SPRINGER NATURE

Antarctica meltdown could double sea level rise

Exploring Societal Impact

Part One: Researcher motivations

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ADVANCING DISCOVERY

About this report

This report forms the first part of a three-part summary of the findings of a global survey with more than 9,000 researchers, conducted in June 2019. The work took place as part of a joint project between Springer Nature and the Association of Universities in the Netherlands (VSNU), *Towards societal impact through open research*.

The goals of the survey were to better define the criteria for research impact in relation to the UN's 17 sustainable development goals, asking researchers what motivations are relevant where their work relates to one of these SDGs; to which audiences is impact generation focused outside of academia; to what end do researchers undertake activities to generate impact as part of their work; and how important it is. The research also aimed to identify means of support for impact generation, from the library, institution, funder, publisher or from other third parties.

In addition to analysis of global trends, this report highlights findings from a subset of 99 responses from researchers in the Netherlands. However given the small sample size, these highlights should be treated with caution.

The findings from this survey will be used to develop a best practice toolkit for researchers, focused on the specific needs of researchers in the Netherlands, working on individual SDGs. The toolkit will be made freely available from the project website.

For further details about our methodology and the demographics of the survey respondents, please see the Appendix. A full list of survey questions and the raw data can be downloaded from Zenodo. Parts two and three of the report can be found here.

Section 1: Understanding motivations

This section explores:

- **How important is societal impact to researchers?**
- **How do funder or institutional requirements on societal impact affect researcher behaviours?**

Headline findings:

Societal impact beyond academia is important for two thirds of global researchers

- In general, however, more researchers think it is more important/very important that their papers are read by their peers (82%) than the societal impact of their research (68%)
- Younger researchers in particular are more likely to feel societal impact is important
- Nearly half of respondents are asked by their funder “always” or “most of the time” to consider societal impact when applying for a grant, although there was wide variance, even within geographic regions

Most researchers are aiming for academic impact with their work

- 70% of respondents are aiming to inform future research with their work, and the vast majority (83%) are targeting other researchers in their subject area
- Nearly a fifth (13% of total respondents) are not hoping for any impact beyond academia
- The intended types of impact and target audience vary by the discipline of the respondent
- 40% of all respondents say that their choice of where to submit was influenced by the intended societal impact for their research, with reputation, open access and interdisciplinarity important factors as well

Importance of impact

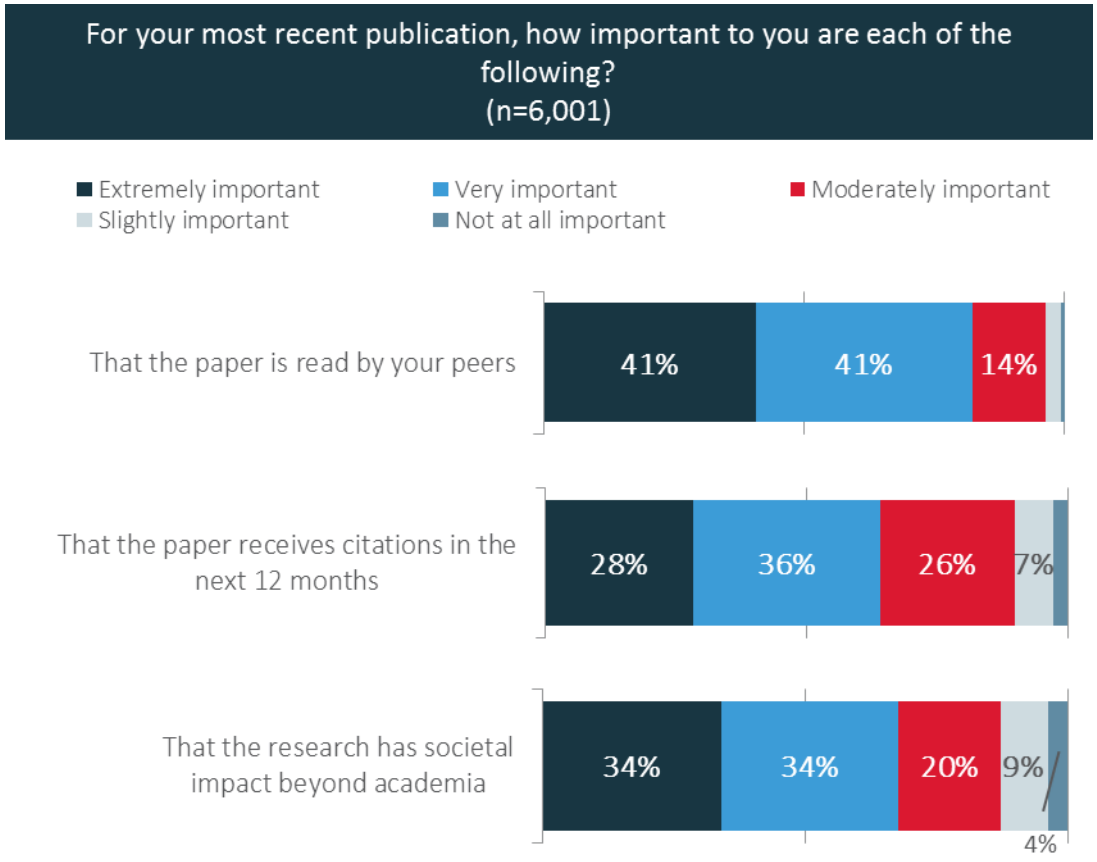
Societal impact is seen as less important than being read by peers

