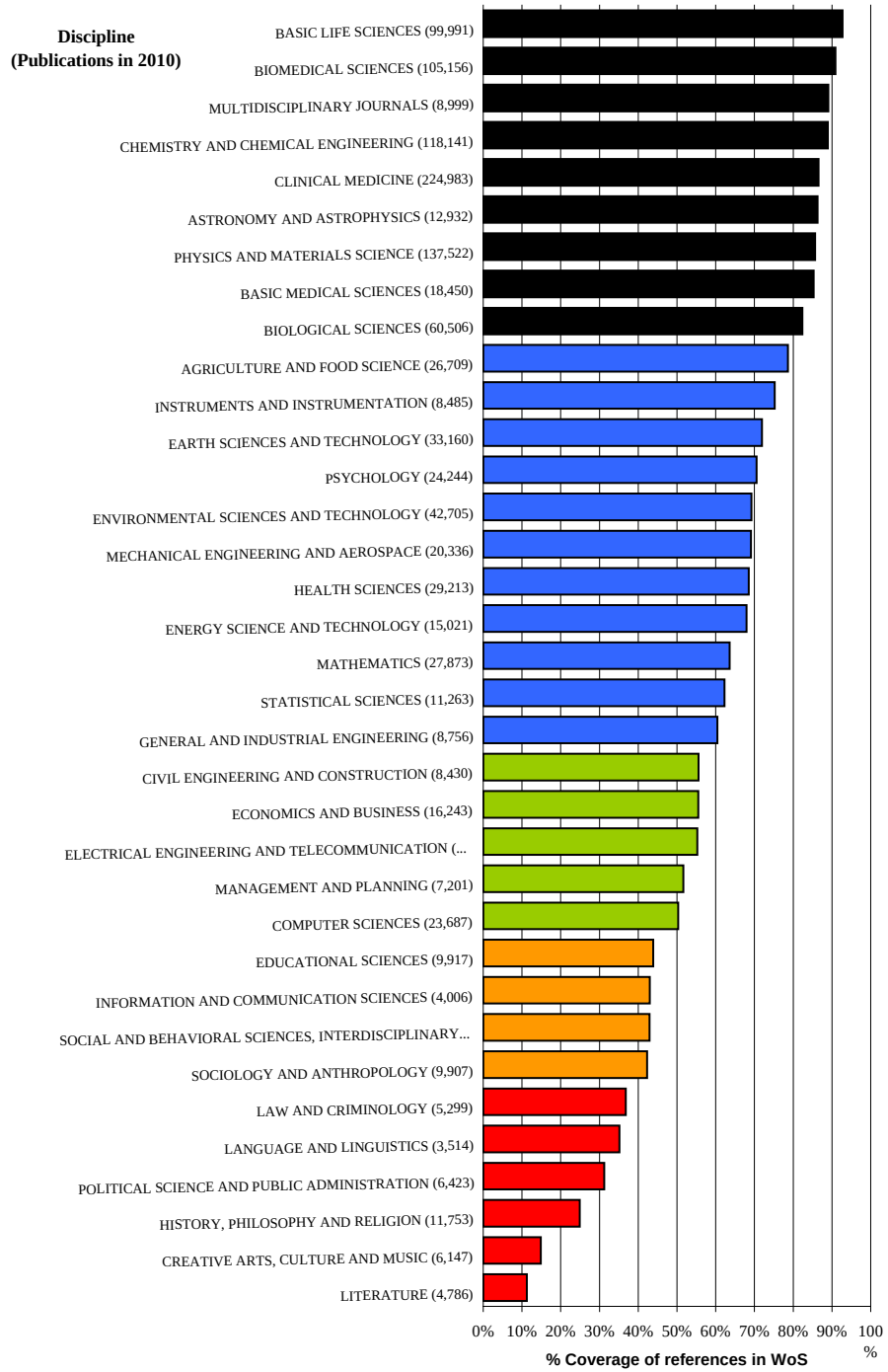
AU	Moed, HF; Garfield, E.	in WOS
TI	In basic science the percentage of 'authoritative' references decreases as bibliographies become shorter	
SO	SCIENTOMETRICS 60 (3): 295-303, 2004	Y
RF	ABT HA, J AM SOC INF SCI T, v 53, p 1106, 2004	Y
	GAR TION INDEXING, 1979 (BOOK!)	N
	GA S INFORMATION S, v 8, p 403, 1985	N
	GILBERT GN, SOC STUDIES SCI, v 7, p 113, 1977	Y
	MERTO	Y
	RO	Y
	ZUC	Y

