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GRANT
REVIEW IN
FOCUS

GLOBAL STATE OF PEER REVIEW SERIES

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Web of
Science
Group

A **Clarivate**
Analytics
company

FOREWORD

Last year Publons released its inaugural *Global State of Peer Review* report, the largest ever study of peer review. Conceived in response to the gap in empirical assessments of global peer review, we were delighted with the audience the report received and the debate it generated.

As a result, we are proud to announce the second report in the *Global State of Peer Review Series: Grant Review in Focus*. As an independent platform of 1.9-million researchers and 5-million peer reviews, Publons is uniquely capable of calling upon diverse data and insights on peer review worldwide. In openly sharing these insights with the research community we hope to inspire evidence-based debate and inform decision making.

Grant Review In Focus, developed in collaboration with our colleagues in the Web of Science Group, springs from discussions, feedback surveys and other responses to our inaugural report, all of which highlighted a substantial gap in data and insights into grant peer review.

Grant funding drives the research and innovation ecosystem. It is a fundamental part of the research life cycle, as evidenced by the profound impact recent funding reforms have had on the wider research community – from publisher business models to authorship practices.[1] Funders, fully aware of this, are striving to better understand and innovate the peer review process that guides their research strategy.

Grant Review In Focus brings together the most extensive researcher survey on grant peer review ever conducted – with over 4,500 researchers surveyed – and the full power of *Web of Science* and *InCites* datasets. The researchers we surveyed enumerated interactions with more than 800 unique funders across 95 countries. We subsequently interviewed a range of these funders to build a detailed understanding of their perspectives.

While we will cover the details of our findings in the report that follows, I would like to call out a theme that has appeared in both this and the *Global State of Peer Review* report: a need to 'close the loop' between the work of reviewers and the researcher evaluation process. More than 80% of the reviewers we've surveyed believe that greater recognition of peer review would improve the peer review process, and in our conversations with publishers and other stakeholders it is becoming increasingly common to hear requests for funders and universities to factor this work, which is now measurable, into their own evaluation (formal recognition) criteria.

We hope you find *Grant Review In Focus* as informative to read as it was for us to create, and we look forward to your feedback, ideas, and suggestions.

**Regards,
Dr Andrew Preston**

October 2019

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[1] Quaderi, N., Hardcastle, J., Petrou, C. and Szomszor, M. (2019). The Plan S footprint: Implications for the scholarly publishing landscape – Web of Science Group. [online] Available at: https://clarivate.com/webofsciencegroup/campaigns/plan−s−footprint/ [Accessed 19 Aug. 2019].

EXECUTIVE SUMMARY

Grant Review In Focus aids understanding of the global grant peer review process, highlighting what researchers think – on the efficiency of the process, its merits and limitations, and the trends and challenges we need to be mindful of. It links reviewer insights, opinions and behaviors with funder perspectives and quantitative data.

Two findings are particularly striking.

The first concerns the continued relevance of the peer review process. Recently we have seen calls for dramatic changes in the way research funding is allocated, but the researchers and funders surveyed in this report strongly support the continued use of peer review to aid grant funding decisions. The use of experts continues to be viewed as a bulwark of quality decision–making in the funding process, ensuring continued trust and accountability.

The second finding relates to reviewer motivation and engagement. Whilst cash payments can seem an attractive driver of reviewer participation to many funders, this report finds that they are not a significant means of reviewer motivation (with cash coming sixth for reviewers in a list of motivating incentives).

Other thought–provoking findings include:

- Peer review is consistently recognized as a sign of quality, with 78% of respondents agreeing it is the best way to allocate funds to the best research. However, researchers also identify perceived failings of the peer review process, including unfair treatment of junior researchers and discouragement of innovative research.

- Grant peer review is a time–intensive endeavour. Funders spend up to 6-hours per application finding reviewers (and this is getting increasingly difficult), and grant reviewers spend on average 10-days per year on reviews.

- The reviewing workload is not evenly distributed, with just 4% of reviewers accounting for over 25% of all reviews undertaken.

- Researchers are dissatisfied with the transparency of the grant peer review process, with 60% believing that greater transparency would have a positive impact on the process.

- 89% of respondents believe that greater recognition of grant peer review work would improve the process, with 81% believing that funders should take on this responsibility.

- Cash is not a significant incentive to review, coming 6th in a list of initiatives that would make researchers more likely to review, with reviewer recognition coming in top.

- Greater training and explicit guidelines for peer reviewers are needed to ensure the quality and consistency of grant funding decisions.

Framing all these is the need for greater recognition for reviewers, from funders and universities. The passion from reviewers to support research, and their fellow researchers, is clear in our survey results and supporting comments. Cash is not king – fundamentally, researchers want an appreciation that their time helping improve a peer's application, or guiding a funder's grant priorities, is a crucial contribution to research and to their field. Funders can be a powerful agent for change here, by doing more to recognize reviewers and encouraging other funders, universities and governments to join them. Most immediately, they will be supporting the aspirations of the reviewers they rely on – and inviting new reviewers to join them.

Report Authors:

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1

WHAT DO WE ALREADY KNOW?

What is a grant?

A grant is a financial award given by a governmental body, non–profit, or private enterprise for a beneficial project of some kind. The grantee is not expected to repay the money and grants may be awarded for a wide variety of activities, including research studies, infrastructure requirements and more. It can be awarded to individuals, groups or organizations. This report looks at competitive grants, not performance–based funding (or block grants) distributed via national evaluation exercises.

The ability to attract grant funding is a key factor in the progression of a researcher's career. 36% of researchers consider securing grant funding the most important factor to their overall success.[1] In many cases (but not all), grants travel with the researcher. Researchers who have secured grants may find the tenure track smoother and universities can attempt to poach senior researchers to attract their funding.[2]

Who can apply for competitive grants?

Eligibility for a particular grant or funding round is determined by the funder. It may be restricted to individual researchers, or it may also be open to research groups, as well as private individuals and companies. However, the majority of grants are applied to by researchers and it is this group our report is concerned with. These grants may come in the form of fellowships or training grants, individual or small research grants for specific projects, and larger collaborative grants (which may be interdisciplinary in nature).

FUNDER INTERVIEW INSIGHTS

"Our grant funding aims to support creative, pioneering scientific research from basic to applied fields. We believe such research to be the foundation of human endeavor – and as such see our grant funding as playing a major role in the betterment of academic research and human society."

Yasuhiro Iye, Executive Director, Japan Society for the Promotion of Science (JSPS)

"One of our biggest challenges is to increase the impact of the research we fund."

Unnamed official interviewee, Polish National Science Centre (NCN)

Grant peer review can be at risk of cronyism, does not always support risky research and is under strain.

RESEARCHER SURVEY COMMENTS

"I don't know how widespread it is but there is a clear bias toward senior researchers. Grants that I have submitted have been judged less harshly when a much more senior researcher has been the first named investigator compared to when I have been the first named investigator (as a early–mid career researcher)."

Anonymous survey respondent

[1] Publons, 2018. *Global State of Peer Review*

[2] Benderly, B.L. 2015, 'Recruiting or academic poaching?', *Science Online*
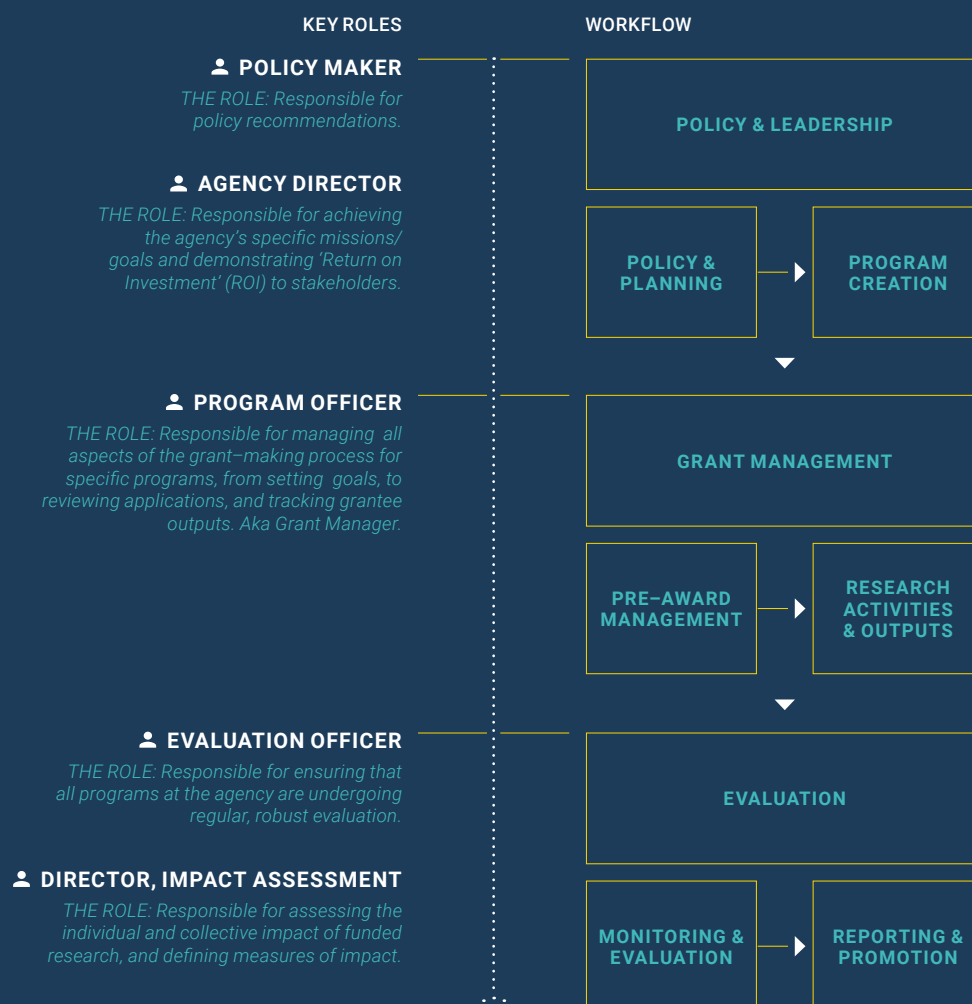
How are grants allocated?