In general, researchers care more about their papers being read by their peers than about the societal impact of their research beyond academia. When asked about their most recent publication,

- 82% say that having their paper read by their peers is ‘extremely’ or ‘very’ important
- 68% say that their research having societal impact beyond academia is ‘extremely’ or ‘very’ important
- For 31% of researchers, societal impact is only moderately or slightly important, or not at all important

Researchers from the Netherlands have a similar view to other regions:

- 89% of Netherlands researchers feel being read by peers is ‘extremely’ or ‘very’ important
- 68% of Netherlands researchers feel that their research having societal impact is ‘extremely’ or ‘very’ important.



Researcher attitudes to societal impact – Penny, D.; Lucraft, M. July 2020

Importance of impact

Researchers view societal impact as a moral responsibility

81 respondents from the Netherlands commented on why societal impact was important. Almost all talked about how research was publicly funded and therefore researchers had a duty to deliver something back to society, or about how having an impact on society was more likely to result in funding for future work.

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

Importance of impact

Statistically significant differences can be found by region, discipline, seniority and institutional size

That research has societal impact beyond academia is seen as **most** important:

- In **India** and **C & S America** (84% and 77% respectively said 'extremely' or 'very' important compared to mean of 68%)
- In **Social Sciences** and **Medicine** (77% and 73% respectively said 'extremely' or 'very' important compared to mean of 68%)
- By **younger researchers** (73% of those first publishing in 2010 or later said 'extremely' or 'very' important compared to mean of 68%)
- By those in **very small institutions** (73% of researchers at very small institutions said 'extremely' or 'very' important compared to mean of 68%)

That research has societal impact beyond academia is seen as **least** important:

- In **Germany** and **France** (49% for both said 'extremely' or 'very' important compared to mean of 68%)
- In **Japan & S. Korea** (43% said 'extremely' or 'very' important compared to mean of 68%)
- In **Physics/Chemistry** and **Engineering** (54% and 64% respectively said 'extremely' or 'very' important compared to mean of 68%)
- By **older researchers** (58% of those first publishing before 1990 said 'extremely' or 'very' important compared to mean of 68%)
- By those in **large institutions** (63% of researchers at large institutions said 'extremely' or 'very' important compared to mean of 68%).

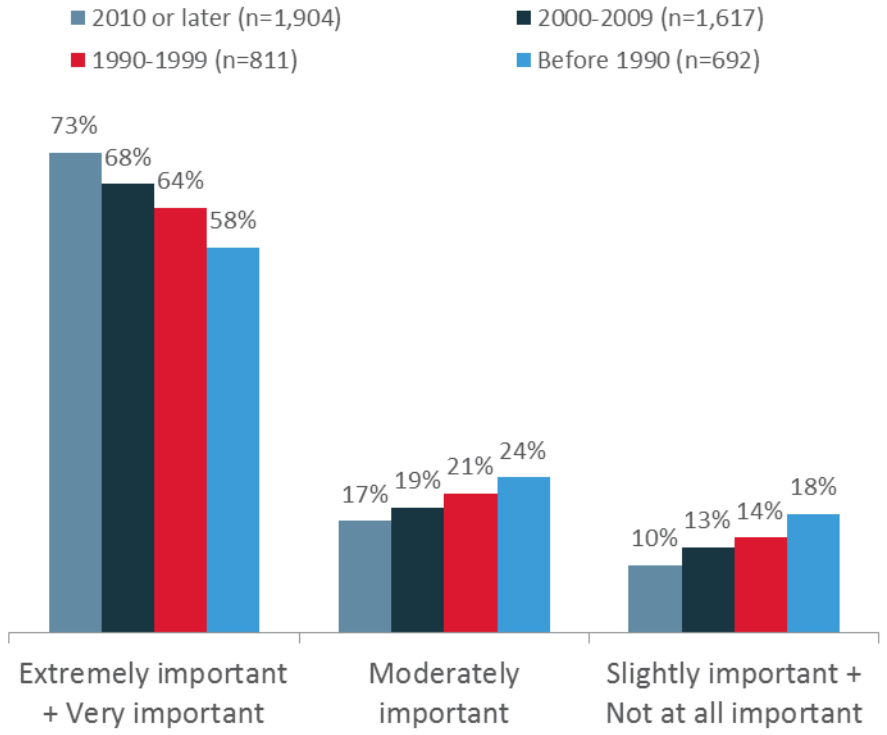
Importance of impact

The perceived importance of societal impact varies with seniority

Researchers who first published a research article before 1990 see societal impact as less important than those who first published more recently. The trend clearly continues for those who first published between those dates.

It is unclear whether this effect is generational, with researchers' beliefs tending to change as they get older, or whether these beliefs are ingrained, and so likely to lead to a universal growth in the perception of the importance of societal impact in the future.