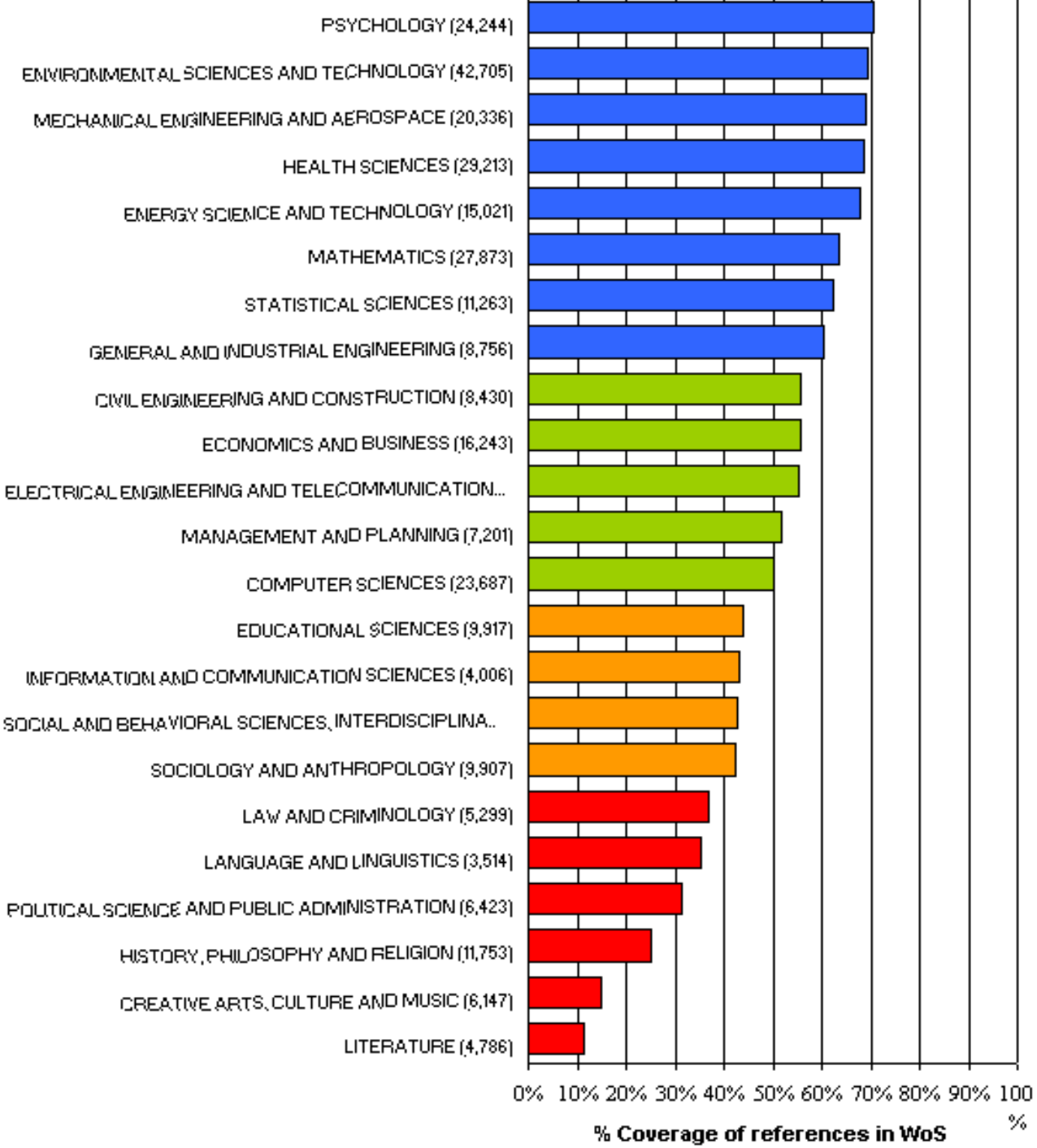
Not in WoS

WoS Coverage
= 5/7 = 71%

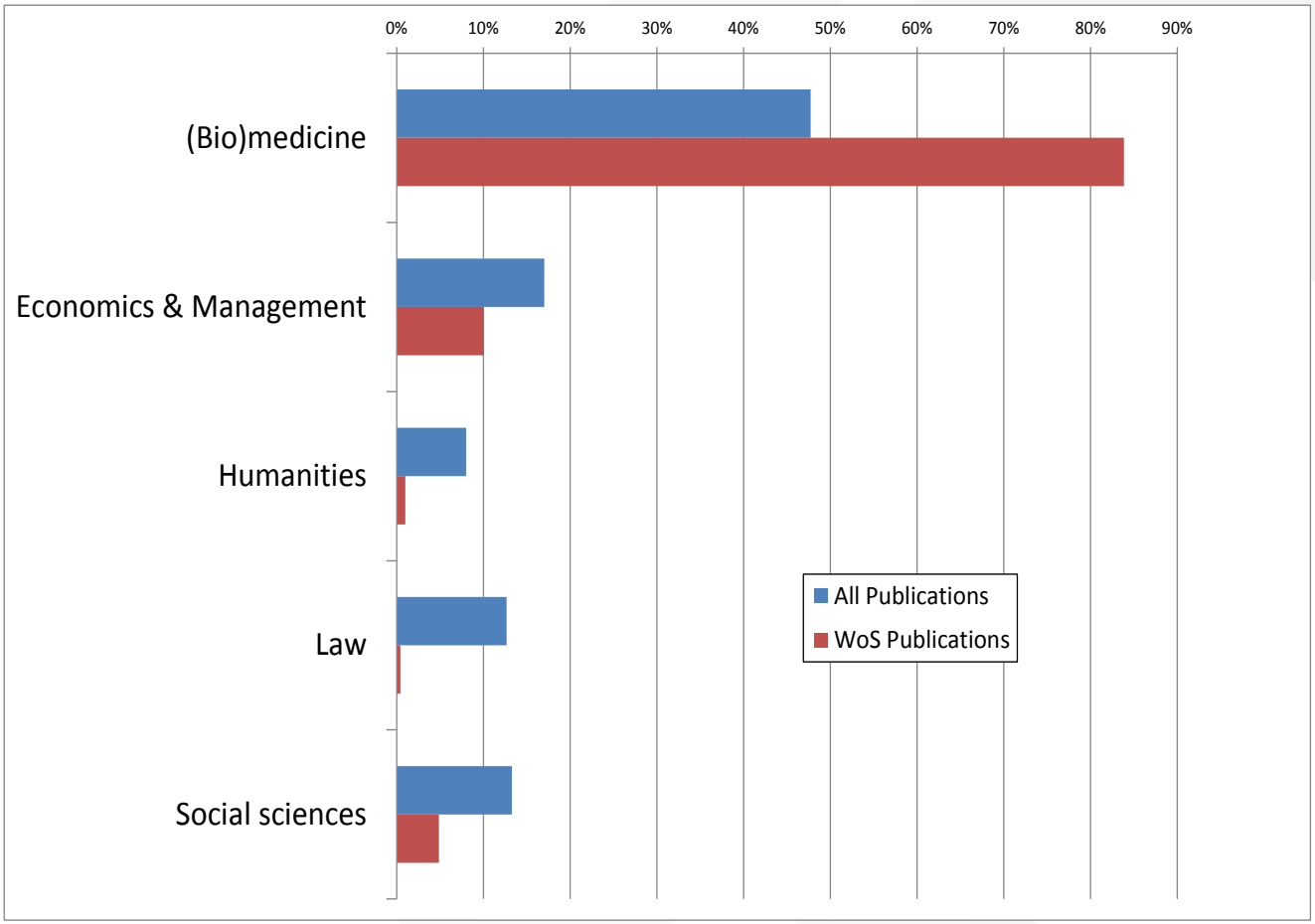


WoS Coverage in 2010 across disciplines

- **Black=Excellent coverage** (>80%)
- **Blue= Good coverage** (between 60-80%)
- **Green= Moderate coverage** (but above 50%)
- **Orange= Moderate coverage** (below 50%, but above 40%)
- **Red= Poor coverage** (highly problematic, below 40%)


PSYCHOLOGY (24,244)
ENVIRONMENTAL SCIENCES AND TECHNOLOGY (42,705)
MECHANICAL ENGINEERING AND AEROSPACE (20,336)
HEALTH SCIENCES (29,213)
ENERGY SCIENCE AND TECHNOLOGY (15,021)
MATHEMATICS (27,873)
STATISTICAL SCIENCES (11,263)
GENERAL AND INDUSTRIAL ENGINEERING (8,756)
CIVIL ENGINEERING AND CONSTRUCTION (8,430)
ECONOMICS AND BUSINESS (16,243)
ELECTRICAL ENGINEERING AND TELECOMMUNICATION...
MANAGEMENT AND PLANNING (7,201)
COMPUTER SCIENCES (23,687)
EDUCATIONAL SCIENCES (9,917)
INFORMATION AND COMMUNICATION SCIENCES (4,006)
SOCIAL AND BEHAVIORAL SCIENCES, INTERDISCIPLINA..
SOCIOLOGY AND ANTHROPOLOGY (9,907)
LAW AND CRIMINOLOGY (5,299)
LANGUAGE AND LINGUISTICS (3,514)
POLITICAL SCIENCE AND PUBLIC ADMINISTRATION (6,423)
HISTORY, PHILOSOPHY AND RELIGION (11,753)
CREATIVE ARTS, CULTURE AND MUSIC (6,147)
LITERATURE (4,786)
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %
% Coverage of references in WoS