Ensuring the fair and efficient allocation of grants is critical to all funders.

Given the highly specialized nature of research, and the need to avoid perceived or real conflicts of interest, it is often not practicable for funders to evaluate grant applications using internal staff alone. This is where external peer review is required, providing independent experts to help inform the allocation of limited funds. Reviewer participation allows the funder to evaluate applications alongside one another to prioritize their budget, often doing so through specially convened panels of external experts, who consider not just the scientific aspects of the proposed research, but also the overarching strategy of the funder and its program officers.

FIG.1 — THE FUNDING WORKFLOW, FUNDER FOCUS

KEY ROLES

WORKFLOW

POLICY MAKER
THE ROLE: Responsible for policy recommendations.

POLICY & LEADERSHIP

AGENCY DIRECTOR
THE ROLE: Responsible for achieving the agency's specific missions/ goals and demonstrating 'Return on Investment' (ROI) to stakeholders.

POLICY & PLANNING → PROGRAM CREATION

PROGRAM OFFICER
THE ROLE: Responsible for managing all aspects of the grant–making process for specific programs, from setting goals, to reviewing applications, and tracking grantee outputs. Aka Grant Manager.

GRANT MANAGEMENT

PRE–AWARD MANAGEMENT → RESEARCH ACTIVITIES & OUTPUTS

EVALUATION OFFICER
THE ROLE: Responsible for ensuring that all programs at the agency are undergoing regular, robust evaluation.

EVALUATION

DIRECTOR, IMPACT ASSESSMENT
THE ROLE: Responsible for assessing the individual and collective impact of funded research, and defining measures of impact.

MONITORING & EVALUATION → REPORTING & PROMOTION
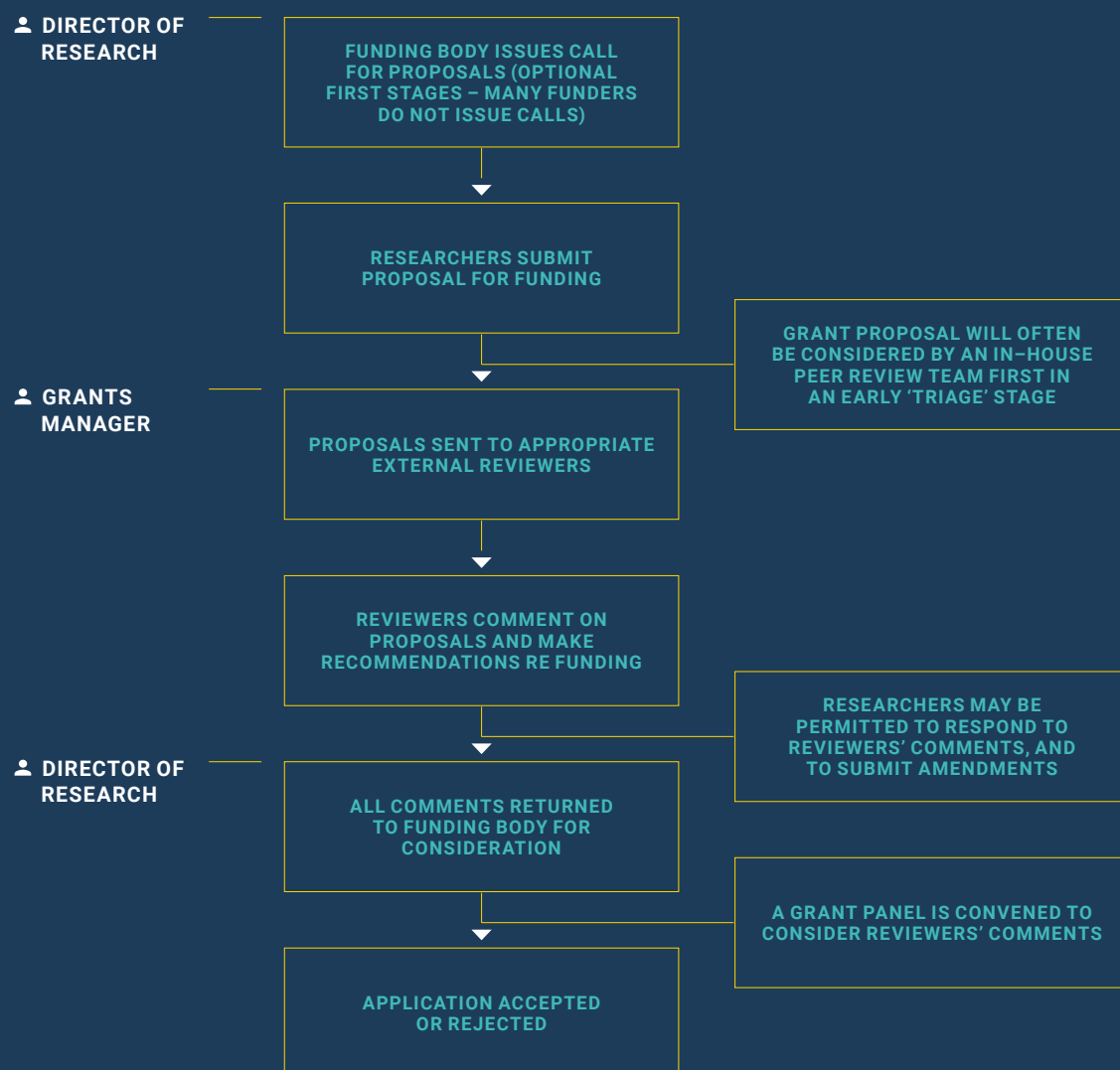
What is grant peer review?

Grant peer review (also known as refereeing) is the process of subjecting a researcher's grant application to the scrutiny of experts in the same field, experts in related fields and, increasingly, members of the public. This scrutiny supports the funding committee's decision-making process on which applications to fund.

FUNDER INTERVIEW INSIGHTS

"It's trust in the system which is so essential. Without independent, expert peer review grant applicants would say the funding process is a lottery, a closed system."

Eleanor Riley, Director of the Roslin Institute and experienced grant panel member

FIG.2 — THE BASIC GRANT REVIEW WORKFLOW

👤 **DIRECTOR OF RESEARCH**

> FUNDING BODY ISSUES CALL FOR PROPOSALS (OPTIONAL FIRST STAGES – MANY FUNDERS DO NOT ISSUE CALLS)

> RESEARCHERS SUBMIT PROPOSAL FOR FUNDING

> GRANT PROPOSAL WILL OFTEN BE CONSIDERED BY AN IN–HOUSE PEER REVIEW TEAM FIRST IN AN EARLY 'TRIAGE' STAGE

👤 **GRANTS MANAGER**

> PROPOSALS SENT TO APPROPRIATE EXTERNAL REVIEWERS

> REVIEWERS COMMENT ON PROPOSALS AND MAKE RECOMMENDATIONS RE FUNDING

> RESEARCHERS MAY BE PERMITTED TO RESPOND TO REVIEWERS' COMMENTS, AND TO SUBMIT AMENDMENTS

👤 **DIRECTOR OF RESEARCH**

> ALL COMMENTS RETURNED TO FUNDING BODY FOR CONSIDERATION

> A GRANT PANEL IS CONVENED TO CONSIDER REVIEWERS' COMMENTS

> APPLICATION ACCEPTED OR REJECTED

Types of grant peer review

There are two broad types of peer review in the grant allocation space:

1. Grant panel review:
A funder brings together a range of experts across a discipline to review multiple grant applications, in line with the funder's 'funding rounds' (the cadence by which they distribute their grant budget). These experts are often paid, certainly with a stipend and perhaps with an additional fee. They will evaluate each grant application in turn and make a determination on funding across multiple applications.

2. Individual and grant panel review:
A funder commissions experts (usually 2–3) in the relevant field to provide a detailed review on the application in question. These experts are often academic researchers and they can provide the review for free, or for a fee of some kind. These reviews are then often collectively reviewed as part of a funding round, with a grant panel tasked to evaluate each application in turn, working from the reviews against them and making the ultimate funding decision. This panel is usually comprised of senior academics, though it can include other professionals and members of the public. Its members can be paid a small fee, and expenses are usually covered. However, there is little consolidated data on the most common practice here, with a wide variety of practices across funders.

In some instances there is also an ethics review process, however that is not within the scope of this report.

How is grant peer review different to publication peer review?

It is worth highlighting a key distinction between the purpose of journal article (publication) peer review and grant peer review.

By its very nature publication peer review takes place after research has been completed. It informs the direction of research in a given field, but indirectly—by acting as a gatekeeper to what is published and where it is published. This, in turn, influences researchers as they determine the direction their own research should take.

By contrast, grant peer review has a more direct influence on the direction of research in a given field. Survey respondents consider grant peer review not only as a means of assessing the quality and integrity of research to be funded, but also whether it should be funded at all. In this respect, grant peer review uses measures particular to each reviewer. These measures may include the viability of the research, the impact it can have on the field, its utility to the public at large and much more. At times these measures are at the discretion of the reviewer, at others they have been formally provided through funder guidelines. For example, the National Science Foundation in the USA has recently included an emphasis on "potentially transformative research" in its merit review criteria[1]. All of which highlights the unique challenges for grant peer reviews and how essential their contribution is to the overall direction of global research.