"For your most recent publication, how important to you are each of the following?" vs *Date of first published research article*
(n=5,024)
That the research has societal impact beyond academia



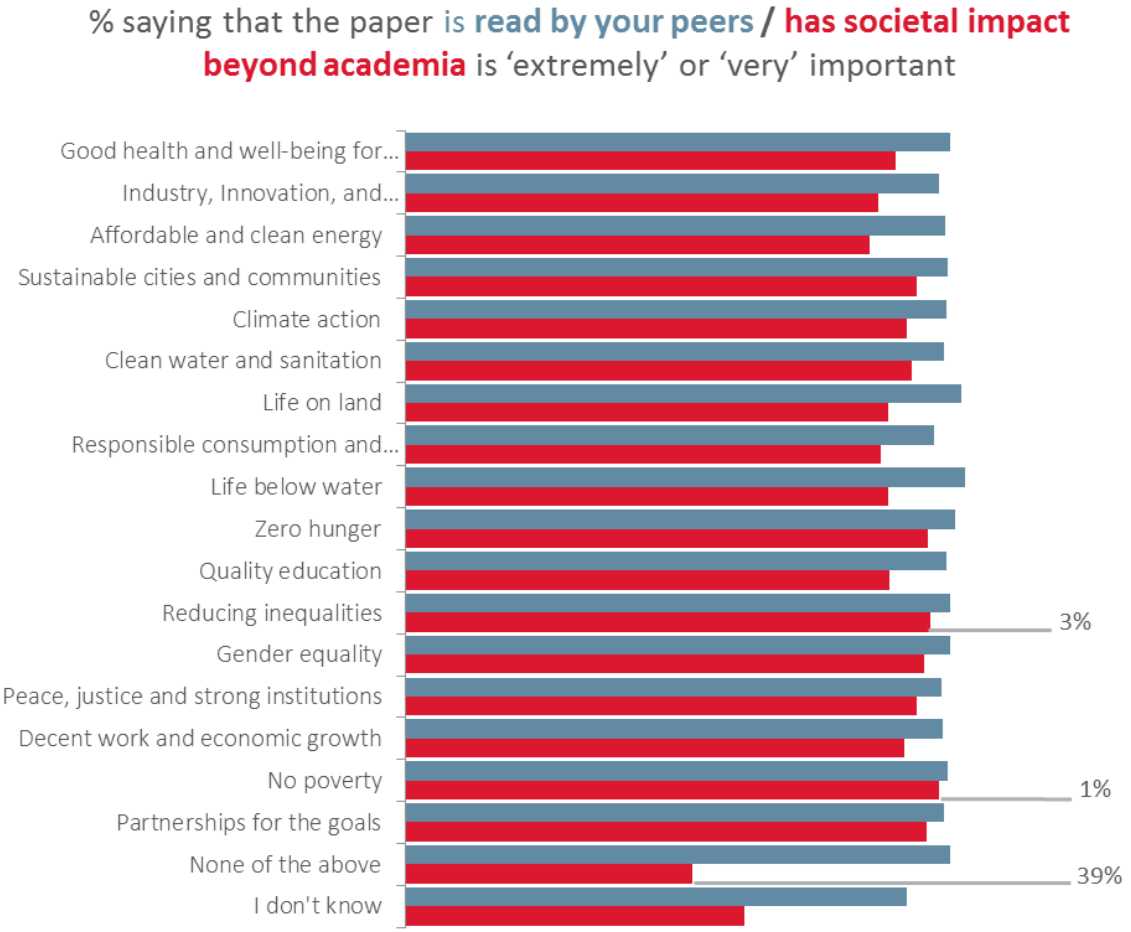
Importance of impact

There is little variance in the perceived importance of societal impact by SDGs

There is little variance by SDG in the percentage of authors feeling that societal impact is important. However, some SDGs see a larger gap between the percentage of authors judging that being read by peers is important and the percentage judging that societal impact is important.

Reducing inequalities and *No poverty* see only a 3% and 1% gap respectively between the percentage judging that being read by peers is important and judging that societal impact is important.

By contrast, those who said that **none** of the SDGs were a fit for their research were 39% less likely to say that societal impact was important, which indicates this group is more oriented towards pure research.