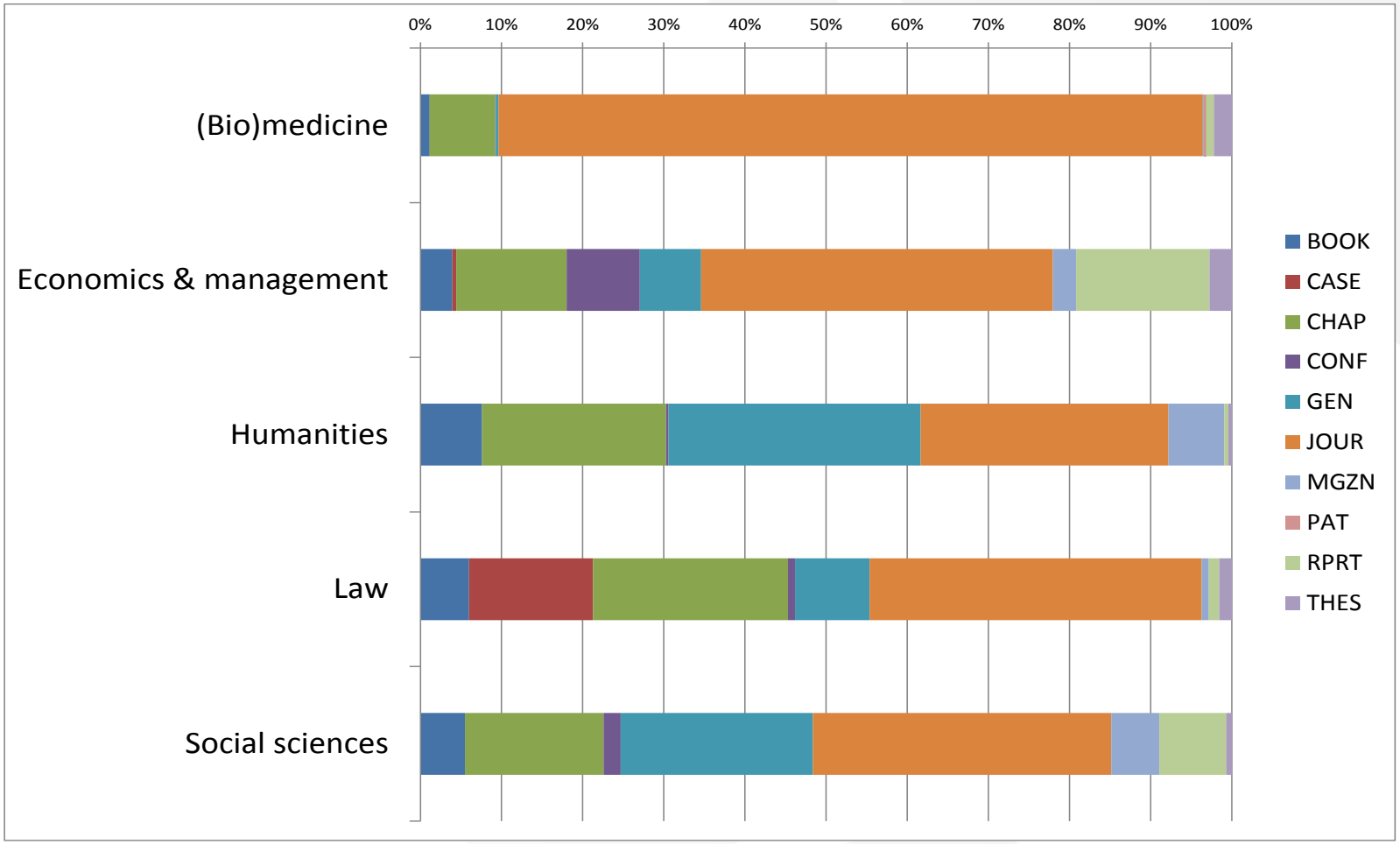
Difference between the internal registration system METIS & representation in WoS



- Dominance university hospital in WoS realm extremely visible
- Law and Humanities 'disappear' in WoS realm

Van Leeuwen et al, 2016, Scientometrics

Composition of the output of the university in METIS



- The category General is in some cases voluminous
- All units **do** have journal publications !

Here, we can say ….

- In the case of application in the SSH, the current set of research metrics are completely inadequate
- A broader variation of substantiations of activities is needed, therefore scholars have to register more broadly.

- **But be aware:** *don't make that immediately another form of accounting and/or numbers & indicator game!*

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Infamous bibliometric indicators

Journal Impact Factor & h-index

On micro level: Rankings of individual researchers

- *Clarivate Analytics* Science Watch: overview of Highly Cited Individuals in the sciences, biomedicine and engineering
- In the Netherlands, economists do create a league table of most productive researchers *(ESB, "De Economen Top-40")*
- Many research organizations rank staff for funding and promotion with bibliometric indicators
- For this purpose, easy-to-find quantitative indicators are often misused …

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Journal Impact Factor: A bit of history

- The Science Citation Index (SCI) was founded in 1961 by Eugene Garfield.
- The Journal Impact Factor (JIF) was introduced as a tool for determining which journals to include in the SCI
- Over time, the impact factor has become primarily a research evaluation tool

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Journal Impact Factor

- Best-known indicator of journal impact
- Reported yearly in Thomson Reuters' **Journal Citation Reports**
- Extensively used by:
  - Researchers
  - Journal editors
  - Publishers
  - Librarians
  - Science policy makers

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Definition of Journal Impact Factor

- **Definition of JIF:**
  - The mean citation score of a journal, determined by dividing all citations in year T by all citable documents in years T-1 and T-2.
- **Ingredients:**
  - Number of publications (here defined as citable documents: Art & Rev);
  - Number of received citations
- **Example:**
  - A journal has a total of 100 publications in 2008 and 2009
  - In 2010, these publications were cited 200 times
  - The impact factor then equals 200 / 100 = 2

