Service and Research in the IVS-CPT

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MAX PLANCK INSTITUTE
FOR SOLID STATE RESEARCH

12/11/2015

IVS-CPT

Service

- Special literature search
- Patent search
- Research evaluation
- . . .

Databases

- Web of Science
- Scopus
- STN (Chemical Abstracts Service, . . .)
- . . .

IVS-CPT

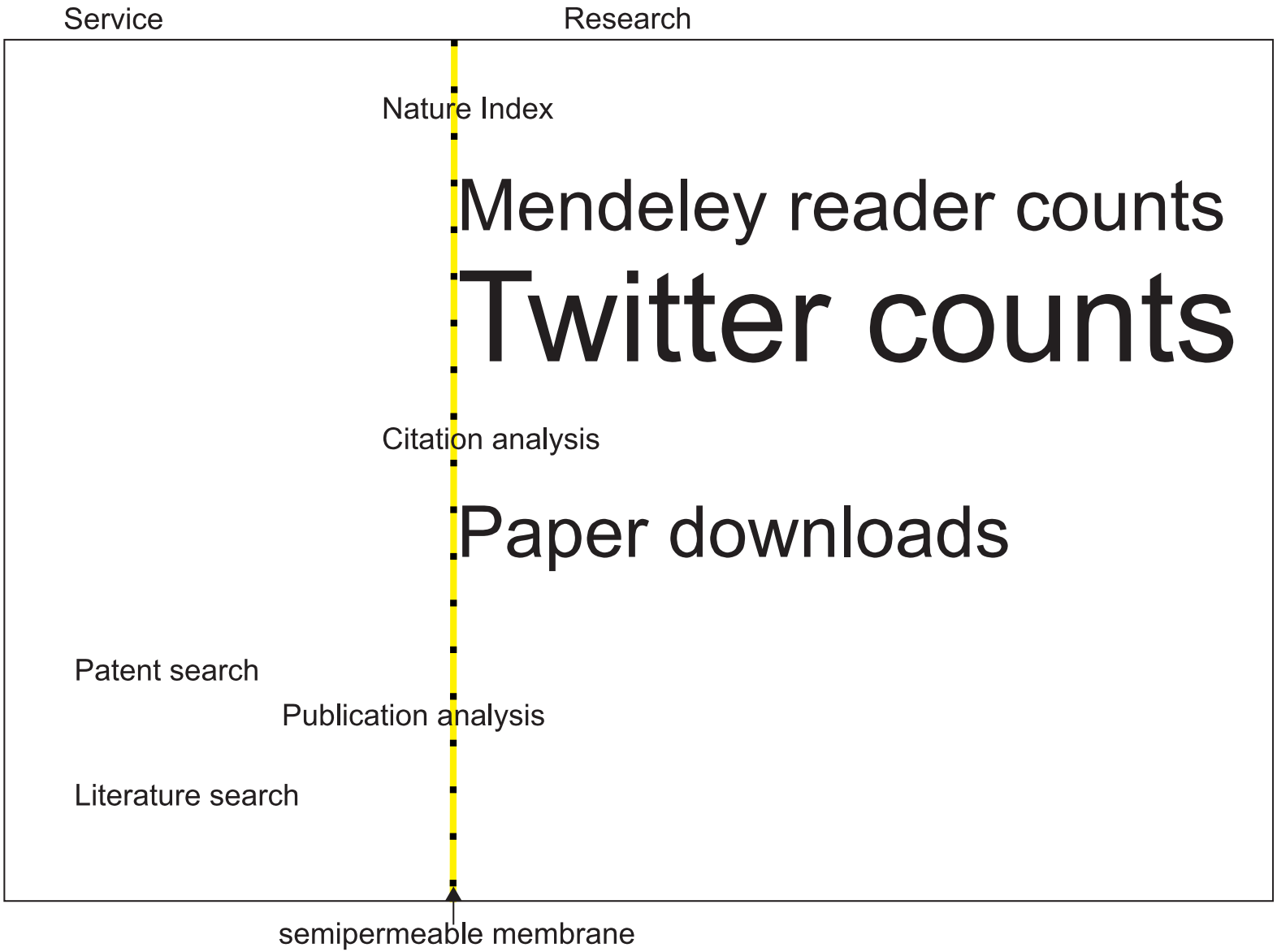
Research

- Bibliometrics
- Chemical bibliometrics
- Article-level metrics
- Altmetrics
- . . .

Databases

- Web of Science
- Scopus
- STN (Chemical Abstracts Service, . . .)
- . . .

IVS-CPT


Service
Research
Nature Index
Mendeley reader counts
Twitter counts
Citation analysis
Paper downloads
Patent search
Publication analysis
Literature search
semipermeable membrane

Introduction of the Nature Index

What is the Nature Index?

In the Nature issue 7526, volume 515 (13 November, 2014), Michelle Grayson and Nick Campbell introduced the Nature Index.
What is behind it?