Funder & Institutional requirements

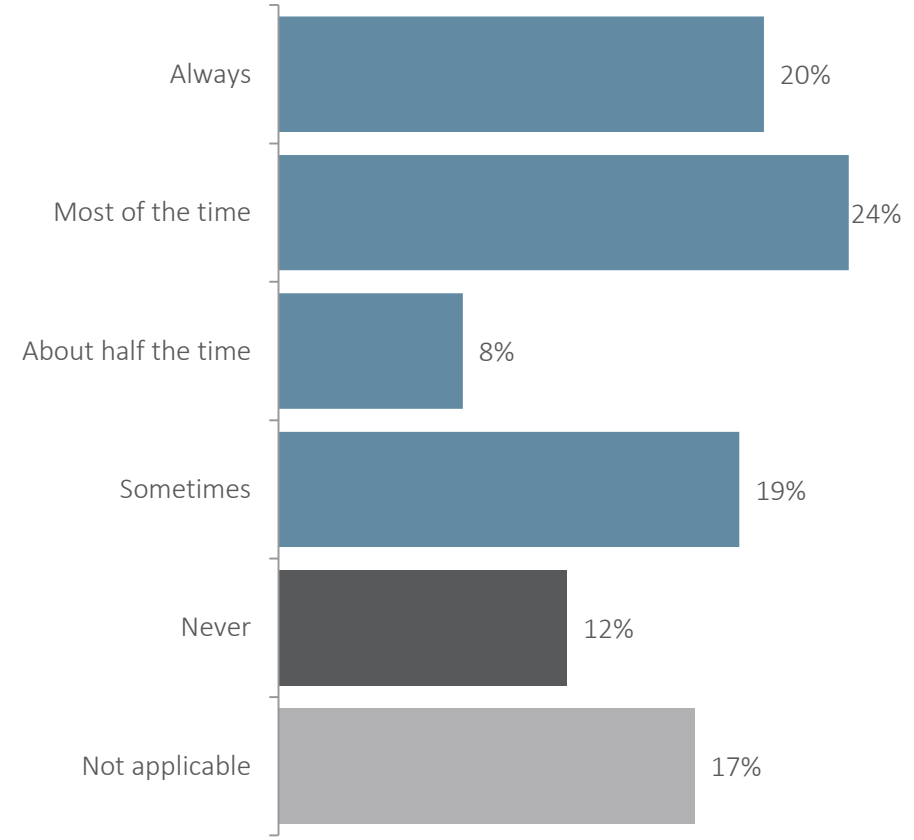
The majority of researchers are asked by funders to consider potential societal impacts

Nearly half (44%) of respondents globally said that their funder asks them ‘always’ or ‘most of the time’ to consider the social impact of their research when applying for a grant.

Netherlands researchers are more frequently asked to consider societal impact when applying for a grant: 60% say their funder asks them ‘always’ or ‘most of the time’ to consider the social impact of their research when applying for a grant.

There was little variation by SDG, although other variances can be found (see slide 10).

“My funder asks me to consider the potential societal impact of my research when I apply for a grant…” (n=5,184)



Researcher attitudes to societal impact – Penny, D.; Lucraft, M. July 2020

Funder & Institutional requirements

Statistically significant differences can be found by region, discipline, seniority and institutional size

Respondents more likely to be asked by funders to consider potential societal impact '**always**' or '**most of the time**':

- Researchers from the **Netherlands, India, Scandinavia and UK** (60%, 59%, 58% and 54% respectively compared to mean of 47%)
- **Earth & Environmental Scientists** and **Biologists** (50% and 49% respectively compared to mean of 47%)

Respondents more likely to **never** be asked by funders to consider potential societal impact:

- **Germany** (20% compared to mean of 12%)
- **Medicine** (15% compared to mean of 12%)
- **Older researchers** (15% of those first publishing before 1990 compared to mean of 12%)

Respondents more likely to be asked by funders to report on the resulting societal impact '**always**' or '**most of the time**':

- Researchers from **India** (50% compared to mean of 34%)
- **Younger scientists** (36% of those first publishing in 2010 or later, compared to mean of 34%)

Respondents more likely to **never** be asked by funders to report on the resulting societal impact:

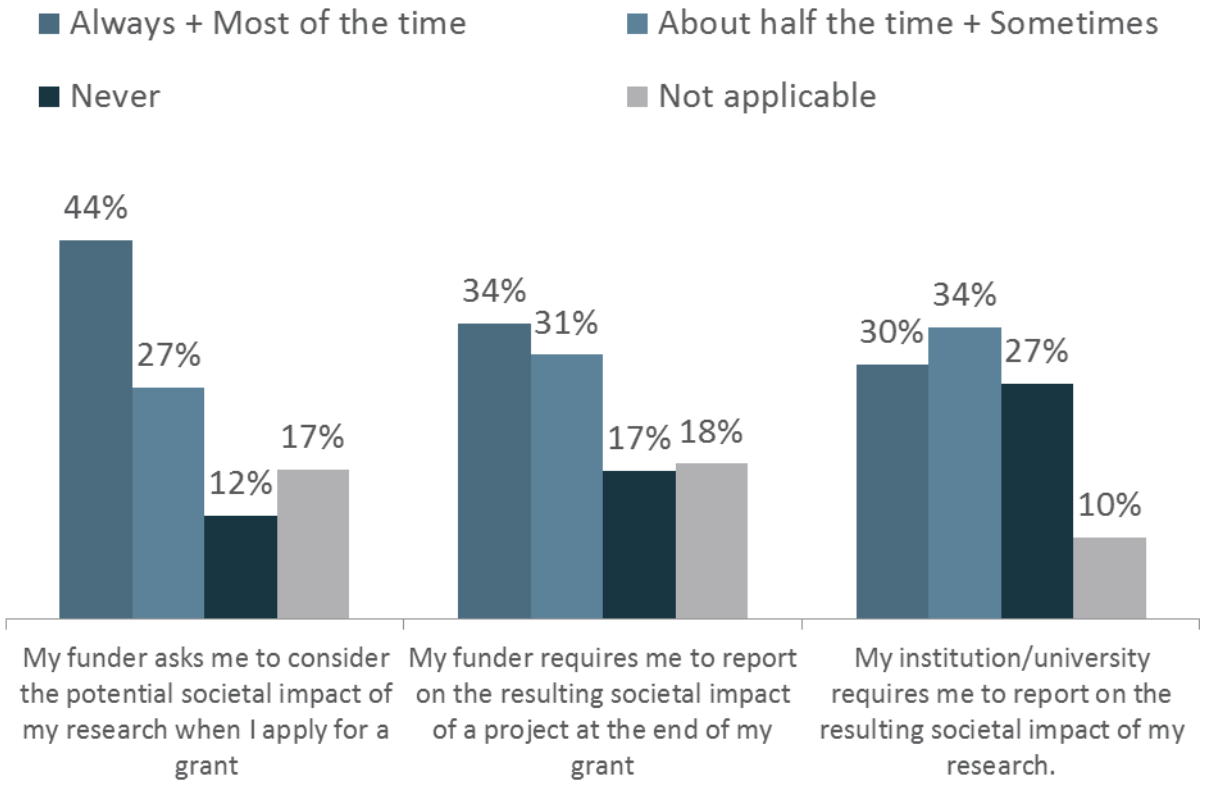
- **Germany and N. America** (27% and 23% respectively compared to mean of 18%)
- **Medics** (21% compared to mean of 18%)
- **Physician/Clinician/Healthcare professional** (25% compared to mean of 18%)
- Those at **very large** institutions (25% compared to mean of 18%).