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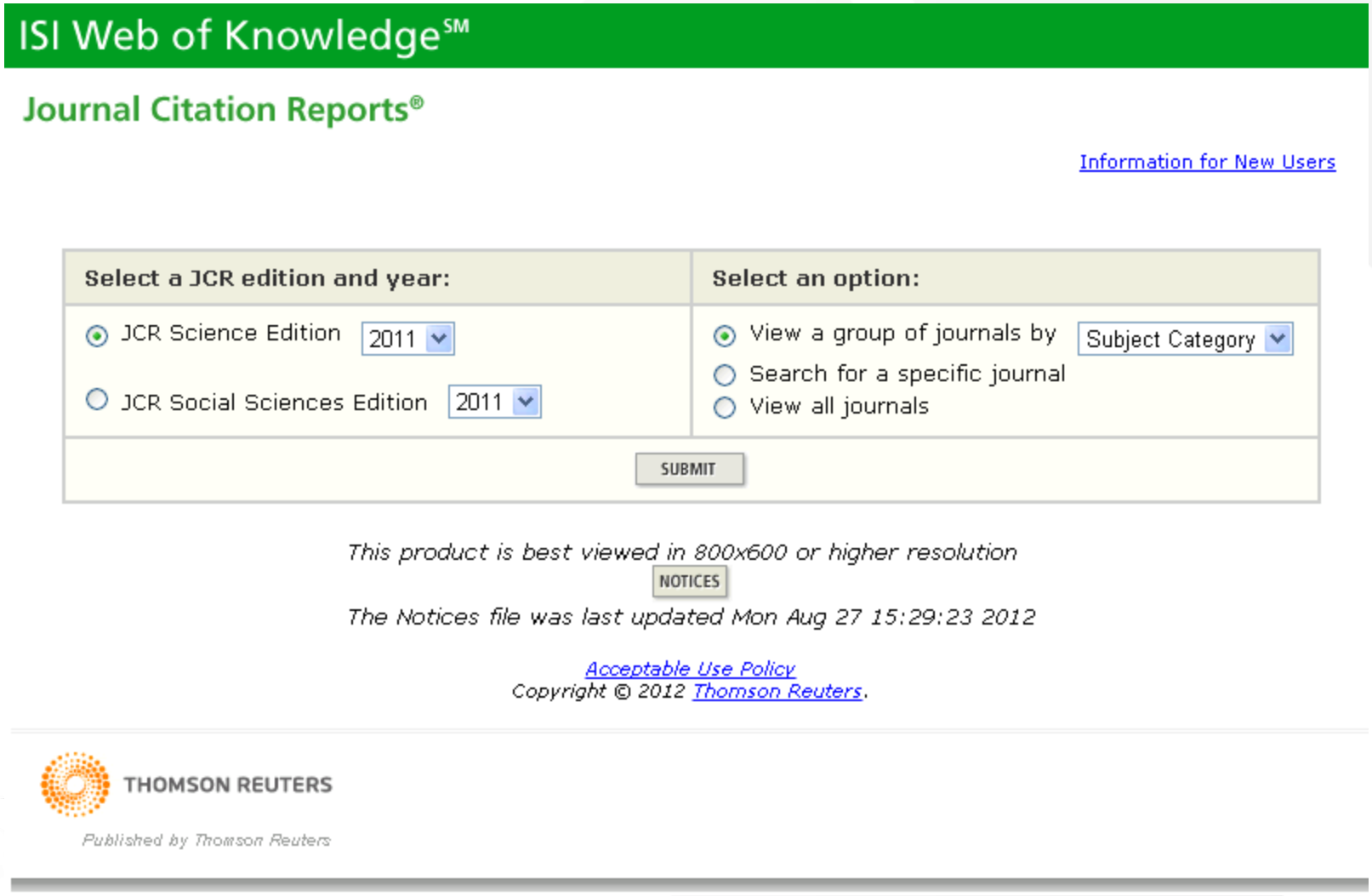
The Journal Impact Factor

Journal Citation Reports



Biochemistry & Molecular Biology

Journal Summary List

Journals from: subject categories BIOCHEMISTRY & MOLECULAR BIOLOGY VIEW CATEGORY SUMMARY LIST

Sorted by: Impact Factor SORT AGAIN

Journals 1 - 20 (of 290)

[1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

MARK ALL UPDATE MARKED LIST

Ranking is based on your journal and s

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR		
				Total Cites	Impact Factor	5-Year Impact Factor
☐	1	CELL	0092-8674	201108	32.242	35.532
☐	2	ANNU REV BIOCHEM	0066-4154	19927	30.283	32.360
☐	3	NAT MED	1078-8956	62572	28.223	27.504
☐	4	GENOME RES	1088-9051	33977	14.630	15.567
☐	5	MOL PSYCHIATR	1359-4184	14510	14.496	13.834
☐	6	MOL CELL	1097-2765	53786	14.018	15.052
☐	7	NAT STRUCT MOL BIOL	1545-9993	26673	13.309	12.479
☐	8	NAT CHEM BIOL	1552-4450	14121	12.996	14.273
☐	9	TRENDS BIOCHEM SCI	0968-0004	15782	11.227	11.810
☐	10	MOL SYST BIOL	1744-4292	7644	10.872	12.019
☐	11	EMBO J	0261-4189	72583	10.434	9.837
☐	12	MOL ASPECTS MED	0098-2997	4050	10.238	11.000
☐	13	NAT PROD REP	0265-0568	8047	10.107	10.545
☐	14	PROG LIPID RES	0163-7827	4825	10.015	12.204
☐	15	CURR BIOL	0960-9822	48575	9.571	10.134
☐	16	TRENDS MOL MED	1471-4914	7186	9.453	9.931
☐	17	PLOS BIOL	1545-7885	25729	9.343	11.896
☐	18	PLANT CELL	1040-4651	46901	9.338	10.529
☐	19	TRENDS MICROBIOL	0966-842X	9285	9.186	9.017
☐	20	NUCLEIC ACIDS RES	0305-1048	136883	9.112	8.867

Anatomy & Morphology

Journal Summary List

Journals from: subject categories ANATOMY & MORPHOLOGY VIEW CATEGORY SUMMARY LIST

Sorted by: Impact Factor SORT AGAIN

Journals 1 - 20 (of 21)

MARK ALL UPDATE MARKED LIST

[1]

Ranking is based on your jo

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	Total Cites	Impact Factor
☐	1	ADV ANAT EMBRYOL CEL	0301-5556	424	17.000
☐	2	BRAIN STRUCT FUNCT	1863-2653	2478	5.618
☐	3	FRONT NEUROANAT	1662-5129	1100	3.544
☐	4	DEV DYNAM	1058-8388	10254	2.376
☐	5	CELLS TISSUES ORGANS	1422-6405	2067	2.137
☐	6	J ANAT	0021-8782	7745	2.097
☐	7	APPL IMMUNOHISTO M M	1541-2016	1617	2.012
☐	8	J MORPHOL	0362-2525	4895	1.735
☐	9	ZOOMORPHOLOGY	0720-213X	897	1.702
☐	10	ANAT REC	1932-8486	7924	1.542
☐	11	ANN ANAT	0940-9602	1328	1.483
☐	12	CLIN ANAT	0897-3806	2294	1.332
☐	13	ACTA ZOOL-STOCKHOLM	0001-7272	972	1.258
☐	14	TISSUE CELL	0040-8166	1788	1.252
☐	15	MICROSC RES TECHNIQ	1059-910X	4564	1.154
☐	16	SURG RADIOL ANAT	0930-1038	2206	1.047
☐	17	ANAT SCI INT	1447-6959	370	0.827
☐	18	ANAT HISTOL EMBRYOL	0340-2096	765	0.672
☐	19	FOLIA MORPHOL	0015-5659	484	0.336
☐	20	INT J MORPHOL	0717-9502	619	0.318

Psychology, multidisciplinary

Journal Summary List

Journals from: subject categories PSYCHOLOGY, MULTIDISCIPLINARY VIEW CATEGORY SUMMARY LIST

Sorted by: Impact Factor SORT AGAIN

Journals 1 - 20 (of 129)

