Societal impact and open research

Results of a joint partner investigation (SpringerNature, VSNU,UKB)

Henk van den Hoogen, Maastricht University Library

Timon Oefelein, SpringerNature

LIBER 2021

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A joint investigation into the social impact of research..

Research questions and project structure

Work Stream 1
- "**What is the societal impact of scholarly publication and how can we best capture it?**"

Work Stream 2
- "**How do OA formats perform when compared to non OA formats? What is the impact on non-academic sector?**"

Work Stream 3
- "**What tools can we recommend to researchers to maximize societal impact of their research?**"
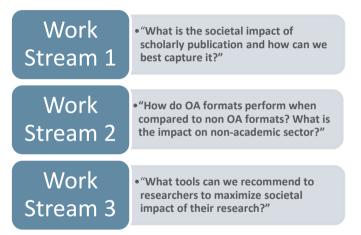
Image Credit: Courtesy NASA/JPL-Caltech. Source: Wikimedia Commons

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Project managers and coordination

WS1

Project Lead: <u>Timon Oefelein,</u> Springer Nature
- Maurice Vanderfeesten, VU Amsterdam Library
- Jürgen Wastl and Mario Diwersy, Digital Science
- Markus Kaindl, Springer Nature
- Nicola Jones, Springer Nature
- Jos Franssen, Maastricht University

WS2

Project Lead: <u>Harald Wirsching</u>, Springer Nature
- Dan Penny, Springer Nature
- Daren Howell, Springer Nature, et al.

WS3

Project Lead: <u>Mithu Lucraft</u>, Springer Nature
- Henk van den Hoogen, Maastricht University
- Maurice Vanderfeesten, VU Amsterdam Library
- Carien Hilvering, Maastricht University
- Lucy Frisch, Springer Nature
- Stefan de Jong, Consultant

Overall Coordination

- Ingrid Wijk, Maastricht University
- Henk van den Hoogen, Maastricht
- Timon Oefelein, Springer Nature
- Darco Jansen, VSNU
- Mithu Lucraft, Springer Nature
- Harald Wirsching, Springer Nature
- Maurice Vanderfeesten, VU Amsterdam

High Level Steering Committee

- Harry Blom, Springer Nature
- Carrie Webster, Springer Nature
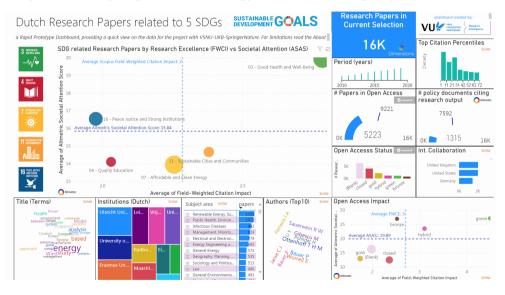- Prof. dr. K.M. (Koen) Becking, VSNU, and President of the Executive Board of Tilburg University

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Work Stream 1

1. Basic **definition of "societal impact of research"**
2. **Definition: SDG-relevancy, usage data, altmetric data and survey data**
3. **Create SDG classifier**, we sub-contracted Digital Science:
   - Start five goals: Nr. 3,4, 7,11,16
   - For each goal: keyword search string based on UN's SDG targets and indicators
   - Search strategy was conservative, favoring "precision" over "recall "
   - Generated training set for Machine Learning
   - Quality Assurance via SN editorial network including several NL academics
   - Classified NL content between 2010-2019, approx. 600k items, with 40k SDG results
4. **Prototype dashboard** for initial analysis **of Open Access**
5. Main filters: OA format; institutional affiliations, policy, altmetric data, etc.
6. In second dashboard we **added Counter usage**, **all SDGs 17 goals, content from all countries**
7. **Secure rights and permission** to publically release data

WS2

Rapid prototype SDG dashboard of NL publications

https://www.springernature.com/gp/researchers/sdg-impact

Free SDG dashboard of global publications (119 million items)

https://app.dimensions.ai/discover/publication

Work Stream 2

1. Completion of SDG classifier triggered **Work stream 2**
2. WS2 focused **on four tasks:**
   - Creating THE final dashboard covering 17 SDG goals
   - Analyzing all data points, including regression analysis
   - Conducting additional qualitative survey work
   - Published all results in a White Paper, which includes both the bibliometric analysis as well as survey data.