Funder & Institutional requirements

Researchers are more often asked to consider impact when applying for grants than asked to report at the end of a grant

Fewer researchers globally are required to report on impact at the end of a grant by either their funder or institution:

- 34% globally are required to report on resulting societal impact 'always' or 'most of the time'
- Netherlands researchers reported a higher amount of reporting on societal impact, with only 13% saying they are never required by their funder to report on resulting societal impact, and 23% saying they are never required by their institution to report on resulting societal impact.



Researcher attitudes to societal impact – Penny, D.; Lucraft, M. July 2020

Section 2: Understanding goals

This section explores:

- **What is the intended impact?**
- **Who is the intended audience?**
- **How is the choice of journal influenced by intended societal impact?**

Intended type of impact

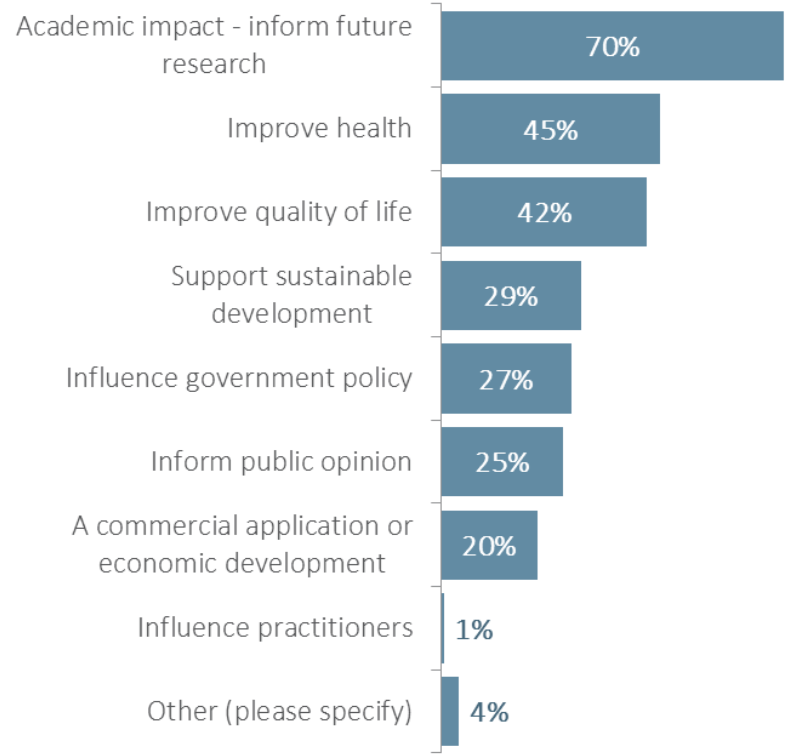
Most researchers are aiming to achieve academic impact and inform future research

70% of respondents were aiming for academic impact with their research, with 70% selecting this option:

- Of those who selected this option, nearly a fifth did not select any other option, suggesting that around 13% of total respondents are not hoping for any impact beyond academic
- Other intended impacts varied by region, seniority and institution size, but most variation was seen by discipline (see slide 14)
- Netherlands respondents are significantly more likely to say that they were aiming to '*influence government policy*' (40%) than other respondents, notably from Italy (15%) and Eastern Europe (14%).

Note: 'Influence practitioners' was not an answer option provided in the survey, but has been added because it occurred several times in the "Other" answer option.