[1 | 2 | 3 | 4 |

MARK ALL UPDATE MARKED LIST

Ranking is based on your jou

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	Total Cites	Impact Factor
☐	1	ANNU REV PSYCHOL	0066-4308	13101	21.810
☐	2	PSYCHOL SCI PUBL INT	1529-1006	685	16.833
☐	3	PSYCHOL BULL	0033-2909	36794	14.756
☐	4	PERSPECT PSYCHOL SCI	1745-6916	4439	9.546
☐	5	PSYCHOL REV	0033-295X	24097	7.972
☐	6	PSYCHOL METHODS	1082-989X	7617	7.338
☐	7	PSYCHOL INQ	1047-840X	2700	6.250
☐	8	AM PSYCHOL	0003-066X	17525	6.100
☐	9	CURR DIR PSYCHOL SCI	0963-7214	6921	5.678
☐	10	J ABNORM PSYCHOL	0021-843X	14289	5.153
☐	11	PSYCHOL SCI	0956-7976	23416	4.940
☐	12	ANN BEHAV MED	0883-6612	4886	4.144
☐	13	NEUROBIOL LEARN MEM	1074-7427	5453	3.652
☐	14	PSYCHOSOM MED	0033-3174	11333	3.473
☐	15	EMOT REV	1754-0739	930	3.356
☐	16	INTELLIGENCE	0160-2896	3224	3.245
☐	17	J GERONTOL B-PSYCHOL	1079-5014	5686	3.213
☐	18	BEHAV GENET	0001-8244	3465	3.210
☐	19	PSYCHOL ADDICT BEHAV	0893-164X	3987	2.747
☐	20	COMPUT HUM BEHAV	0747-5632	7267	2.694

Political science

Journal Summary List

Journals from: subject categories POLITICAL SCIENCE VIEW CATEGORY SUMMARY LIST

Sorted by: Impact Factor SORT AGAIN

Journals 1 - 20 (of 161)

[1 | 2 | 3 | 4 | 5

MARK ALL UPDATE MARKED LIST

Ranking is based on your jo

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	Total Cites	Impact Factor
☐	1	POLIT ANAL	1047-1987	1934	4.655
☐	2	AM POLIT SCI REV	0003-0554	9680	3.688
☐	3	J PEACE RES	0022-3433	2358	3.387
☐	4	AM J POLIT SCI	0092-5853	7753	3.269
☐	5	ANNU REV POLIT SCI	1094-2939	1812	3.140
☐	6	POLIT GEOGR	0962-6298	1883	2.676
☐	7	EUR J POLIT RES	0304-4130	2687	2.508
☐	8	POLIT PSYCHOL	0162-895X	1972	2.384
☐	9	J POLIT	0022-3816	4654	2.255
☐	10	GOVERNANCE	0952-1895	1154	2.237
☐	11	PERSPECT POLIT	1537-5927	1032	2.132
☐	12	COMP POLIT STUD	0010-4140	2577	2.028
☐	13	POLICY STUD J	0190-292X	1134	2.000
☐	14	ENVIRON POLIT	0964-4016	1127	1.990
☐	15	BRIT J POLIT SCI	0007-1234	2173	1.987
☐	16	AFR AFFAIRS	0001-9909	804	1.945
☐	17	REV INT POLIT ECON	0969-2290	1030	1.875
☐	18	INT J PRESS/POLIT	1940-1612	347	1.872
☐	19	JCMS-J COMMON MARK S	0021-9886	1778	1.855
☐	20	PARTY POLIT	1354-0688	1199	1.830

Citations for free

THE LANCET

The Lancet is committed to applying scientific knowledge to improve health and advance human progress and this is as true today as it was when the first issue was published on October 5 1823.

Reputation and impact

The Lancet has an Impact Factor of 45·217. The journal is currently ranked second out of 150 journals in the general medicine category (2014 Journal Citation Reports®, Thomson Reuters 2015).

At the heart of The Lancet are core editorial values that underpin its commitment:

With a voice for all people

When you publish with The Lancet you're joining a community that believes that everyone has the right to the highest attainable standard of health and that care should be equitable and just.

With high-impact content that changes medical and public health practice

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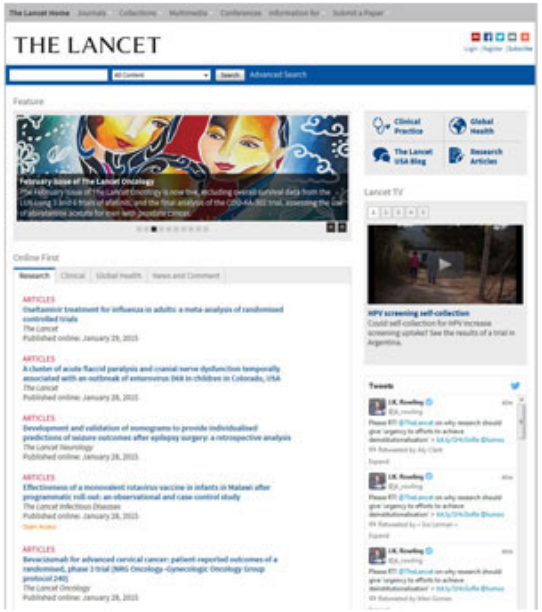
We make the experience of reading more fulfilling by enriching content with editorial, news, letters, commentary, and reviews.



- View current issue
- New issue alerts
- Subscribe
- Submit a paper

Share 'citations-for-free' for *The Lancet*

	Publications	Citations
	2012+2013	**2014**
Items published	**589**	**26.633**
Art+Rev	**1.600**	**22.828**
Art+rev+Let	**4.100**	**25.862**

In Blue= Clarivate Analytics JCR scores

In Green= CWTS calculations

- **CA Method:**

$$\frac{\textbf{Citations in 2014}}{\textbf{Citeable documents in '12 and '13}}$$

$$\frac{26633}{589}$$

JIF=45,217

- **CWTS Method:**

$$\frac{\text{Citations to } \textbf{Art/Rev} \text{ in 2014}}{\textbf{Art/Rev} \text{ in '12 and '13}}$$

$$\frac{22.828}{1.600}$$

JIF=14,268

$$\frac{\text{Citations to } \textbf{Art/Let/Rev} \text{ in 2014}}{\textbf{Art/Let/Rev} \text{ in '12 and '13}}$$

$$\frac{25.862}{4.100}$$

JIF=6,438

CWTS

Problems with JIF

- **Methodological issues**
  - Was/is calculated erroneously *(Moed & van Leeuwen, 1996)*
  - Not field normalized
  - Not document type normalized
  - Underlying citation distributions are highly skewed *(Seglen, 1994)*
- **Conceptual/general issues**
  - Inflation (van Leeuwen & Moed, 2002)
  - Availability promotes journal publishing
  - Is based on expected values only
  - Stimulates one-indicator thinking
  - Ignores other scholarly virtues (sharing, funding capacity, teaching)

CWTS

What to do if ….

- Sometimes, for example when submitting a research grant proposal to a research council, scholars are asked to deliver their own bibliometric scores.

- What could be your reaction to this ?

CWTS

Would you know how to ….