"There is no standard way of doing peer review across funders (and between reviewers). It's feeling around in the dark and trusting that your approach is appropriate."
Anonymous survey respondent

[1] Banal–Estañol, A., Macho–Stadler, I. and Pérez–Castrillo, D., 2019. Evaluation in research funding agencies: Are structurally diverse teams biased against?. *Research Policy*, 48(7), pp.1823–1840

The remaining knowledge gap in the grant funding process

Moving beyond these observations to both a deeper and broader understanding of the grant funding process, as it unfolds across thousands of funders globally, is difficult. There is a significant knowledge gap to address. To contrast the world of grant peer review with that of publication peer review, the latter has consolidated in the last decade or so into a small group of publishers and service providers making generalized and global analysis a much easier task.

Publication data is widely available in a largely standardized format through indexing services and discovery engines. In our *Global State of Peer Review* report, we were able to utilize such data from the *Web of Science*. There is no equivalent centralized store of funding data. A large proportion of global publication peer review activity is covered by a small number of peer review platforms. In our previous report we were able to collaborate with one such platform, *ScholarOne Manuscripts* – a dataset of over 10-million original submissions and 15-million peer reviews performed by reviewers from around the world. There is no equivalent grant management platform operating at such a scale, with a similarly representative dataset. Unlike publishers, most funders tend to fund researchers in a single region and most of the largest funders prefer to use their own in–house tools, or bespoke adaptations of third party platforms. This makes sourcing centralized data at scale very difficult, particularly when factoring in the data privacy requirements of many funders.

Despite this knowledge gap, there have been some excellent academic articles examining the grant peer review process.[1] These articles have identified and highlighted a number of recurring issues in grant peer review.

For example, it is generally acknowledged that grant peer review can be at risk of cronyism, does not always support risky research and is under strain with an increasing number of applications to review and a busier–than–ever researcher schedule.

However, such findings are often derived from studies of specific funders or through small–medium scale interviews and surveys. There is a need for more quantitative data supporting these studies – to ascertain just how prevalent these issues really are, worldwide, and what, if any, other trends in grant peer review we might be missing. Perhaps most importantly, we need more information on what researchers themselves think and how they behave.

Aim of this report

The aim of our report is to address this knowledge gap, building on the invaluable work of previous studies – by carrying forward known issues and a shared language – whilst also bringing in new data to address the knowledge gap. We worked from a number of data sources (please see Appendix for further detail):

✓ **Researcher survey of 4,700 researchers**

✓ **Deep dive interviews with a sample set of surveyed researchers**

✓ ***Web of Science* and *InCites* datasets**

✓ **Interviews with a range of global funders**

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[1] See, for example: Banal–Estañol, A., Macho–Stadler, I. and Pérez–Castrillo, D., 2019. 'Evaluation in research funding agencies: Are structurally diverse teams biased against?". *Research Policy, 48*(7), pp.1823–1840; Guthrie, S., Ghiga, I. and Wooding, S., 2017. 'What do we know about grant peer review in the health sciences?' *RAND Europe*; Gallo, S.A., Sullivan, J.H. and Glisson, S.R., 2016. 'The influence of peer reviewer expertise on the evaluation of research funding applications'. *PLoS One*, 11(10); Shepherd, J., Frampton, G.K., Pickett, K. and Wyatt, J.C., 2018. 'Peer review of health research funding proposals: A systematic map and systematic review of innovations for effectiveness and efficiency'. *PloS One*, 13(5)

2

THE ROLE OF GRANT FUNDING IN THE RESEARCH LIFECYCLE

A word from the Institute for Scientific Information (ISI)

Peer review is and always has been integral to the research process. It not only acts as the filter by which valid research reports are admitted to the formal corpus of published articles, it also determines how research funds are allocated, aiming to ensure that limited funds are allocated to the most promising research proposals.

As part of the ISI report on the Plan S footprint,[1] we used data from *Web of Science* to understand the make-up of research that acknowledges grants from Plan S signatories. This analysis revealed the pervasive influence of funding organizations, with 60% of global research output acknowledging one or more sources of grant funding (Figure 3b).

Research in many countries is becoming more focused on social and economic policy, and under increased scrutiny from governments and from policy organizations. This occurs not only in natural sciences. Social science research is also coming under pressure to demonstrate its wider impact and 'return on investment'.

Transparency in determining research priorities is essential in ensuring continued public support for government funding of research. It is no longer sufficient to assert that research provides a public good when many other sectors, such as health and education, are under pressure to justify their funding. People want to know how research priorities are decided and the nature of the process that leads to funding decisions. Similarly, the evolution of research assessment provides feedback to other research sponsors – including charities and industry – on the value realized by their grant investments. Everywhere, there has been a rising demand to demonstrate the link between research funding and real-world impact. This means understanding the views of researchers and funders on the challenges of grant peer review, how the process can be improved and the impact of increased transparency.

This report will contribute to wider discussions and provide a set of analyses that can be built on.

**Jonathan Adams,
Director**

RESEARCH PROJECT CONCEPT / RESPONSE TO FUNDER CALL → GRANT APPLICATION → GRANT REVIEW → GRANT AWARD → RESEARCH PROJECT INITIATION → GRANT AWARD MANAGEMENT AND REVIEW → GRANT AWARD CLOSE-OUT → RESEARCH OUTPUT PUBLISHED → PUBLICATION DISSEMINATED AND CITED → GRANT AWARD EVALUATION → GRANT EVALUATION AGGREGATED IN FUNDER REPORTING → (back to RESEARCH PROJECT CONCEPT)

FIG.3A — THE RESEARCH LIFECYCLE, FUNDER FOCUS

[1] Quaderi, N., Hardcastle, J., Petrou, C. and Szomszor, M. (2019). The Plan S footprint: Implications for the scholarly publishing landscape – Web of Science Group. [online] Available at: https://clarivate.com/webofsciencegroup/campaigns/plan-s-footprint/ [Accessed 19 Aug. 2019]

The funder's influence

Funders are acknowledged on more than 60% of papers in *Web of Science* — for the Sciences this rises to over 70%.

Authors normally acknowledge direct grants from the funding organizations that supported their research as part of the publication process. *Web of Science* captures and processes the acknowledgements from indexed articles, which allows analysis of funding trends based on metadata from these articles. Figure 3B shows the proprotion of papers that have funder acknowledgments within *Web of Science*.

However, author behavior when acknowledging funding in a research output is different when compared to the outputs reported back to the funder. This can be seen when comparing funder acknowledgements in *Web of Science* indexed papers to the population reported to the funder and listed by them. To look at one UK based funder, 40% of papers listed by the funder do not acknowledge the funder in the body of the article, and 25% of papers that acknowledge the
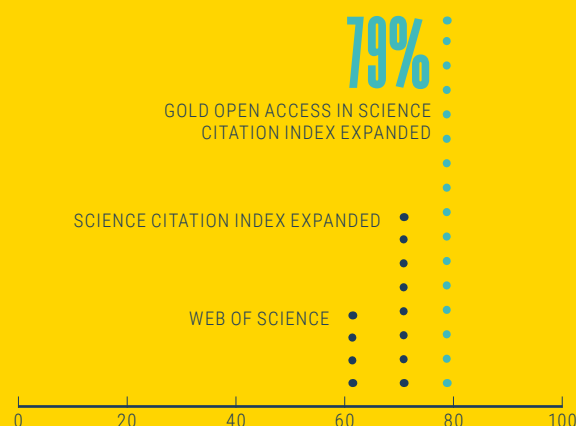
funder in the body of the article are not listed as an output by the funder. Differences seen in the following data could be driven, in part, by behavioral differences in acknowledgments.

At the country level there are also strong differences in the proportion of papers that acknowledge funding, with 90% of papers with an author from China acknowledging a funder, compared to c. 60% for those with an India or Italy based author (Figure 4).
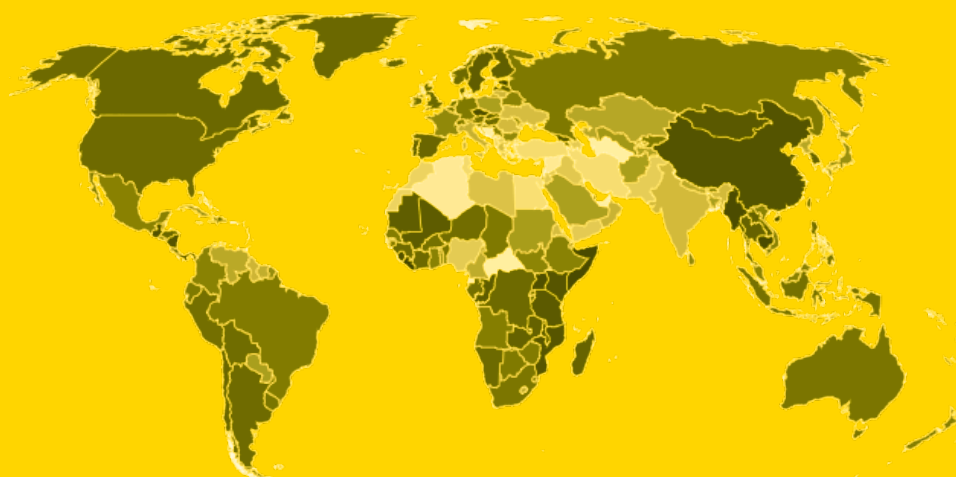
79%
GOLD OPEN ACCESS IN SCIENCE CITATION INDEX EXPANDED

SCIENCE CITATION INDEX EXPANDED

WEB OF SCIENCE

0   20   40   60   80   100

FIG.3B — PERCENTAGE OF 2018 ARTICLES & REVIEWS ACKNOWLEDGING ONE OR MORE FUNDERS
Data source: Web of Science

FIG.4 — GLOBAL RESEARCH OUTPUT ACKNOWLEDGING FUNDING
Data source: Web of Science

0%   100%

The internationalization of research funding

Most research acknowledges more than one funder. Research outputs that acknowledge funders based in different countries appear to be more highly cited than research that only acknowledges funders from one country.