- 68 reputable journals (Appl. Phys. Lett., PNAS, Phys. Rev. Lett., etc.)
- Raw article count (AC), fractional article count (FC), and weighted fractional article count (WFC) of the articles published in those 68 journals. For some journals (e.g.: Phys. Rev. A, Phys. Rev. B), primary research articles are selected and other articles are neglected.
- Snapshot data from the Nature Index are available under a Creative Commons license at www.natureindex.com, usually three months behind.

68 Journals from 68 Scientists

Why 68 scientists, why those?

Chairs of the panels: John Morton (physical sciences) and Yin-Biao Sun (life sciences)

Panel construction:

- Editorial staff from Nature journals proposed scientists which are “fully active in research” for the initial list of panel members.
- By the request of the chairs, they “should be drawn from the main disciplines of natural science; they should represent all active regions worldwide; and there should be a gender ballance.”

The chairs signed off on the ultimate list of 68 panel members.

68 Journals from 68 Scientists

Why 68 journals, why those?

- Each panellist was asked to name at maximum 10 journals where they would like to publish their best work.
- First journal received 10 points, second journal received 9 points, etc.
- “We emailed 100,000 scientists in the life, physical and medical sciences with an online questionaire. We targeted a broad geographical mix of scientists across Europe, North America, Asia, and the rest of the world, receiving more than 2,800 responses from across the major disciplines of the natural sciences.”
- Less than 3% response rate for the “confirmatory survey”.
- A high degree of convergence confirmed the view of the panellists. “The final selection was entirely the responsibility of the panel chairs.”

Final Adjustments

Fractional counting

In the FC, the articles are weighted according to the number of co-authors, e.g.: 3 of 6 authors are from MPI-FKF, the FC is 0.5 for MPI-FKF.

Weighting

The journals from astronomy and astrophysics contribute 50% of the articles to the Nature Index. That is approximately 5 times more than from journals in other categories.
Thus:
WFC = 0.2 FC (for astronomy and astrophysics journals)
WFC = FC (for all other journals)

Aims of the Nature Index

Aims as stated by Grayson and Campbell

1. “Above all, our hope is that this supplement, rather than providing some authoritative analysis, will act as a conversation starter and a nucleation point for ideas for further analysis.”
2. “We hope that the Nature Index will find a niche among the tools that research organizations use to track and quantify research outputs and develop comparisons across peer institutions.”

Well, aim no. 1 is already fulfilled.

Conversation starter 1

R. Haunschild and L. Bornmann, Scientometrics, 102, 1829 (2015)

1. The choice of 68 scientists and 68 journals is completely arbitrary.
2. Is a survey where less than 3% of the scientists bothered to reply a validation or a signal that there is no need for the Nature Index in the scientific community?
3. The Nature Index based on absolute numbers of articles published in a selection of journals can be misleading.
4. The Nature Index covers less than 1% of the journals in the Web of Science core collection.

Conversation starter 2

R. Haunschild and L. Bornmann, Nature, 517, 21 (2015)

5. The Nature Index ranks the CAS (AC = 2,661) above Harvard (AC = 2,555). A relative perspective (CAS published 31,428 articles and Harvard published 17,836 articles in the same time frame, InCites data) shows that 8% of the CAS articles and 14% of the Harvard articles are in the Nature Index.
6. Does reputation matter? Test on articles published in 2008 in Appl. Phys. Lett. with citations until 2013:
   Approx. 40% of the articles accounted for 80% of the citations.
   Also, approx. 60% of the articles accounted for 20% of the citations.

Response to Conversation starter 1

Main points by Grayson and Campbell

- No ranking
- Value in absolute numbers such as GDP
- 2.8% response rate is not unusual
- Useful indicator of high-quality research output is needed.
- The NI is not affected by variations of citation patterns between scientific disciplines.
- Multiple Metrics are needed.
- New papers can't be evaluated accurately using citations because they need time to accumulate.

Tweets about the NI Introduction

So far Altmetric has seen **13** tweets from **13** accounts with an upper bound of **10,900** combined followers.

Martin R Smith
@PalaeoSmith
101 followers

Are the Earth & Environmental Sciences underrepresented in high-impact journals? http://t.co/pldyMRQSRD #NatureIndex

13-Nov-2014

Earth Sci Library
@EarthSciCam
385 followers

Are the Earth & Environmental Sciences underrepresented in high-impact journals? http://t.co/pldyMRQSRD #NatureIndex

13-Nov-2014

mary williams
@PlantTeaching
2,476 followers

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@PlantTeaching
2,476 followers

Nature index "includes...selective journals w/in main disciplines of natural sciences" - plant blindness going on? http://t.co/QQFUg6JdCf

13-Nov-2014

Noah Fahlgren
@NoahFahlgren
340 followers

Nature index "includes...selective journals w/in main disciplines of natural sciences" - plant blindness going on? http://t.co/QQFUg6JdCf

13-Nov-2014

Phil Davis
@ScholarlyChickn
1,228 followers

The Nature Index is based on 68 journals. Tough luck if you're #69. http://t.co/7SlnpqddJP