- Determine your own position in the field(s) in which you are active ?
  - What field are you in?
  - What are general citation characteristics that apply on your field ?
  - Can you determine average scores for your own work ?

CWTS

Would you know how to ….

- Select JIF-values for your list of publications ?
  - Do you know where to look for these ?
  - Which years do you take ?
    - The current year for all publications ?
    - The year the paper appeared in the journal ?
    - The year you made up your mind where to publish ?

CWTS

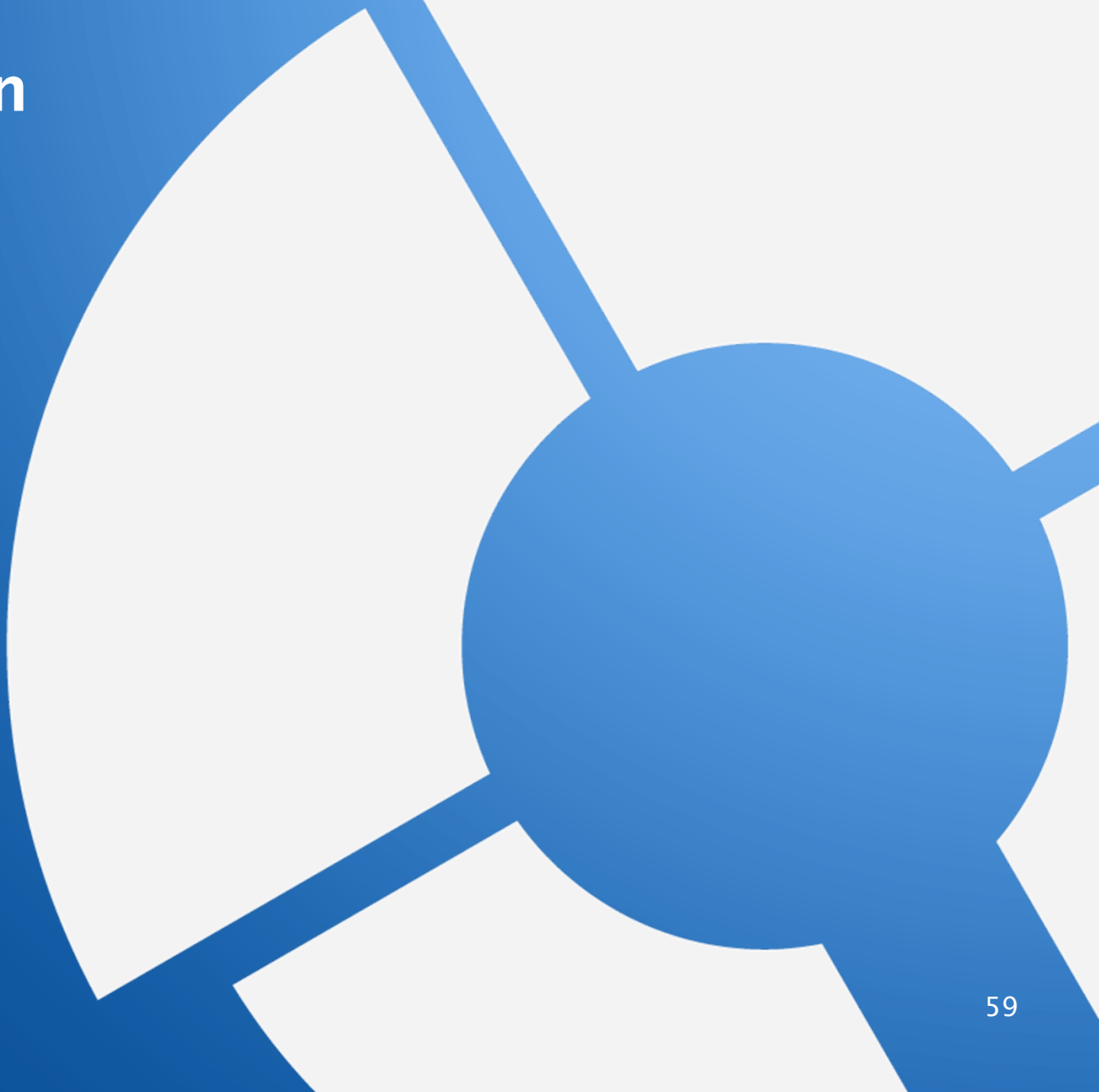
Definition of Hirsch Index

- **Definition of h-index:**
  - The ‘impact’ of a researcher, determined by the number of received citations of an oeuvre, sorted by descending order, where the number of received citations equals the rank order position.

- **Ingredients:**
  - The number of publications by a ‘unit’;
  - The number of citations on each individual publication.
- **Example:**
  - An author has published 75 papers, of which the 35th ranked paper received 35 citations
  - Hence, this author’s h-index is 35