Which of the following types of impact do you hope that your most recent publication will have? (Mark all that apply) (n=5,376)



Intended type of impact

Intended research impact varies most by discipline

Although academic impact was the most commonly selected type of impact, other intended types of impact varied by the discipline of the respondent.

'To improve health' was selected by 81% of those carrying out medical research, and to **'Support sustainable development'** was selected by 60% of those carrying out earth and environmental research.

By contrast, **"commercial application or economic development"** was selected by only 9% of medicine researchers and only 12% of social scientists, whereas 34% of those working in engineering and the physical sciences reported that this was an intended type of impact.

Intended type of impact (select all that apply)	Biology	Medicine	Eng/Phys / Chem / Mats	Earth & Env	Social Sciences	Arts & Humanities
Academic impact - inform future research	72%	64%	75%	70%	73%	85%
Inform public opinion	23%	25%	14%	36%	41%	53%
Improve quality of life	40%	55%	34%	32%	42%	32%
Improve health	46%	81%	22%	22%	28%	13%
Support sustainable development	35%	12%	37%	60%	28%	17%
A commercial application or economic development	24%	9%	34%	20%	12%	7%
Influence government policy	22%	27%	14%	47%	50%	35%

Intended audience

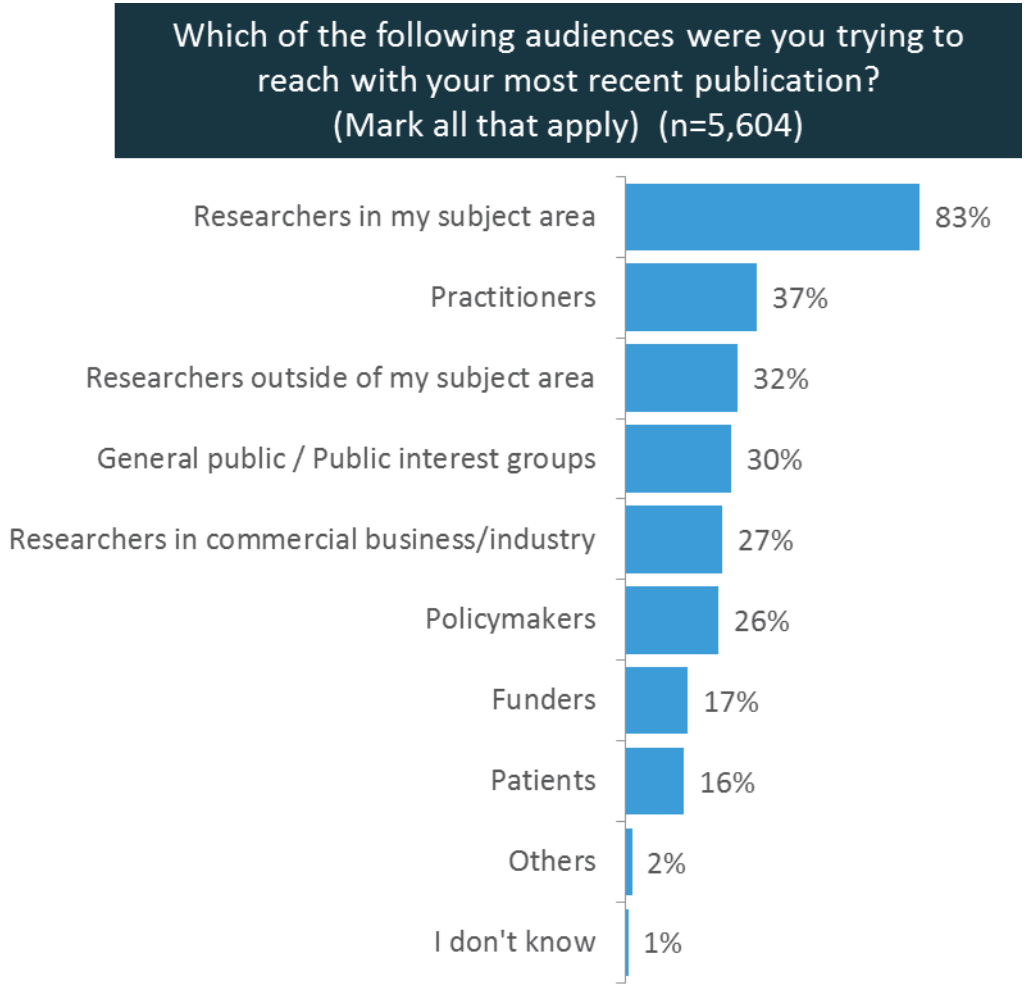
A majority of respondents are targeting researchers in their subject area

When asked who they were trying to reach, the vast majority of respondents (83%) answered that they were targeting researchers in their subject area:

- Around 20% of the respondents who answered in this way did not select any other answer
- “Other” answers that were provided included students and educators (for example lecturers or teachers)

There was some notable variance by region:

- Respondents from N. America were more likely to target practitioners (45% vs mean of 40%), compared with China and Japan (23% and 19% respectively)
- Respondents from India were more likely to be targeting researchers in commercial business/industry (42% vs mean of 28%)
- Respondents from China were much more likely to be targeting funders (33% vs mean of 19%)
- Researchers from the Netherlands were more likely to be targeting policymakers (44%)



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Intended audience

Target audience varies somewhat by SDG

There is some variation seen between SDG and intended audience, the greatest variation being between the percentage of researchers trying to reach practitioners. Here, the highest proportion of researchers aiming to reach practitioners are those who are researching in areas related to SDGs on good health and social equality.