Research is an increasingly international endeavor. In 2018, the proportion of internationally collaborative papers was 26%, which is reflected in the funding landscape.[1]

To further understand how this might impact the funding landscape we can look at papers which acknowledge funders based in different countries: 70% of papers acknowledging a Plan S funder also acknowledged at least one other funder.[1]

Taking the Australian Research Council (ARC) as an example, they were acknowledged on nearly 12,000 papers in 2018. Of these over 10% also listed the National Natural Science Foundation of China. Within the top 20 'collaborating funders' of the ARC, 17 are international and on average their papers have higher category normalized citations than papers that have domestic 'collaborating funders' (Figure 5).
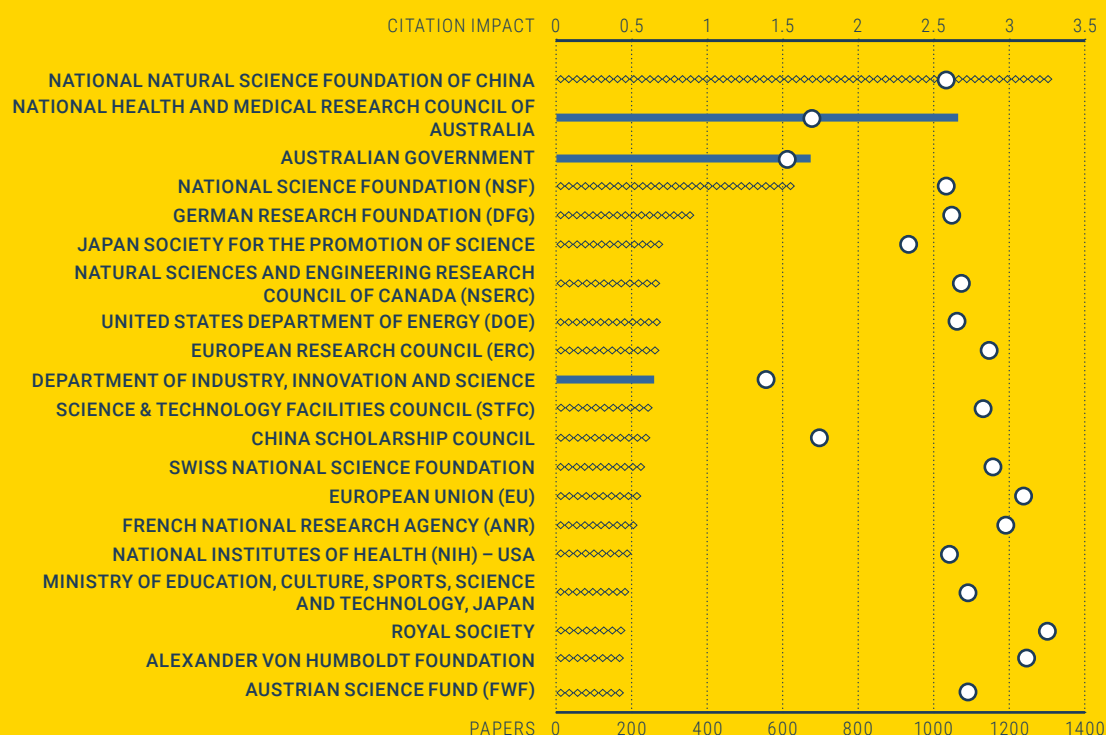

FIG.5 – AUSTRALIAN RESEARCH COUNCIL, TOP 20 COLLABORATING FUNDERS.
Data source: InCites

▬ *Domestic Funder: number of papers acknowledging funder*

◇◇◇ *International Funder: number of papers acknowledging funder*

○ *Category Normalized Citation Impact*

[1] Quaderi, N., Hardcastle, J., Petrou, C. and Szomszor, M. (2019). The Plan S footprint: Implications for the scholarly publishing landscape – Web of Science Group. [online] Available at: https://clarivate.com/webofsciencegroup/campaigns/plan−s−footprint/ [Accessed 19 Aug. 2019]

We additionally looked at the papers that acknowledge the National Natural Science Foundation of China and the US Department of Energy. For these funders we also see that papers that acknowledge a funder from another country tend to have a higher category normalized citation rate than research that acknowledges another domestic funder (Figures 6A & 6B).

Further research is required to explore this and compare the citation profile of papers that acknowledge funders from different countries to papers that have international collaboration between authors. This contemporary funding landscape – the internationalization of funding, and its prevalence across global research output – is the context in which the grant peer review process operates.
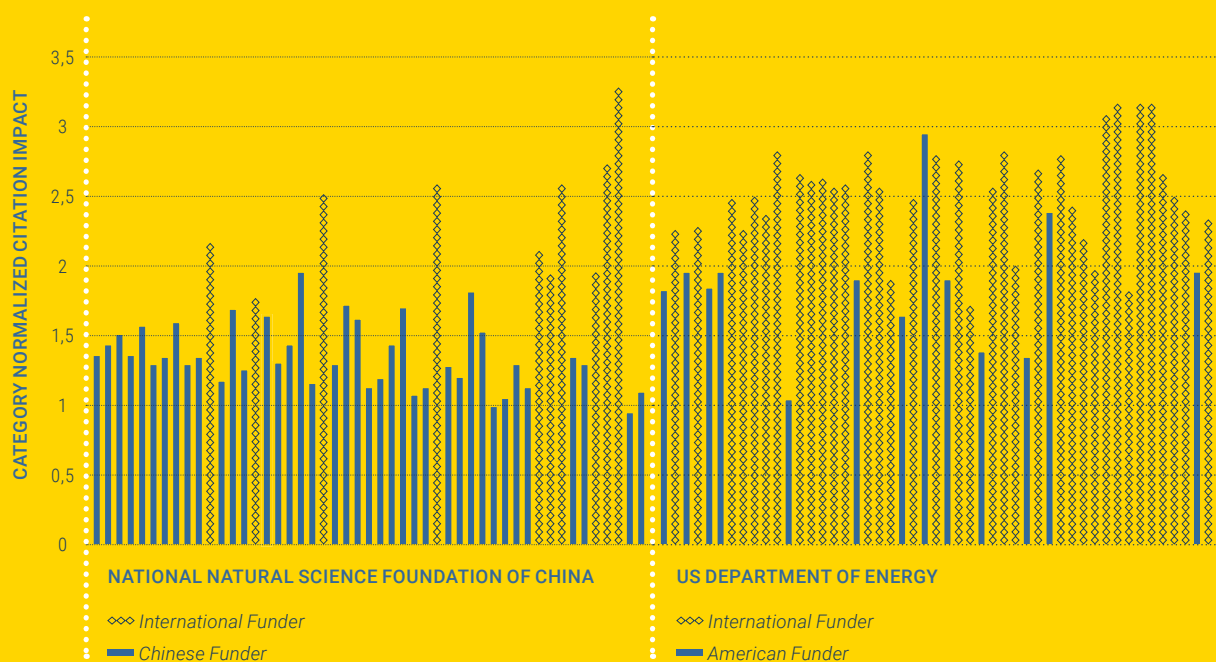
EDITORIAL COMMENTS

"For some funders, their principal objective is to fund potentially transformative and risky research. For these funders, to talk about 'Return on Investment' is not accurate, because by its very nature such research cannot be evaluated in this way. Measuring impact then poses a significant challenge."

Anand Desai, Research Office Policy and Assessment Advisor, Institute for Scientific Information (former Head of Evaluation and Assessment at the US National Science Foundation)

FIG.6A & 6B – COLLABORATING FUNDING AGENCIES

Data source: InCites

CATEGORY NORMALIZED CITATION IMPACT

NATIONAL NATURAL SCIENCE FOUNDATION OF CHINA

◇◇◇ *International Funder*
▬ *Chinese Funder*

US DEPARTMENT OF ENERGY

◇◇◇ *International Funder*
▬ *American Funder*

FUNDER INTERVIEW INSIGHTS

"The potential impacts that could have been generated by projects which were not funded is also of interest in ensuring the best research is being funded, but clearly this is far more challenging to assess [than funded projects]."

Julia Dickinson, Senior Strategy Advisor, UKRI

The importance of grant funding to researchers

Grant funding is of fundamental importance to researchers, many of whom see this as one of the most important factors in their research career.

FIG.7 — TOP FOUR ACHIEVEMENTS MOST COMMONLY CITED AS BEING IMPORTANT TO OVERALL CAREER SUCCESS

Data source: Publons' 2018 Global Reviewer Survey

Respondents identified the following factors as contributing most to overall career success from a list of 12 options: "getting published in respected journals"; "being highly cited in respected journals"; "securing grant funding"; and "general research, teaching or administrative work".

BEING PUBLISHED IN RESPECTED JOURNALS 53.4%

BEING HIGHLY CITED IN RESPECTED JOURNALS 27%

GENERAL RESEARCH, TEACHING OR ADMINISTRATIVE WORK 18.8%

SECURING GRANT FUNDING 35.9%

36%

of researchers consider securing grant funding one of the most important factors in their career
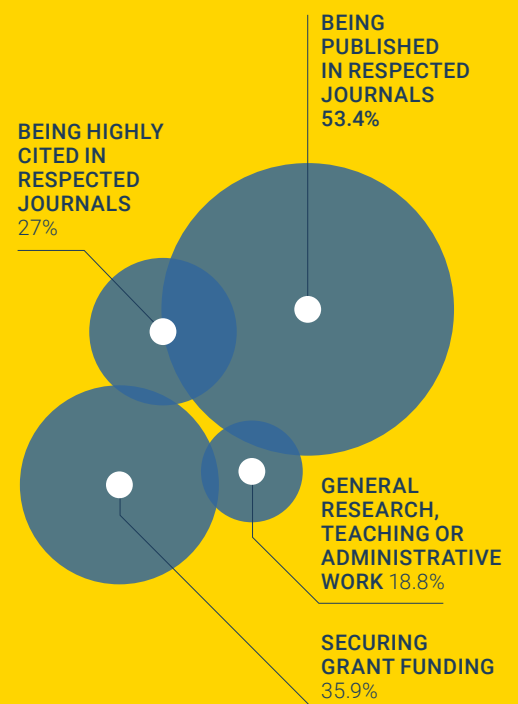
3

DEEP DIVE: THE GRANT REVIEW PROCESS

What do researchers think of peer review?