CWTS

Normalization issue

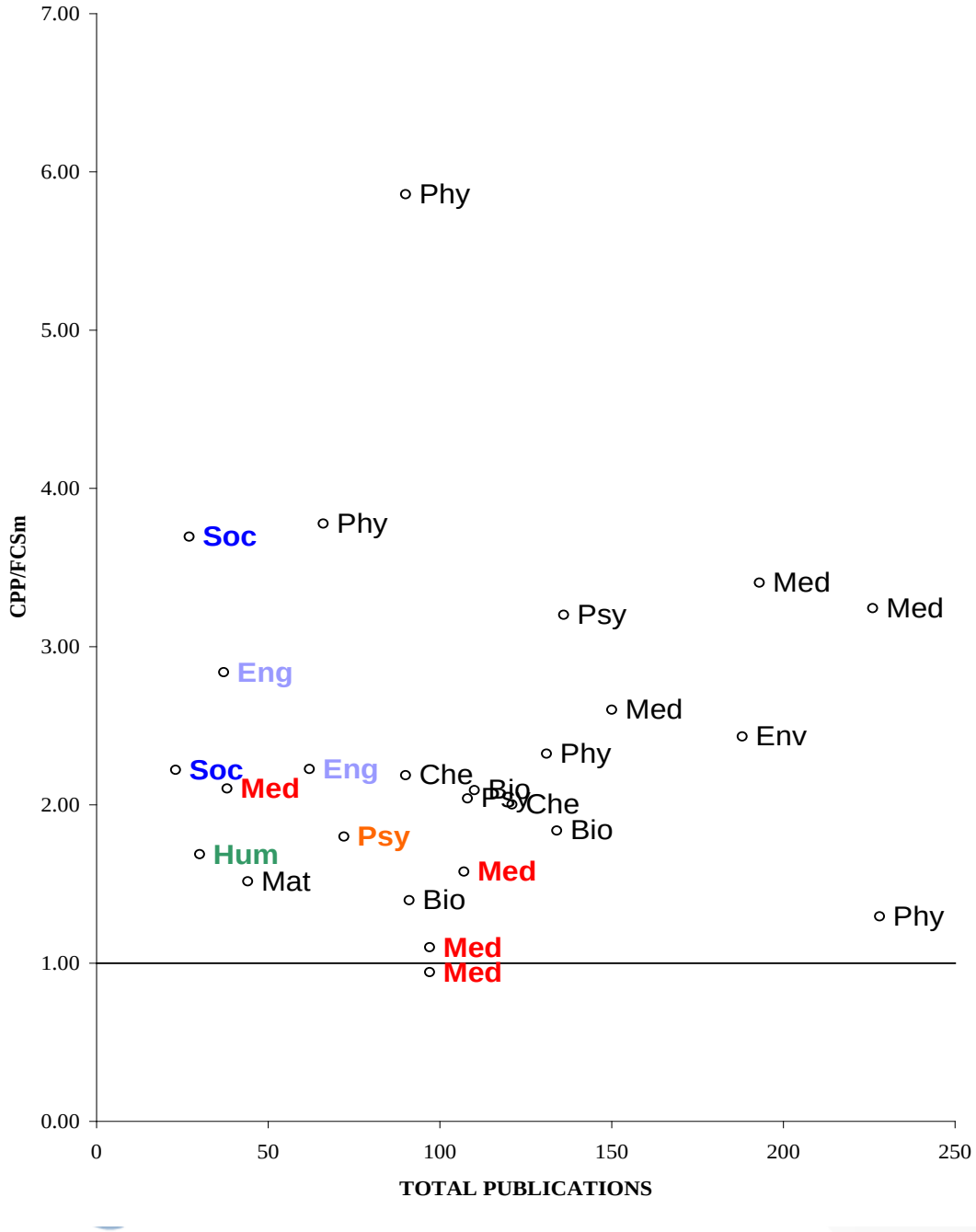


The Question raised …

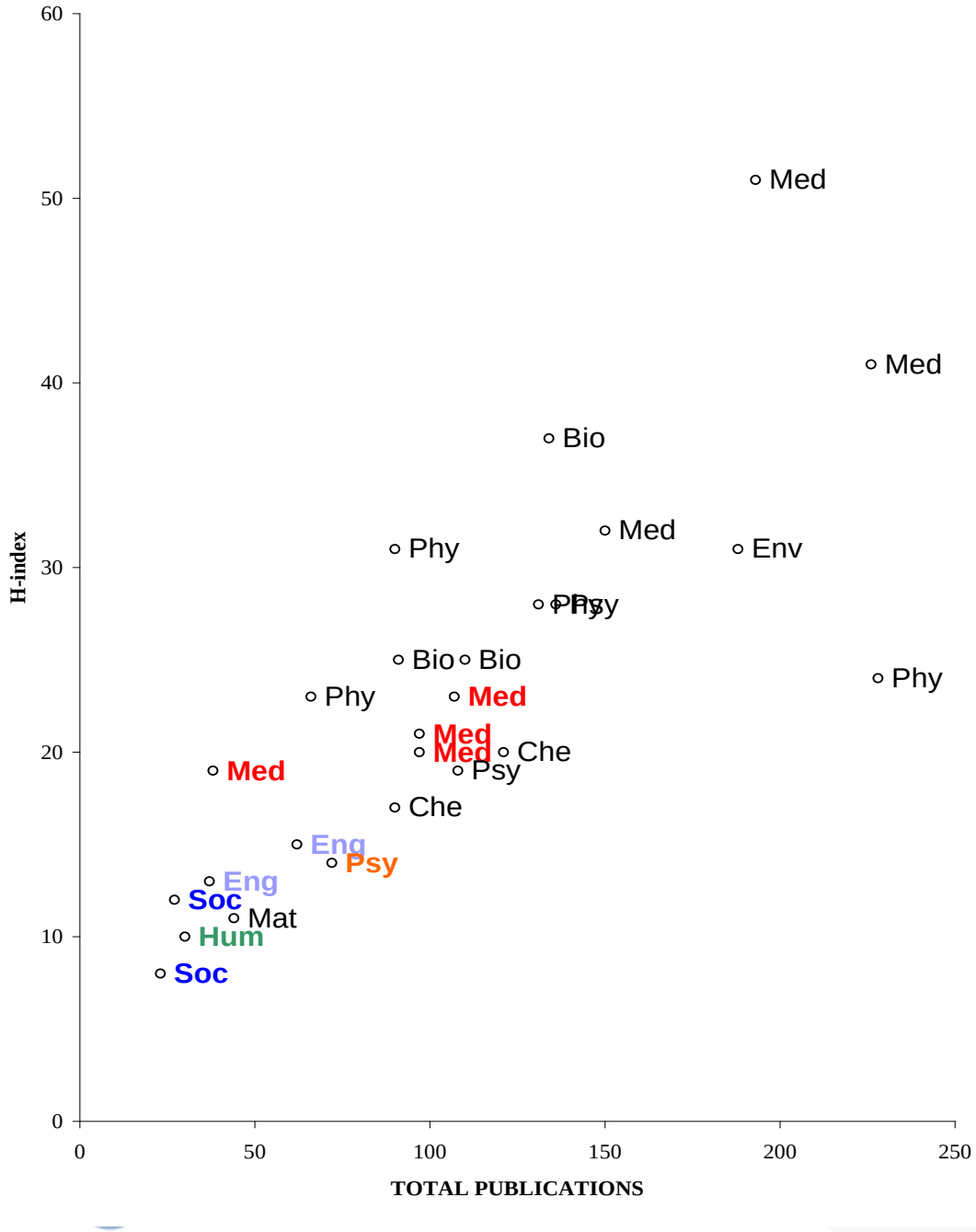
- NWO annually organizes the Spinoza Award.
- Universities list candidates for this prestigious prize.
- Spinoza candidates, across all domains …