     Open for all: exploring the reach of open access content to non-academic audiences DOI: 10.5281/Zenodo.4143313

3. Digital Science also did some global SDG benchmarking, published in their White Paper.

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Open Research

OPEN FOR ALL: EXPLORING THE REACH OF OPEN ACCESS CONTENT TO NON-ACADEMIC AUDIENCES

White paper

Partnering with

vsnu   UKB

ADVANCING DISCOVERY

Open Research

Journals   Data
Books   Tools
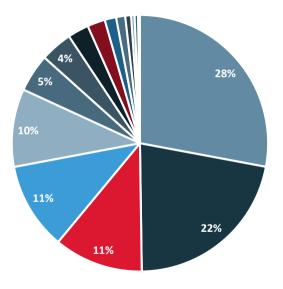
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Number of SDG documents published 2015-19 (n=1.9m)

- 7 Affordable and Clean Energy
- 3 Good Health and Well Being
- 4 Quality Education
- 16 Peace, Justice and Strong Institutions
- 13 Climate Action
- 11 Sustainable Cities and Communities
- 8 Decent Work and Economic Growth
- 10 Reduced Inequalities
- 2 Zero Hunger
- 12 Responsible Consumption and Production
- 14 Life Below Water
- 1 No Poverty
- 9 Industry, Innovation and Infrastructure
- 5 Gender Equality
- 17 Partnerships for the Goals

SDG content (2015-2019) by publication format

Legend: ■ Not any form of OA ■ Gold: Fully OA Journal ■ Gold: Hybrid OA ■ Bronze OA ■ Green OA

SDG	Not any form of OA	Gold: Fully OA Journal	Gold: Hybrid OA	Bronze OA	Green OA
3 Good Health and Well-being	44%	24%	8%	16%	8%
4 Quality Education	46%	16%	16%	16%	6%
2 Zero Hunger	48%	22%	10%	14%	6%
6 Clean Water and Sanitation	48%	23%	9%	14%	6%
15 Life on Land	49%	23%	11%	9%	7%
1 No Poverty	50%	15%	13%	14%	9%
8 Decent Work and Economic Growth	51%	13%	12%	15%	9%
11 Sustainable Cities and Communities	51%	20%	9%	14%	6%
10 Reduced Inequalities	53%	15%	9%	11%	12%
9 Industry, Innovation and Infrastructure	53%	14%	12%	14%	8%
17 Partnerships to achieve the Goal	53%	17%	11%	13%	7%
14 Life Below Water	53%	19%	9%	12%	7%
All SDGs	55%	17%	9%	12%	8%
5 Gender Equality	56%	13%	10%	12%	9%
12 Responsible Consumption and Production	57%	17%	9%	12%	7%
16 Peace and Justice Strong Institutions	57%	13%	10%	12%	7%
13 Climate Action	57%	17%	7%	8%	10%
7 Affordable and Clean Energy	68%	12%	4%	8%	7%

OA-status data source: unpaywall

SDG content (__2017__) by OA status, usage and altmetric attention

COUNTER

36k SN only

OA Status	# Springer Nature Documents only	Avg. # Downloads	Median # Downloads	Regression Downloads
Non-OA (Sub)	22,192	898	507	100%
Gold: Fully OA Journal	8,379	2,489	1,699	286%
Green OA	3,556	1,081	620	132%
Gold: Hybrid OA	1,707	4,049	2,368	422%
Bronze OA	989	1,400	676	201%

358k all publishers

OA status	# Docs	Avg. Alt. Score	Avg. # Twitter	Avg. # News	Avg. # Policy	Regression Alt Score
Non-OA (Sub)	191,739	2.51	1.72	0.13	0.01	100%
Gold: Fully OA Journal	61,176	6.51	4.55	0.41	0.02	182%
Bronze OA	44,096	8.44	4.84	0.64	0.02	196%
Green OA	31,241	11.48	7.68	0.73	0.04	151%
Gold: Hybrid OA	30,671	7.81	5.48	0.52	0.03	243%

Negative Binomial Model (Controlled for: document, author, journal)

Source: "Results of a bibliometric analysis of research content contributing to the Sustainable Development Goals", Springer Nature 2020. **SPRINGER NATURE**

Key takeaways and lessons learned (WS1-2)

- Overall, SDG **classifier works well,** some limitations due to an imperfect training set and conservative initial search approach.
  - ➢ Second generation of the filter: expanded results for SDGs 2,9,14,15.
- **Open Access SDG-research has a strong wider impact.**
  - ➢ Additional study: how academic content is picked up by policy makers and governments
- Goals with **a low count include**: No Poverty, Zero Hunger, Gender Equality and Life Below Water
- Open Science: many **practical challenges**. But with right planning and training, they can be overcome.
- Project outcomes **support VSNU policy on research evaluation**
- **Partnership was a huge success.** By joining forces and working together, progress can be made..