A majority of researchers agree that peer review remains the best method for ensuring the best research is funded whilst also agreeing that it can be less objective for early-career researchers.

78% of respondents strongly agree or agree with the statement that peer review of grant applications is the best method we have for ensuring we fund the best research (Figure 8). This support for the peer review process resonates with our previous findings from Publons 2018 *Global State of Peer Review* report, which focused on publication peer review. In our 2018 report we found that 98% of respondents considered publication peer review either important (31.2%) or extremely important (66.8%) for ensuring the general quality and integrity of scholarly communication.

78%

of respondents strongly agree or agree with the statement that peer review of grant applications is the best method we have for ensuring we fund the best research

FIG.8 — HOW STRONGLY DO YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENT ABOUT GRANT PEER REVIEW?

PEER REVIEW OF GRANT APPLICATIONS IS THE BEST METHOD WE HAVE FOR ENSURING WE FUND THE BEST RESEARCH

STRONGLY DISAGREE

DISAGREE

AGREE

STRONGLY AGREE

DON'T KNOW
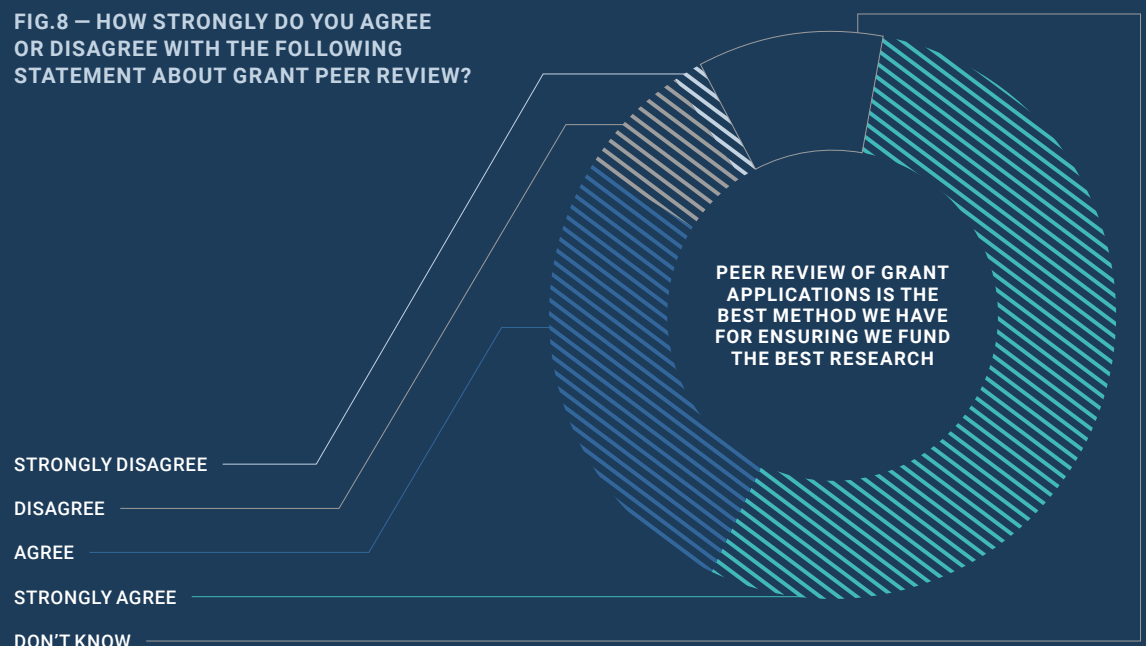
These views of survey respondents on grant peer review would seem to confirm the analysis of Jacob and Lefgren in their study of the impact of research grant funding on scientific productivity, where they argued that poor quality grant peer review had a negative impact on the research output of the relevant grant. They found that just a one standard deviation worse peer review score correlated with 15% fewer citations, 7% fewer publications, 19% fewer high–impact publications, and 14% fewer follow–on patents.[1]

...but peer review is not above reproach

The same respondents that felt peer review was the best method of funding research also identified significant issues with the process.

Nearly 50% of survey respondents do not believe that grant peer review treats applications from junior researchers with the same objectivity as more senior researchers, 45% disagree that it encourages innovative or risky research, and 35% disagree with the statement that peer review is fair and unbiased (Figures 9A & 9B). Additionally 40% of respondents that consider peer review to be the best way to allocate funding agree with these criticisms - that it is not objective towards early career researchers and does not encourage innovative research.

FUNDER INTERVIEW INSIGHTS

"The role of the reviewer is extremely important to us and we ask a lot of them – we are effectively asking these individuals to predict the future."

Sarah Collinge, Head of Research Funding Operations, Medical Research Council (MRC), UK

"Peer reviewing is essential to the quality of our evaluation process."

Matthias Egger, President of the National Research Council of the Swiss National Science Foundation (SNSF)

"Peer review is essential, with the reviewer's judgement of quality playing the most significant factor in determining who gets funded."

Research Funding Team, Royal Society Te Apārangi (New Zealand)

"We provide statistics against the make–up of each panel in terms of aspects such as gender and geographical balance. We always endeavour to have a better balance than the relevant research community."

Jose Labastida, Head of ERC Scientific Department

"[Peer review is an] imperfect system but I have found it to be rewarding, valuable, and important."

"I think it is the least worse way to allocate funding."

Anonymous survey respondents

[1] Jacob, B.A. and Lefgren, L., 2011. The impact of research grant funding on scientific productivity. *Journal of public economics*, 95(9–10), pp.1168–1177.

A number of alternative solutions have been proposed to address these issues. Here is one influential researcher in a recent post on *Nature Index*: "Research rankings by committee or peer review are notoriously unreliable. The same grant application that succeeds in one round might be rejected in the next. A fairer outcome could be achieved through a lottery system. Relying on the luck of the draw would reduce the influence of implicit human biases, such as risk–averse behaviour, and preferences for certain genders and races, on funding decisions."[1]

38% DISAGREE   **31% AGREE**

FIG.9A — GRANT REVIEW TREATS JUNIOR RESEARCHERS OBJECTIVELY

FIG.9B — SENTIMENTS ABOUT GRANT PEER REVIEW

GRANT REVIEW IS THE BEST METHOD OF ALLOCATING RESEARCH FUNDING

GRANT REVIEW TREATS JUNIOR RESEARCHERS OBJECTIVELY

GRANT REVIEW ENCOURAGES INNOVATIVE OR RISKY RESEARCH

GRANT REVIEW IS FAIR & UNBIASED

☐ Strongly Disagree   ☐ Disagree   ☐ Don't Know   ☐ Agree   ☐ Strongly Agree
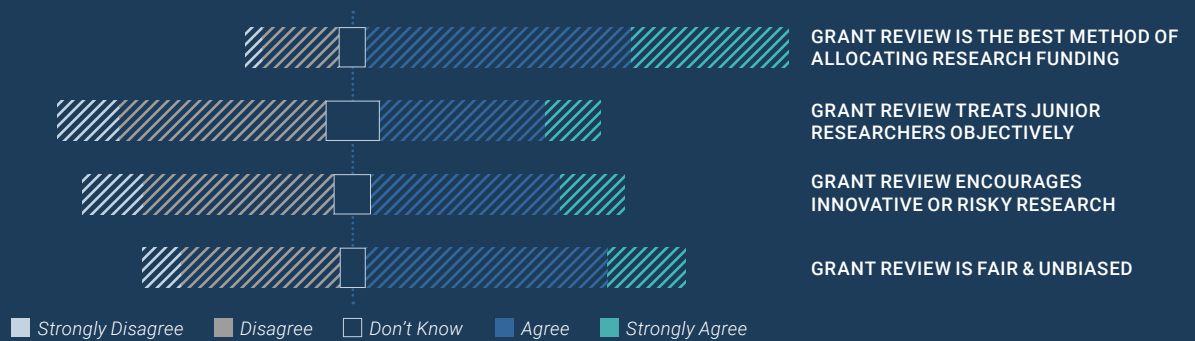
FIG.10 — EXPERIENCE OF GRANT PEER REVIEW

OVERALL SATISFACTION WITH PROCESS

TIME TAKEN FOR GRANT REVIEW

QUALITY OF GRANT REVIEW RESPONSES

TRANSPARENCY OF GRANT REVIEW PROCESS

OVERALL TIME & EFFORT REQUIRED

☐ Very Dissatisfied   ☐ Dissatisfied   ☐ Don't Know   ☐ Satisfied   ☐ Very Satisfied
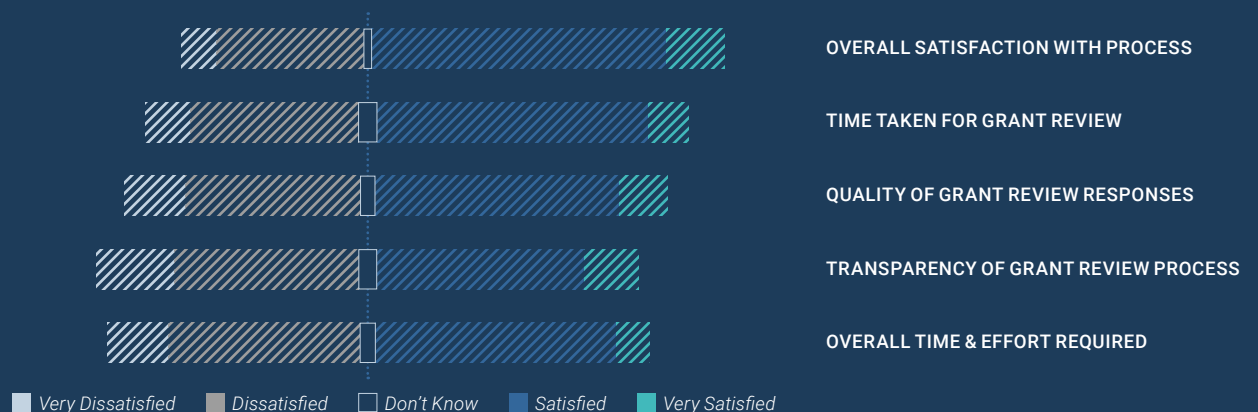
[1] Bishop, J. 2018. 'Luck of the draw', *Nature Index*

What do researchers think of the process?