- Use output, normalized impact, and h-index

CWTS

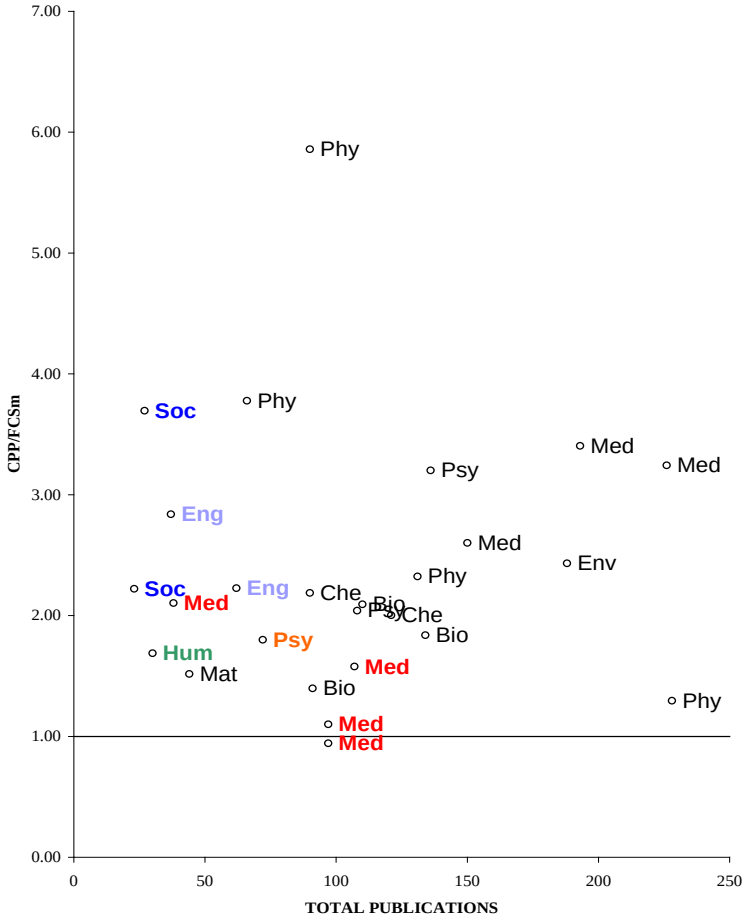


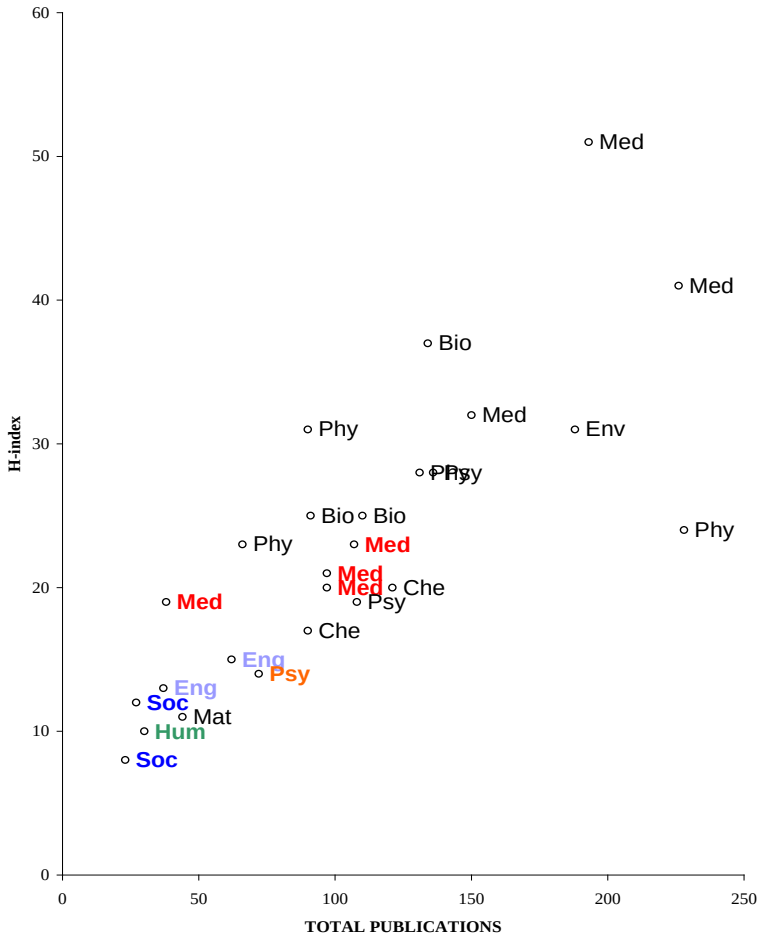
- Actual versus field normalized impact displayed against the output.
- Large output can be combined with a relatively low impact



- H-Index displayed against the output.
- Larger output is strongly correlated with a high H-Index value.
- High impact authors get low H-index values

The problem of fields and h-index …





The author selection issue

What is an author ?
What is an oeuvre ?

- **Thed N van Leeuwen at CWTS at FSW at Leiden University**
  - TN VAN LEEUWEN *(uses all capitals, and is completely separate from the other variations)*
  - T.N. van Leeuwen
  - Thed N. van Leeuwen
  - Thed van Leeuwen
- **Theo van Leeuwen also at FSW at Leiden University**
  - T. van Leeuwen (his first name is Theo)
- **… and several more ‘T van Leeuwen-s’ elsewhere in the world …**

CWTS

Database environment issue

Different databases for bibliometric analysis

- We distinguish three main databases:
  - ***Web of Science***, internet version of the Citation Indexes.
  - since 1963
  - ca. 18,000 Journals are indexed
  - additional indexes (conferences, books, data etc.)
  - ***Scopus***, the Elsevier Science answer to the WoS
  - launched by Elsevier in 2004
  - ca. 21,000 journals and proceedings are indexed
  - ***Google Scholar***, free internet database for bibliometrics.
  - launched in 2004 by Google
  - coverage unclear

CWTS

In what database context …

Selected my own publications in WoS and Scopus, Google Scholar has a pre-set profile.

Database	H-index	Based upon …
Web of Science	29	Articles in journals
Scopus	35	Articles, book (chapters), and conference proceedings papers
Google Scholar	41	All types, incl. reports

Problems with H-index

- **Bibliometric-mathematical issues**
  - mathematically inconsistent ***(Waltman & van Eck, 2012)***
  - Conservative *(life-time achievement, it only increases)*
  - Not field normalized ***(van Leeuwen, 2008)***
- **Bibliometric-methodological issues**
  - How to define an author?
  - In which bibliographic/metric environment? ***(Bar-Ilan, 2008)***
- **Conceptual/general issues**
  - Favors age, experience, and high productivity ***(Costas & Bordons, 2007)***
  - No relationship with research quality
  - Ignores other elements of scholarly activity
  - Promotes one-indicator thinking

CWTS

Wrapping it all up

Measuring is changing

- What counts as quality, is shaped by how we define and measure ‘**quality**’, and …
- … what counts as impact, is shaped by how we define and measure ‘**impact**’.
- We need different indicators at different levels in the scientific system, to inform wise management that strikes the right balance between **trust** and **control**
- Contextualisation is crucial for proper embedding of research metrics

CWTS

Context counts

- Responsible metrics are ***not*** supposed to be reflected by one universal standard (e.g., JIF and H-index)
- Responsible metrics should be responsive and inclusive metrics
- The context shapes what responsible metrics means:
  - the urgency of social problems (e.g. poverty, inequality, unemployment and corruption)
  - local research and educational missions
  - the local appropriation of “the global”
  - the values embedded in policies and communities

CWTS

Is there a role for research metrics ?

- Within the right context, we still consider bibliometric techniques as helpful **supportive** tools in the assessment of research performance, informing peers on structures and patterns otherwise hidden.
- However, this can only be done in conjunction with peer/expert opinions, never as a stand alone tool !
- And try to apply other forms of research metrics, of a more descriptive nature, rather than the evaluative metrics so commonly used, to inform research assessment procedures

CWTS

Goodhart's Law

"When a measure becomes a target, it ceases to be a good measure" *(M. Strathern, 1997, phrasing C. Goodhart , 1981)*

(this follows from individuals trying to anticipate the effect of a policy and then taking actions which alter its outcome)

Strathern, M, "Improving ratings", European Review, 1997
Goodhart, C, "Problems of Monetary Management: The U.K. Experience", in "Inflation, Depression, and Economic Policy in the West", 1981

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The end

Any questions ?

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CWTS

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