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In conclusion so far

OAP does matter for usage and attention!

OA Type	Downloads		Altmetrics Attention Score		Citations	
	Average	Regression model predictions	Average	Regression model predictions	Average	Regression model predictions
Subscription	100%	100%	100%	100%	100%	100%
Gold OA: Hybrid	439%	374%	207%	198%	83%	153%
Gold OA: Fully OA	270%	254%	173%	150%	90%	105%

- **Downloads OA pubs is 2,7 (fully OA) or 4 (hybrid OA) higher than subscription based pubs**

- **Average Altmetric attention score is 1,7 (fully OA) and 2,1 (hybrid OA) higher than subscription base pubs**

- **Citation score data are lacking behind**

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Qualitative analysis non-academic usage

User Survey
5,994 respondents, reading SN-content

57% Core readers

15% Halo readers

28% General readers

In which sort of organisation do you primarily work or study?

- Gov Organisation 7%
- Retired Academic 10%
- Others 12%
- Medical / Health Organisation 47%
- Corporate 24%

In which sort of organisation do you primarily work or study?

- Charity or NGO 7%
- Self-employed 20%
- Not currently working / Studying 8%
- Educational sector/school 9%
- Government organisation 11%
- Others 20%
- Retired (non-academic) 11%
- Corporate (non Pharma/ Biotech) 14%

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OA significantly benefits non academic users

Total of 52% users are able to access full text of subscription content, from which Halo/General users (62%) experience more difficulties

	Core (A)	**Halo (B)**	**General (C)**	**Total**
No	45%	62% A	62% A	52%
Yes	55% B C	38%	38%	48%
Column n	1,687	402	773	2,862

Were you able to access the full text of the research document(s) you wanted to read on this visit to our website? – Subscription documents only

Letters signify where there are statistically significant differences between groups, with a,b,c indicating a difference at $p <= 0.05$ and A,B,C indicating a difference at $p <= 0.001$)

Halo/General users benefit most from OA publications

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Motivations for reading

Were your reasons for looking at this paper primarily professional or personal?

Core (n=3395)	58%	34%	8%
Halo (n=932)	57%	32%	11%
General (n=1667)	35%	36%	29%

- Purely/Mostly because of professional interest
- Both professional and personal interest
- Purely/Mostly because of personal interest

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Motivations for reading

Core (A)	39% BC	23%	17%	14%	8% c	6% C 2% 5%	
Halo (B)	25%	25%	22% ac	21% A	7%	4% 3% 8% A	
General (C)	23%	26%	18%	21% A	6%	3% 4% a 10% A	

■ Cite/Reference in another document
■ Learn or confirm something specific
■ Stay informed/up-to-date
■ Share with others/discuss/advise
■ Writing a document/presentation/review
■ Plan/inform an experiment/form a hypothesis/ plan further research
■ Unclear/Nothing in particular/Could not access
■ Other

Citation score of OA

Number of downloads and attention score is higher from OA pubs, but citation scores lack behind

journal type	Citations average
subscription	100%
Gold OA, Hybrid	83%
Gold OA, Full	90%

Core academic users cite/reference the content more, where Halo/General users tend to share the full text content with others

=> OA Publishing needs to be part of *Rewards and Recognition*

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Work Stream 3

Helping researchers maximizing societal impact

Building a *best practice Societal Impact Toolkit* for researchers, focused on the specific needs of researchers (in the Netherlands), working on individual SDG's.