Researchers are divided on the relative quality and efficiency of the grant peer review process, but there is a noticeable dissatisfaction with transparency.

Researchers seem generally dissatisfied with the time it takes to complete publication peer review,[1] but not grant peer review. This could be because of what is perceived to be at stake.

Researchers are least satisfied with the transparency of the grant peer review process, with nearly 50% of respondents saying they are dissatisfied with this part of the process (Figure 10). This theme is also reflected in areas for improvement covered later in this report.

RESEARCHER SURVEY COMMENTS

"My experience is that for major grants the reviewer pool is small and made up of those in an inner circle who have grants and review grants for each other. I'm not convinced that the processes are sufficiently fair or transparent."

"There is a desperate need for increased transparency and better feedback to applicants."

"The process needs to be more transparent."

Anonymous survey respondents

What proportion of grant applications get funded?

The grant process is highly competitive. The proportion of grant applications that are successfully funded varies significantly internationally and across funders. In research conducted for this report, we found that for most funders a range of between 10–25% of grant applications are funded, and that success rates are generally declining.

10-25%

of grant applications are funded, and success rates are generally declining.[2]

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[1] See Publons' 2018 *Global State of Peer Review* report

[2] Source: Funder Interviews, but see also grant peer review studies such as Guthrie, S., Ghiga, I. and Wooding, S., 2017. 'What do we know about grant peer review in the health sciences?' *RAND Europe*

How much time do funders spend on grant peer review?

In our interviews (see Funder interview insights) we found that funders spent between 2–6 hours finding reviewers for each grant application. We also found that funders had to invite at least three reviewers to secure 1 reviewer, and that the challenge of finding reviewers was only increasing – with reviewer supply unable to keep up with the growth in applications. Part of the challenge for funders is identifying reviewers without a conflict of interest and with the right, very specific expertise. This often means going beyond the immediate research centre – whether that is national or regional – and looking further afield, where the funder may not have a reliable network of contacts and must approach each prospective reviewer 'cold'.

A number of funders are actively looking at ways to address the challenge of finding reviewers, whether by investing in workflow tools to speed up the process of finding reviewers, or in promoting peer review to researchers – through training, new means of recognition and general advocacy of the importance of peer review to the broader community of which each researcher is a part.

FUNDER INTERVIEW INSIGHTS

"We spend approximately 1.5 to 2-days finding reviewers per application, and we have found we need to send out an ever–increasing number of invitations to obtain the required number of reviews."

Research Funding Team, Royal Society Te Apārangi (New Zealand)

"We are developing a text–mining–based computer system to support our Program Officers in the time–consuming job of finding reviewers."

Yasuhiro Iye, Executive Director, Japan Society for the Promotion of Science (JSPS)

"We see three very clear challenges in our peer review process: firstly, increasing the rate of accepted invitations to review; secondly, exploring new reliable resources of potential reviewers; and third; ensuring the reviews we commission are of the highest quality."

Unnamed official interviewee, Polish National Science Centre (NCN)

6 hrs
Average time spent finding reviewers for each grant application

3:1
Average number of reviewers invited to secure one review

7%
of global research and development spending comes from the top 20 funders identified by survey respondents

How much time do researchers spend on grant peer review?

Previous studies have found that as much as 60% of researcher time is spent sourcing funding as opposed to actually doing research.[1] Of course, these figures vary significantly across national research systems. They are also restricted to those researchers that do engage with grant applications - this excludes a significant population of researchers engaged in research where such competitive funding is less prevalent (Arts and Humanities research, for example).

As part of our survey we asked researchers how much time they estimated they spend engaging with funders (e.g. applying for grants, peer reviewing etc.). The average time spent was 28 days and the median 20 days per researcher per year. The average time spent on reviewing grant applications was 10 days per year.

FUNDER INTERVIEW INSIGHTS

"The growing needs of KAKENHI have resulted in the number of new applications exceeding one hundred thousand in recent years. The workload on the researchers who serve as reviewers is getting heavier. Our pressing concern is that if the burden on the reviewers keeps increasing to be excessive, it may seriously affect the reviewers' own research and educational activities, and may also result in deterioration of the quality of the review process."

Yasuhiro Iye, Executive Director, Japan Society for the Promotion of Science (JSPS)

"The local research community is small, so if we need to find the right expert reviewers, as well as those without a conflict of interest, we need to go beyond our national borders."

Arailym Akbolat, Kazakhstan National Center of Science and Technology Evaluation (NCSTE)

FIG.11 — 800+ FUNDERS REVIEWED FOR BY OUR SURVEY RESPONDENTS

878 FUNDERS ACROSS 95 COUNTRIES

0 ▢▢▢▢▢▢▢ 117
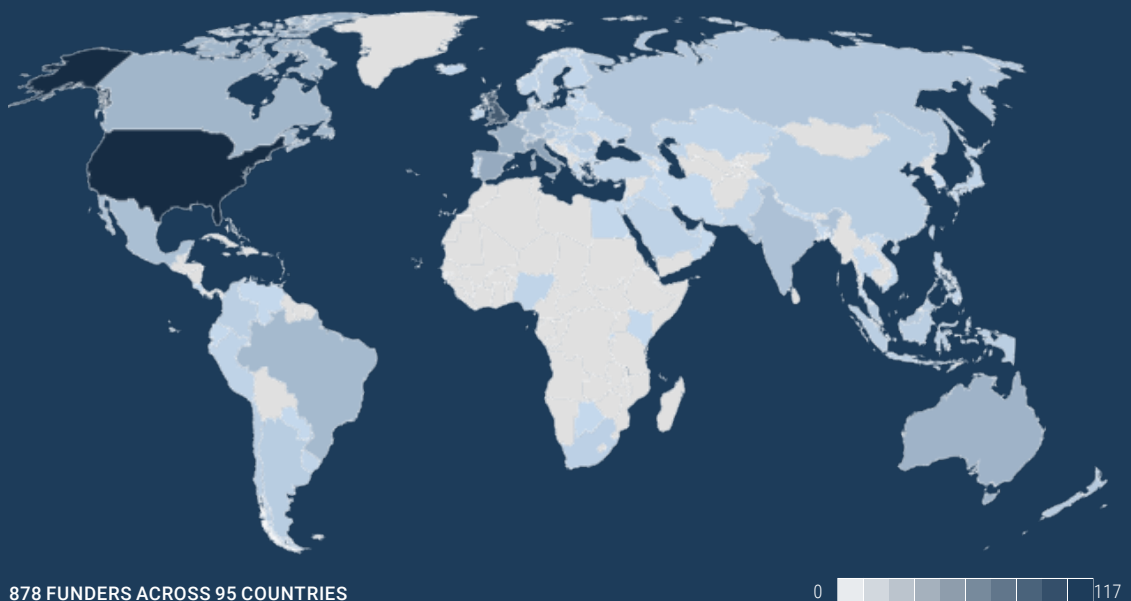
[1] Includes both submitting grant applications or reviewing them. See Guthrie, S., Ghiga, I. and Wooding, S., 2017. 'What do we know about grant peer review in the health sciences?' *RAND Europe*

An uneven distribution of reviewer workload

We asked reviewers to tell us how many grant applications they had reviewed. Appreciating that exact numbers would be difficult to recall, we asked reviewers for approximate bands. This indicated a large disparity in reviewer workload, with a consevertive assessment of this self-reported survey data indicating that just 4% of researchers contribute over 25% of all reviews (Figure 12).
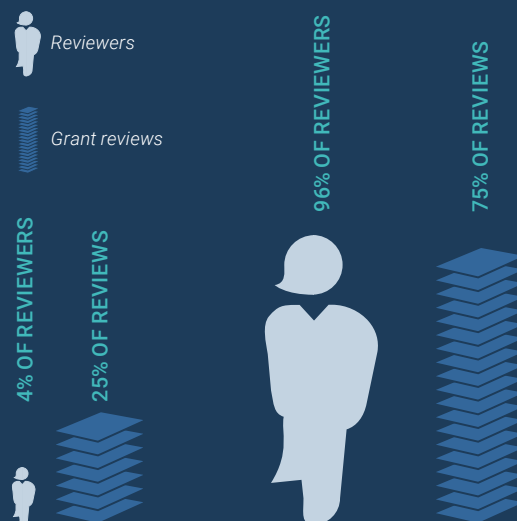

Reviewers

Grant reviews

4% OF REVIEWERS
25% OF REVIEWS
96% OF REVIEWERS
75% OF REVIEWS

FIG.12 — REVIEWING WORKLOAD

FUNDER INTERVIEW INSIGHTS

"To address the workload of each reviewer, we are working to reduce the number of reviews per reviewer. We are also reaching out to younger generations to recruit new reviewers."