	Good health and well-being for people	Industry, Innovation, and Infrastructure	Affordable and clean energy	Sustainable cities and communities	Climate action	Clean water and sanitation	Life on land	Responsible consumption and production	Life below water	Zero hunger	Quality education	Reducing inequalities	Gender equality	Peace, justice and strong institutions	Decent work and economic growth	No poverty	Partnerships for the goals
Researchers in my subject area	84%	86%	86%	84%	84%	84%	88%	85%	87%	84%	86%	87%	85%	84%	85%	81%	86%
Practitioners	49%	37%	30%	42%	33%	34%	33%	40%	34%	35%	45%	49%	52%	48%	44%	45%	47%
Researchers outside of my subject area	34%	38%	38%	44%	42%	38%	45%	42%	42%	39%	38%	42%	41%	42%	40%	40%	42%
General public / Public interest groups	35%	32%	36%	46%	41%	41%	42%	44%	46%	45%	39%	46%	48%	48%	45%	47%	50%
Researchers in commercial business/industry	25%	51%	45%	37%	35%	37%	32%	44%	33%	38%	29%	21%	24%	28%	39%	28%	36%
Policymakers	31%	28%	27%	45%	39%	37%	37%	36%	40%	39%	33%	54%	48%	44%	45%	54%	47%
Funders	20%	22%	23%	22%	23%	22%	23%	21%	22%	26%	19%	21%	23%	18%	21%	24%	30%
Patients	27%	12%	13%	13%	12%	18%	12%	16%	18%	17%	19%	20%	23%	19%	19%	19%	23%
Others	2%	2%	2%	3%	2%	2%	3%	3%	1%	2%	4%	3%	3%	4%	4%	2%	4%
I don't know	0%	0%	1%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
Column n	2482	1050	749	669	842	635	715	601	349	552	1272	558	561	506	480	392	375

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(Red = significantly below mean, blue = significantly above mean, p<0.05)

Intended audience

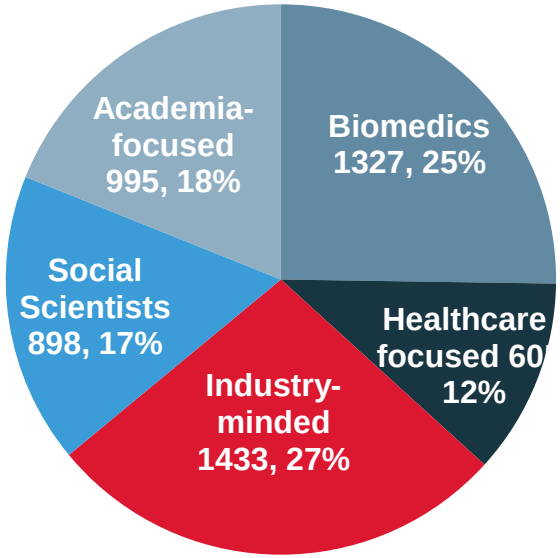
Five groups emerge from combining intended impact type, target audience and discipline

Segmenting the respondent data results in 94% of the sample grouping into five segments. Four of these are oriented by their discipline towards targeting certain audiences and aiming at certain impacts. The fifth, representing 18% of the sample, is aiming only at academic impact and an academic audience.

Disciplines	Various
Targeting	Researchers in field only
Impact aim	Academic impact only

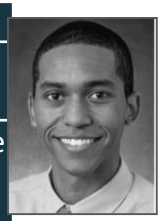
Disciplines	Social Sciences
Targeting	Policymakers & General Public
Impact aim	Influence government policy & Inform public opinion

Disciplines	Mostly Engineering and Physics
Targeting	Researchers in commercial business/industry
Impact aim	Commercial application/economic development and Support sustainable development



Disciplines	Biology & Medicine
Targeting	Practitioners & Patients
Impact aim	Improve health

Disciplines	Medicine
Targeting	Policymakers, Practitioners and General public
Impact aim	Improve health, quality of life and influence government policy