Input:

Survey (2019); > 9.000 respondents worldwide (based on Springer Nature's mailing lists of researchers worldwide):

`how do researchers consider impact'

Testing the results against Dutch practice, via interviews and workshops

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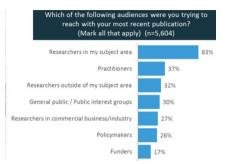
Survey on societal impact
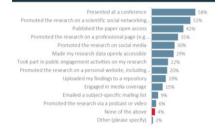
Results:
- Academic impact is leading;

- Social impact: disciplinary different focus
  SSH/LSM (policymakers, practioners,
  patients, general public) vs
  Engineering/Physics (industry)

- Increasing social impact
  conference; scientific social networking,
  publishing OA,
  social media

  Greatest effects on social impact:
  OAP, scientific social networking

Which of the following audiences were you trying to reach with your most recent publication? (Mark all that apply) (n=5,604)

Audience	%
Researchers in my subject area	83%
Practitioners	37%
Researchers outside of my subject area	32%
General public / Public interest groups	30%
Researchers in commercial business/industry	27%
Policymakers	26%
Funders	17%

For your most recent publication, which of the following have you done (or do you plan to do) to increase the societal impact of the research? Please mark all that apply. (n=5,525)

Activity	%
Presented at a conference	58%
Promoted the research on a scientific social networking...	52%
Published the paper open access	42%
Promoted the research on a professional page (e.g...	35%
Promoted the research on social media	30%
Made my research data openly accessible	29%
Took part in public engagement activities on my research	22%
Promoted the research on a personal website, including...	20%
Uploaded my findings to a repository	19%
Engaged in media coverage	15%
Emailed a subject-specific mailing list	9%
Promoted the research via a podcast or video	6%
None of the above	4%
Other (please specify)	2%

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Survey on societal impact

Support and attitude towards societal impact

- Quarter of respondents didn't receive any support
- Most common types of support are financial or communications support, e.g. press release or media coverage

Suggestions
- Funding should be tied more closely to societal impact (60%), especially according to younger researchers,
- Supporting services for researchers

Survey on societal impact

Why is it important to you that your research has some societal impact beyond academia?

My research was paid by tax money. It had the purpose to change societal perspectives on sustainability and the history of the concept.

Because my research is not fundamental and the cause is to improve practice.

Most of my research is done to inform policy makers. Therefore, societal impact is not direct and more difficult to achieve. However, if my research can be used to generate policies, it can have a positive impact in population health, specially in the prevention of non-communicable diseases.

As it is the responsibility of universities to disseminate knowledge and insights to the community

Because I think that impact on everyday life stimulates funding for future studies
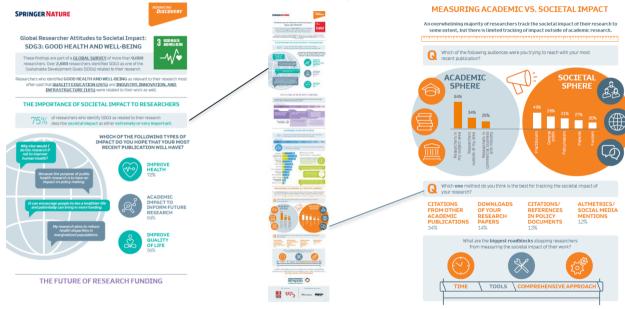
Because generating knowledge is useless unless it can be used for improving life in society

It is my mission to enhance quality of life of humans so my findings should be applied in life outside academia

Reasons for societal impact

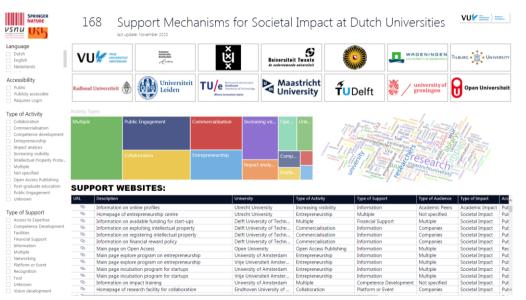**Researchers, esp. younger ones, view social impact as a moral responsibility**

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Survey results available as x17 Infographics

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ADVANCING
DISCOVERY

**Global Researcher Attitudes to Societal Impact:
SDG3: GOOD HEALTH AND WELL-BEING**

3 GOOD HEALTH
AND WELL-BEING

These findings are part of a GLOBAL SURVEY of more than 9,000 researchers. Over 2,600 researchers identified SDG3 as one of the Sustainable Development Goals (SDGs) related to their research.