Yasuhiro Iye, Executive Director, Japan Society for the Promotion of Science (JSPS)

"For our most recent round of reviews, 26.7% of reviewers had been invited to review for us before."

Research Funding Team, Royal Society Te Apārangi (New Zealand)

"The survey's reviewer workload figures resonate with our own experience, as we certainly reuse our pool of experts regularly. About one third of our reviewers at any time are those we have worked with before. We do this because we can be confident that they are reliable, working to the format and guidelines we require. Bringing in new experts requires considerable work training them on our rules and guidelines, which can result in misunderstandings and greater work from us preventing possible issues."

Arailym Akbolat, Kazakhstan National Center of Science and Technology Evaluation (NCSTE)

4%

of reviewers account for over 25% of all reviews undertaken.

How do funders encourage researchers to peer review?

Funders do offer financial remuneration for reviewers, but generally the amounts are seen as low.

Funders can pay cash to recognize researchers for their peer review contribution, but this is not always the case.

Most panel-based grant review appears to be 'paid' (although the difference between whether the value of the payments equate to 'expenses' versus 'fees' is in the eye of the beholder).

Individual grant review can also be both paid and voluntary, varying from one funder to another and in light of their particular context. For example, funders in emerging research nations, such as Kazakhstan, consider monetary payments an essential incentive to encourage international experts to review.[1]

A quantitative study of payment practices, both across and within panel and individual grant peer review practices, would be useful. However, this report is concerned not with the relative prevalence of cash payments, but instead to what extent they are considered as recognition for review and thereby a material means of motivation and encouragement. This focus on researcher motivation can provide more actionable insights to funders and the community at large.

When asked what types of recognition they had received for grant peer review, only 16%[2] of respondents explicitly mentioned receiving a cash payment as recognition for their peer review contribution. This is less than those who asserted they had received no recognition or reward at all from the funder (22%).

These results suggest that cash is not necessarily a motivating source of recognition. The supporting comments from respondents who had received cash payment indicated that these were largely seen as 'symbolic', modest amounts. Common references were to 'a small honorarium', 'a small fee' and a 'cash gift'. Those that cited the actual amount quoted between $50-$100 dollars. $150 was the highest figure quoted for a particular review. We explore this further in Incentives desired by researchers.

The most prevalent means of recognition was a thank you email, with 73% of respondents identifying this. 14% cited their acknowledgment on an online funder reviewer list, with the majority of these having also received a thank you email (Figure 13). Amongst a number of 'benefits-in-kind', several respondents mentioned one nourishing means of recognition: a box of chocolates.

Supporting comments from reviewers indicated that cash payments were largely seen as 'symbolic', modest amounts.

[1] Source: Funder Interview with the Kazakhstan National Center of Science and Technology Evaluation (NCSTE). The NCSTE see reviewer payment as a means of securing trust from sceptical foreign reviewers. Although they have never invited foreign reviewers without the offer of a fee, they have had cases where these reviewers waive their fees – being reluctant to exchange bank details with an unfamiliar organization.

[2] We expect that more than 16% of reviewers have received a cash payment from a funder. Looking at the online information for the top 20 funders as identified in our survey, at least 7 of them offer fees for both panel and individual grant review.

FUNDER INTERVIEW INSIGHTS

"At the MRC we recently identified our top reviewers, we wrote to thank them and encouraged them to inform the head of their university department. But this was really just a toe in the water in terms of improving our recognition offering for reviewers."

Sarah Collinge, Head of Research Funding Operations, Medical Research Council (MRC)

"In terms of reviewer recognition or rewards, we give our reviewers an honorarium. We do not publicly post the list of those who reviewed, but these reviewers are able to put their NASA review on their CV and in promotion documentation if they are not too specific."

Max Bernstein, SMD Lead for Research, National Aeronautics and Space Administration (NASA)

"Our panel members are paid, but we do not pay for individual remote reviews, or reviews done by 'remote referees'. We have experimented with cash payments for these reviewers, on a call in 2012, but we didn't see any significant differences in reviewer uptake or completion times."

"We communicate directly and frequently with our panel members, but the conversation with our reviewers is much more infrequent."
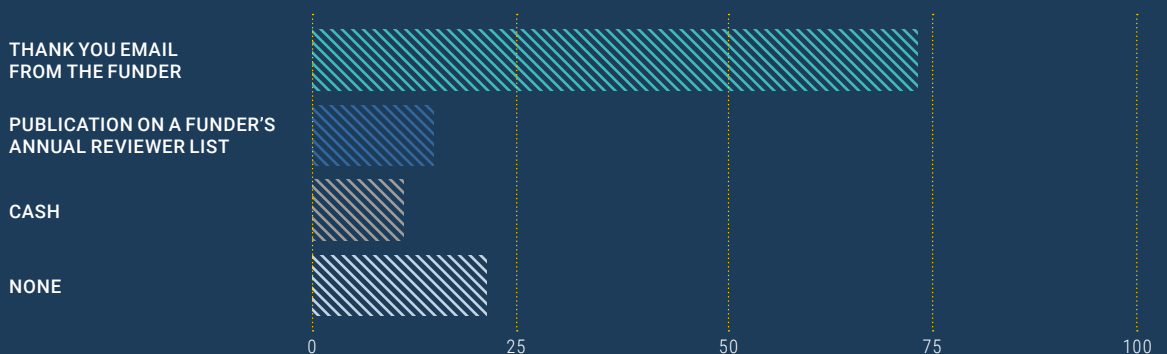
Jose Labastida, Head of ERC Scientific Department

"Usually we do not provide a financial reward for reviewers. However our system informs the reviewers about the outcome of the evaluation."

Matthias Egger, President of the National Research Council of the Swiss National Science Foundation (SNSF)

FIG.13 — PEER REVIEW RECOGNITION*

WHAT TYPES OF RECOGNITION HAVE YOU RECEIVED FOR GRANT PEER REVIEWS YOU CONTRIBUTED TO?

THANK YOU EMAIL FROM THE FUNDER

PUBLICATION ON A FUNDER'S ANNUAL REVIEWER LIST

CASH

NONE

0   25   50   75   100

"The 'thank you' message is typically computer generated, the granting organization could not care less."
Anonymous survey respondent

* Note that these figures will total more than 100%, since respondents may have received multiple types of recognition. See Appendix for methodology behind this chart.

Incentives Matter

Nearly half of reviewers are dissatisfied with the recognition they receive.

We asked reviewers how satisfied they were with their most recent experience as a grant reviewer, providing five options which included reviewer recognition, training and guidance, and clarity of communication within the process. We found that only 44% of reviewers were satisfied with the recognition they received for their grant peer review.

So why do, and why should, busy researchers still choose to peer review?

Community contribution is a more powerful motivator than personal benefit for grant reviewers.

We asked grant reviewers what motivated them to peer review, ranked these results, and compared them with the ranking of responses to the same question posed to publication peer reviewers in our 2018 report (Figure 14). A consistent theme across both grant and publication review is that motivations that could be described as for the greater good are more highly ranked than those focused on self–improvement such as career progression or improved writing style.

However, it is interesting to note slight differences in the responses between grant reviewers and

publication reviewers. Whilst both grant and publication reviewers see peer review as part of their role as a researcher, grant reviewers rank it being a voluntary service to their community much more highly compared to publication reviewers.

Keeping up with the latest trends in research also appeared a less important motivator for grant reviewers than publication reviewers. As one of our funder interviewees noted: "A publication peer review gives the reviewer a 3–6 months advance preview of an advance in their field. This is a highly motivating reason to review, but is not the case for grant peer review. You can't raid a grant application for ideas, given its early stage."[1] This is interesting when we consider the greater sensitivities around the publication of grant peer review, compared to publication peer review. Are these sensitivities less about the potential plagiarism of early stage research ideas and more reputational? This area requires further interrogation, particularly if grant review is to experiment with the Open Peer Review process currently being explored in publication review.[2]

FUNDER INTERVIEW INSIGHTS & RESEARCHER SURVEY COMMENTS

"We believe grant peer review is a responsibility for researchers as peers, but also as previous and prospective beneficiaries of KAKENHI."

Yasuhiro Iye, Executive Director, Japan Society for the Promotionof Science (JSPS)

"As academics, we should regard peer review as part of our service to our fields/ disciplines and colleagues and as a quid pro quo for review of our own applications."

Anonymous survey respondent

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[1] Interview with Eleanor Riley, Director of the Roslin Institute and experienced grant panel member

[2] See for example the scholarly publishers committing to opening up their peer review process in this public letter: https://asapbio.org/letter

Reason	Value	GRANT PEER REVIEW		JOURNAL PEER REVIEW
IT IS PART OF MY JOB AS A RESEARCHER	1093	1	—	1
AS A VOLUNTARY SERVICE TO MY FIELD / RESEARCH COMMUNITY	1022	2	↑	5
I WANT TO DO MY FAIR SHARE / RECIPROCATE FOR REVIEWS OF MY WORK	928	3	↓	2
TO ENSURE THE INTEGRITY AND EFFICACY OF RESEARCH FUNDED IN MY FIELD	880	4	—	4
TO KEEP UP TO DATE ON THE LATEST RESEARCH TRENDS IN MY FIELD	801	5	↓	3
TO DEVELOP PERSONAL REPUTATION & CAREER PROGRESSION	591	6	—	6
TO BUILD RELATIONSHIPS WITH FUNDERS / PUBLISHERS	425	7	↑	8
TO IMPROVE MY OWN WRITING SKILLS	414	8	↓	7

FIG.14 — REASONS FOR REVIEWING GRANT APPLICATIONS OR ACADEMIC PUBLICATIONS

Data Sources: Publons 2018 Global Reviewer Survey and Publons 2019 Grant Review Survey

When do researchers decline to peer review grants, and why?