13-Nov-2014

Marie E McVeigh
@JopieNet
45 followers

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@JopieNet
45 followers

The Nature Index is based on 68 journals. Tough luck if you're #69. http://t.co/7SlnpqddJP

13-Nov-2014

GaryFoster
@Prof_GD_Foster
2,123 followers

Nature index "includes...selective journals w/in main disciplines of natural sciences" - plant blindness going on? http://t.co/QQFUg6JdCf

13-Nov-2014

Ianis G. Matsoukas
@thisisianis
232 followers

Nature index "includes...selective journals w/in main disciplines of natural sciences" - plant blindness going on? http://t.co/QQFUg6JdCf

13-Nov-2014

Tweets about our NI Criticism

So far Altmetric has seen **31** tweets from **22** accounts with an upper bound of **33,294** combined followers.

NIT Solutions Ltd
@NitLtd
173 followers

Publishing: Criteria for Nature Index questioned http://t.co/1lLyQaQj0x http://t.co/59sw90LtHe

30-Dec-2014

Paco Fernandez
@paco_fmendez
205 followers

Publishing: Criteria for Nature Index questioned http://t.co/Jxit3sqGTH

30-Dec-2014

CITRAL
@OfficialCitral
176 followers

CITRAL
@OfficialCitral
176 followers

Publishing: Criteria for Nature Index questioned http://t.co/TDq1ttpOVA

30-Dec-2014

A.P. Ranger
@AParkRanger
54 followers

research matters
@resear_ch

220
FOLLOWERS

About time there's someone with good sense: Criteria for Nature Index questioned http://t.co/M6JmgXxRou

08 Jan 2015

Reply Retweet Favouri

Aldo Ceccarelli
@aldoceccarelli
6,200 followers

NIT Solutions Ltd
@NitLtd
173 followers

Weigel Lab
@PlantEvolution

4,237
FOLLOWERS

@lutzbornmann @RHaunschild comment on #NatureIndex being too arbitrary @NatureMagazine http://t.co/amQG9fyoA0

09 Jan 2015

Reply Retweet Favourite

CITRAL
@OfficialCitral
176 followers

CITRAL
@OfficialCitral
176 followers

Response to Conversation starter 2

No Response, yet

Probably, no response will occur

How random is the NI?

How does the NI correlate with other indicators or a random variant?

Can we do better?

Using the NI values, can we create better indicators?

Other indicators and random variant

Other indicators

- Np (Number of papers published)
- $Q1_{JIF}$ (papers in first quartile of JIF)

Random variant

1. Select 68 journals randomly
2. Do step 1 five times to obtain five random ACs
3. Average over the five random ACs

Correlations with NI values of 55 countries

Spearman rank correlations

	Np	$Q1_{JIF}$	AvgAC	AC	FC	WFC
Np	1					
$Q1_{JIF}$	0.97	1				
AvgAC	0.97	0.95	1			
AC	0.90	0.95	0.90	1		
FC	0.91	0.96	0.89	0.99	1	
WFC	0.91	0.96	0.88	0.98	0.99	1

Relative Variants

Relative AC

$$\mathrm{RelAC} = \frac{\mathrm{AC}}{\mathrm{Np}} \cdot 100 \tag{1}$$

Relative AvgAC

$$\mathrm{RelAvgAC} = \frac{\mathrm{AvgAC}}{\mathrm{Np}} \cdot 100 \tag{2}$$

Relative $\mathrm{Q1_{JIF}}$

$$\mathrm{RelQ1_{JIF}} = \frac{\mathrm{RelQ1_{JIF}}}{\mathrm{Np}} \cdot 100 \tag{3}$$

Correlations with NI values of 55 countries

Spearman rank correlations

	AC	RelAC	$\text{RelQ1}_{\text{JIF}}$	RelAvgAC
AC	1			
RelAC	0.76	1		
$\text{RelQ1}_{\text{JIF}}$	0.64	0.82	1	
RelAvgAC	0.08	0.23	0.06	1

$\rightarrow$ The relative and size-independent indicators offer an additional perspective on country performance.

Conclusions

- The Nature Index is a paper count based on an arbitrary selection of journals.
- The different variants (AC, FC, and WFC) correlate very strongly with each other ($r \geq 0.98$)
- The Nature Index correlates strongly ($r \approx 0.9$) with the total paper count, the $Q1_{JIF}$, and a random AC variant.
- Relative variants such as RelAC or $RelQ1_{JIF}$ offer an additional perspective.
- Of course, more advanced indicators are available when older (two years or more) papers are to be evaluated.
- For evaluation of newer papers, altmetrics (e.g. Mendeley reader counts) or $Q1_{JIF}$-based indicators might be better than the Nature Index.

References

- M. Grayson and N. Campbell, Nature, 515, S49 (2014)
- M. Grayson and N. Campbell, Nature, 515, S52 (2014)
- R. Haunschild and L. Bornmann, Scientometrics, 102, 1829 (2015)
- R. Haunschild and L. Bornmann, Nature, 517, 21 (2015)
- L. Bornmann and R. Haunschild, JASIST, in press


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