Researchers who identified GOOD HEALTH AND WELL-BEING as relevant to their research most often said that QUALITY EDUCATION (26%) and INDUSTRY, INNOVATION, AND INFRASTRUCTURE (16%) were related to their work as well.

THE IMPORTANCE OF SOCIETAL IMPACT TO RESEARCHERS

75% of researchers who identify SDG3 as related to their research describe societal impact as either extremely or very important.

WHICH OF THE FOLLOWING TYPES OF IMPACT DO YOU HOPE THAT YOUR MOST RECENT PUBLICATION WILL HAVE?

Why else would I do the research if not to improve human health?

Because the purpose of public health research is to have an impact on policy making.

It can encourage people to live a healthier life and potentially can bring in more funding.

My research aims to reduce health disparities in marginalized populations.

IMPROVE HEALTH
72%

ACADEMIC IMPACT TO INFORM FUTURE RESEARCH
69%

IMPROVE QUALITY OF LIFE
56%

THE FUTURE OF RESEARCH FUNDING

MEASURING ACADEMIC VS. SOCIETAL IMPACT

An overwhelming majority of researchers track the societal impact of their research to some extent, but there is limited tracking of impact outside of academic research.

Q Which of the following audiences were you trying to reach with your most recent publication?

ACADEMIC SPHERE
84%
34% 25%

SOCIETAL SPHERE
49% 35% 31% 27% 20%

Researchers in my subject area
Researchers outside of my area
Researchers in commercial business and industry
Practitioners
General public
Policymakers
Patients
Funders

Q Which **one** method do you think is the best for tracking the societal impact of your research?

CITATIONS FROM OTHER ACADEMIC PUBLICATIONS
34%

DOWNLOADS OF YOUR RESEARCH PAPERS
14%

CITATIONS/ REFERENCES IN POLICY DOCUMENTS
13%

ALTMETRICS/ SOCIAL MEDIA MENTIONS
12%

What are the **biggest roadblocks** stopping researchers from measuring the societal impact of their work?

TIME   **TOOLS**   **COMPREHENSIVE APPROACH**

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Impact support mechanisms in Netherlands

New blog post on societal impact

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Q Search   EN ⌄

☰ Menu

Hear from researchers about societal impact

We interviewed researchers from a whole range of disciplines about their experiences of creating societal impact through research. Read their thoughts in our new blog series, "Exploring societal impact."

SN SDG Programme

Exploring societal impact: "It's a huge privilege to fulfill a ro...

A researcher discusses co-founding an NGO which works on issues relating to transitional justice an...

Ⓣ The Source
02 Dec 2020

SN SDG Programme

Exploring societal impact: "We would like to award points for...

Professor Frank shares his work with policymakers and the challenges of measuring societal...

Ⓣ The Source
26 Nov 2020

SN SDG Programme

Exploring societal impact: "We have to build bridges with...

Professor Nelen discusses societal impact in the context of his research career is criminology.

Ⓣ The Source
24 Nov 2020

SN SDG Programme

Exploring societal impact: "I see it as my mission to train the...

A researchers shares why interdisciplinary working is one of the core principles of his institute.

Ⓣ The Source
22 Nov 2020

x12 interviews so far, see project webpage

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Helping researchers maximizing societal impact

Review and specification of survey results for Dutch situation by:

Case study interviews with societal impact experienced researchers (VU , UM)

Workshops early career researchers (VU, UM)

- discussing social impact (possibilities)
- conducting dedicated societal impact plans

Resulting in a Societal Impact Toolkit
https://springernature.turtl.co/story/societal-impact-toolkit/?teaser=yes

- *What societal impact is and how important it is to researchers*
- *Methods researchers use to maximize societal impact*
- *How to engage and communicate for impact*
- *How to evaluate societal impact, and much more*

Towards Societal Impact

A toolkit to maximise the reach of your research

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Lessons learned, Takeaway message

- OAP really matters: for halo/general readers, but also for core readers;

- Policy attention for societal recognition is essential for further uptake of OAP and increase societal impact;

- Young researchers see it as their moral responsibility to maximize societal impact; they are the ones to go for;

- Support on possibilities of societal impact is needed: awareness, tools, services/skill training;

- Collaboration between commercial publisher and academia was fruitful and productive, with lots of engagement and full commitment.

Thank You!

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www.springernature.com/SDGimpact