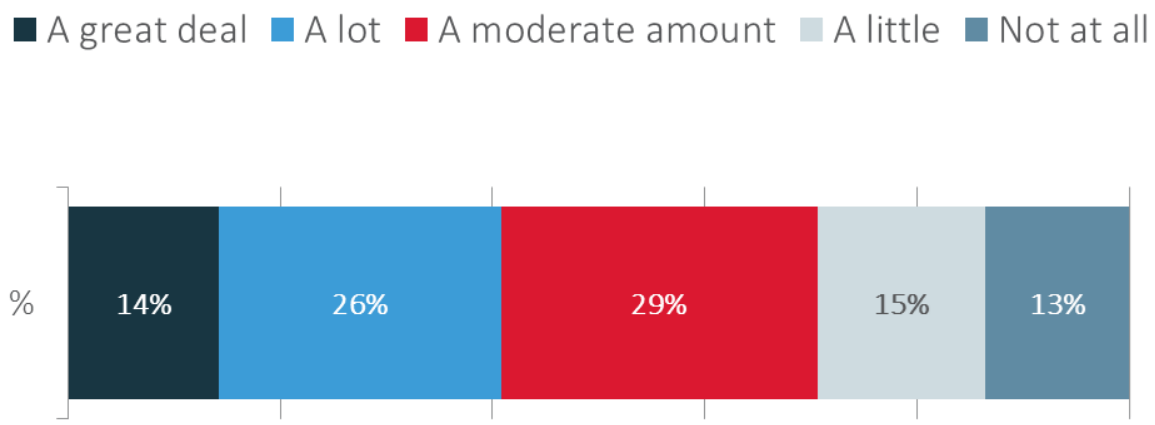
Choice of journal

Intended societal impact shows some influence on journal choice

40% of all respondents said that their choice of where to submit was influenced by the intended societal impact for their research:

- Only 13% of respondents said that choice of journal was 'not at all' influenced by their intended societal impact.
- Respondents in India were most likely to be influenced by intended societal impact (65% selected 'a great deal' or 'a lot', vs mean of 36%)
- Respondents in Medicine were most likely to say choice of journal is influenced by intended impact (43% selected 'a great deal' or 'a lot').

To what extent was your choice of journal influenced by your intended societal impact for the research? (n=5,715)



Choice of journal

A journal's reputation, open access and interdisciplinarity contribute to societal impact

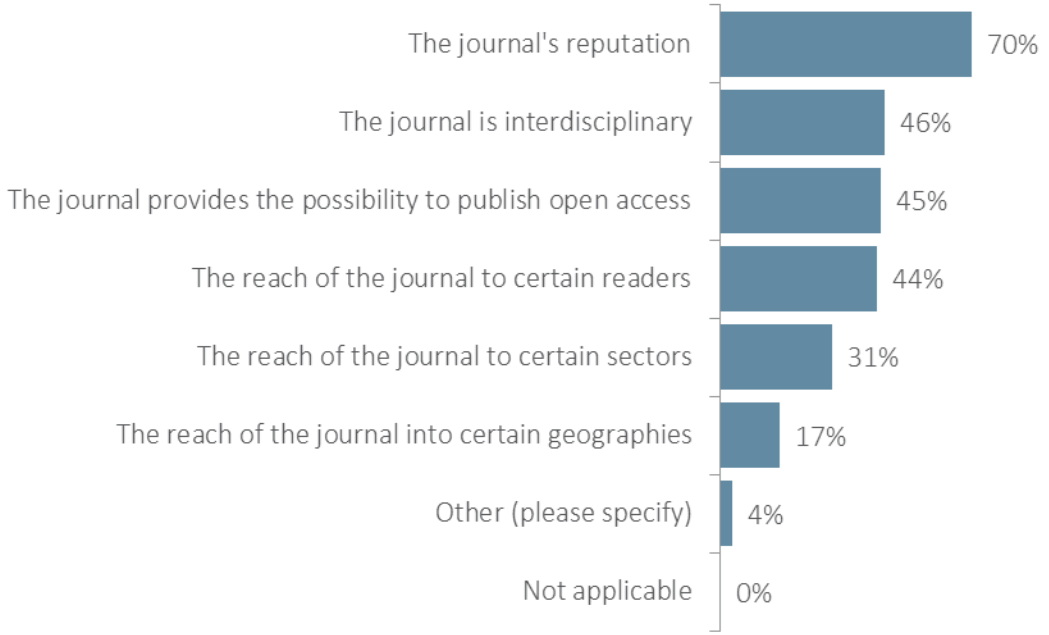
It is unsurprising that respondents considered that a journal's reputation made it more likely to increase societal impact.

But it is notable that nearly half of those who said that their journal choice was influenced by societal impact said that a journal being interdisciplinary (46%) or providing an OA option (45%) was an influence. However it is unclear whether these are active considerations being taken when the journal decision is being made, or whether respondents were post-rationalising their choice.

Open access as an influencer was chosen by a proportionally smaller number of respondents from N. America (36%).

Interdisciplinarity was a strong driver for researchers in Earth and Environmental Science (selected by 55%).

What aspects of this journal did you think made it appropriate to the potential societal impact of your research?
Please mark all that apply. (n=3,857)



NB Only asked of those who said that the impact influence on their choice of journal was 'a great deal', 'a lot' or 'a moderate amount;

Thank you

Find out more about the project and download further resources from https://www.springernature.com/gp/researchers/sdg-impact

The story behind the image

Antarctica meltdown could double sea level rise

Researchers at Pennsylvania State University have been considering how quickly a glacial ice melt in Antarctica would raise sea levels. By updating models with new discoveries and comparing them with past sea-level rise events they predict that a melting Antarctica could raise oceans by more than 3 feet by the end of the century if greenhouse gas emissions continued unabated, roughly doubling previous total sea-level rise estimates. Rising seas could put many of the world's coastlines underwater or at risk of flooding and storm surges.