The top reason researchers decline grant reviews is being too busy with other commitments.

The second most common reason for researchers declining grant peer review requests is due to the grant being outside their area of expertise. Our *Global State of Peer Review* report also identified expertise as an issue for publication peer reviewers. However, a greater proportion of publication peer reviewers decline reviews due to insufficient expertise than their grant reviewer counterparts. This implies either that funders are particularly good at targeting the right reviewers for their grant proposals, or that grant proposals are less specialized than publications, allowing a wider range of experts to contribute to the review process (Figure 15).

Conflict of interests, the number of other outstanding review requests, and review invitations from unknown sources, were similarly common reasons for rejecting at around 30% each.

FUNDER INTERVIEW INSIGHTS

"In our own analysis of peer review data, we found the most common reasons for rejecting review invitations were being too busy (61%) and outside of their expertise (17%)."

Sarah Collinge, Head of Research Funding Operations, Medical Research Council (MRC), UK

"In our own analysis of reviewer rejections, we found the most common reason (60% of reviewers) was that they 'do not have enough time'."

Matthias Egger, President of the National Research Council of the Swiss National Science Foundation (SNSF)

There is an important connection here to the challenge faced by funders in finding reviewers

Sarah Collinge, Head of Research Funding Operations at the Medical Research Council in the UK, called out the challenge of finding reviewers as a central issue in the grant process – "and an increasing one, which seems to be getting harder and harder.'' Sarah went further highlighting "the increasing integration and inter-granularity of research, which is resulting in more complicated applications. How do we engage reviewers with these applications? They are not within the usual type of applications our reviewers would be used to, so we need to reassure them that although they may not be able to review the application in its entirety, we still want their perspective."

The growth in interdisciplinary grant proposals was also highlighted by Jose Labastida, Head of ERC Scientific Department, as their 'biggest challenge', identifying the lower success rate of proposals which fall across panels and the need for the ERC to reexamine the way reviewers are allocated to such proposals and the make-up of their panels.

FUNDER INTERVIEW INSIGHTS & RESEARCHER SURVEY COMMENTS

"The most common reasons we find reviewers decline review invitations are either a conflict of interest or their schedule."

Max Bernstein, SMD Lead for Research, National Aeronautics and Space Administration (NASA)

"One of the main reasons for reviewers declining is that they don't consider themselves experts in the field. This comes second after the most common one which is that they don't have time."

Jose Labastida, Head of ERC Scientific Department

"[Reviewers should be] better matched with expertise."

"Nobody ever wants to pitch in to review interdisciplinary grant proposals because everyone thinks it's outside of their area. That suffocates all attempts to think outside the box."

"Increasingly I see people decline to review because they are "too busy". What happens when everyone is "too busy" and we end up scraping the bottom of the barrel for reviewers?"

Anonymous survey respondents

FIG.15 — REASONS FOR DECLINING REVIEW INVITATIONS

TOO BUSY WITH OTHER PROFESSIONAL COMMITMENTS

APPLICATION WAS OUTSIDE MY AREA OF EXPERTISE

0   25   50   75   100

Publication peer reviewers
Grant peer reviewers
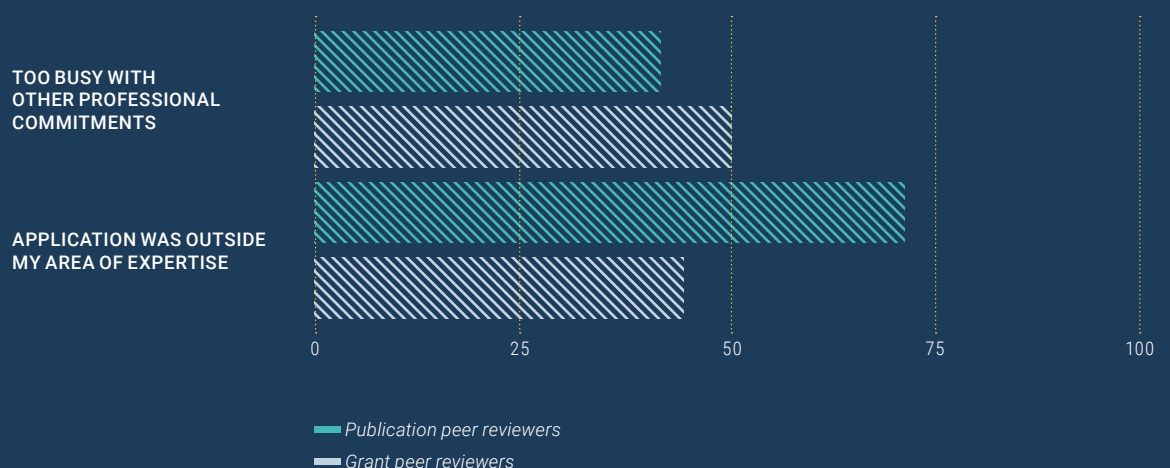
4

NEW HORIZONS IN GRANT PEER REVIEW

There have been on-going debates within the wider community on the continued relevance of peer review in the grant allocation process, given criticism that it is very costly and uses a large amount of researcher time. Our survey shows that researchers broadly feel that peer review is the best way to allocate grant funding. Beyond that though, our survey and funder interviews help to suggest some reforms to improve the grant peer review process.

A shift to greater transparency in grant peer review?

Researchers want to see greater transparency in the peer review process, and both funders and researchers think this could bring real benefits – but there are difficulties in implementation.

Researchers were least satisfied with the transparency of grant peer review, and broadly believe that methods to increase transparency would have a positive impact on the grant peer review process.

60% believe that more transparency of review identity would have a positive impact on grant peer review compared to only 40% for publication peer review.

70% believe that publishing peer review reports alongside grant awards would have a positive impact compared to 45% for publications.

60%

of respondents believe that more transparency of review identity would have a positive impact on grant peer review

FIG.16 — WHAT COULD IMPROVE EFFICIENCY IN THE GRANT REVIEW PROCESS?

MORE TRANSPARENCY OF REVIEWER IDENTITIES

PUBLICATION OF PEER REVIEW REPORTS ALONGSIDE GRANT AWARD NOTICES

CROWD-SOURCED OR PUBLIC PEER REVIEW SYSTEM

☐ *Very negative impact* ☐ *Negative impact* ☐ *Don't Know* ☐ *Positive impact* ☐ *Very positive impact*
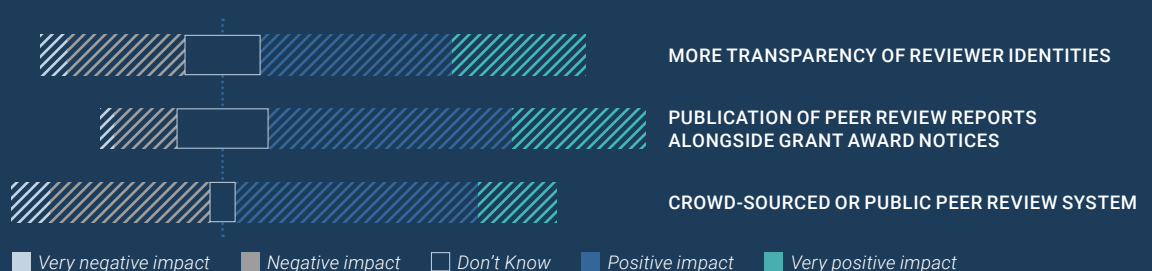
There is an increasing demand for funders to be seen as transparent in how they reach their funding decisions. In areas of political sensitivity they may be asked to justify their funding allocation post-hoc. More open peer review systems, such as by publishing peer review reports alongside the grant award, are seen as likely to have a positive impact by nearly 70% of our respondents. Setting this in the context of other findings in this report, we note both a potential challenge to such transparency and a possible solution. The challenge was well articulated by one of our funder interviewees:

"There are significant tensions involved in protecting the identity of reviewers yet also appearing transparent."[1]

The solution is suggested by the practice amongst some funders, as noted by 14% of our survey respondents, to openly publish reviewer names on their website. This is one step to increasing transparency, whilst preserving anonymity in regards to specific reviews. A further step might be to publish the reviewer reports, but anonymize the reviewer name. Such initiatives, if rolled out across multiple funders simultaneously, may also help address the related issue of reviewer recognition – by bringing the reviewer's important contribution into the public domain, where it can be independently verified, acknowledged and even assessed.

Greater transparency in the review process would also support the broader transparency and accountability of research funding as a whole, which we know policy–makers and governments are eager to promote.

"[There should be more] feedback for reviewers about the final decision."

Anonymous survey respondent

70%

of respondents believe that publishing peer review reports alongside grant awards would have a positive impact

FUNDER INTERVIEW INSIGHTS

"[Reviewers] want to know if the application they reviewed was funded or not. Otherwise the reviewer has no idea if their comments were appropriate or not. Closing this loop actively helps them in their own future grant application process – and as such is a key motivator for reviewing."

Eleanor Riley, Director of the Roslin Institute and experienced grant panel member

"We are making efforts to ensure greater transparency in our funding process, by disclosing the review results and by publishing a list of reviewers when their term of appointment ends."

Yasuhiro Iye, Executive Director, Japan Society for the Promotion of Science (JSPS)

[1] Interview with official representative from the Association of Medical Research Charities (AMRC), UK

A call for clearer guidelines and more reviewer training

Most of our respondents believe that improved training for grant reviewers would improve the overall efficacy of the process, which is backed up by our funder interviews.

When asked what initiatives could have a positive impact on the overall efficacy of the grant review process, 87.8% of survey respondents said more peer review training would have a positive or very positive impact, and 85.6% said that better communication between all parties would have a positive or very positive impact (Figure 17).
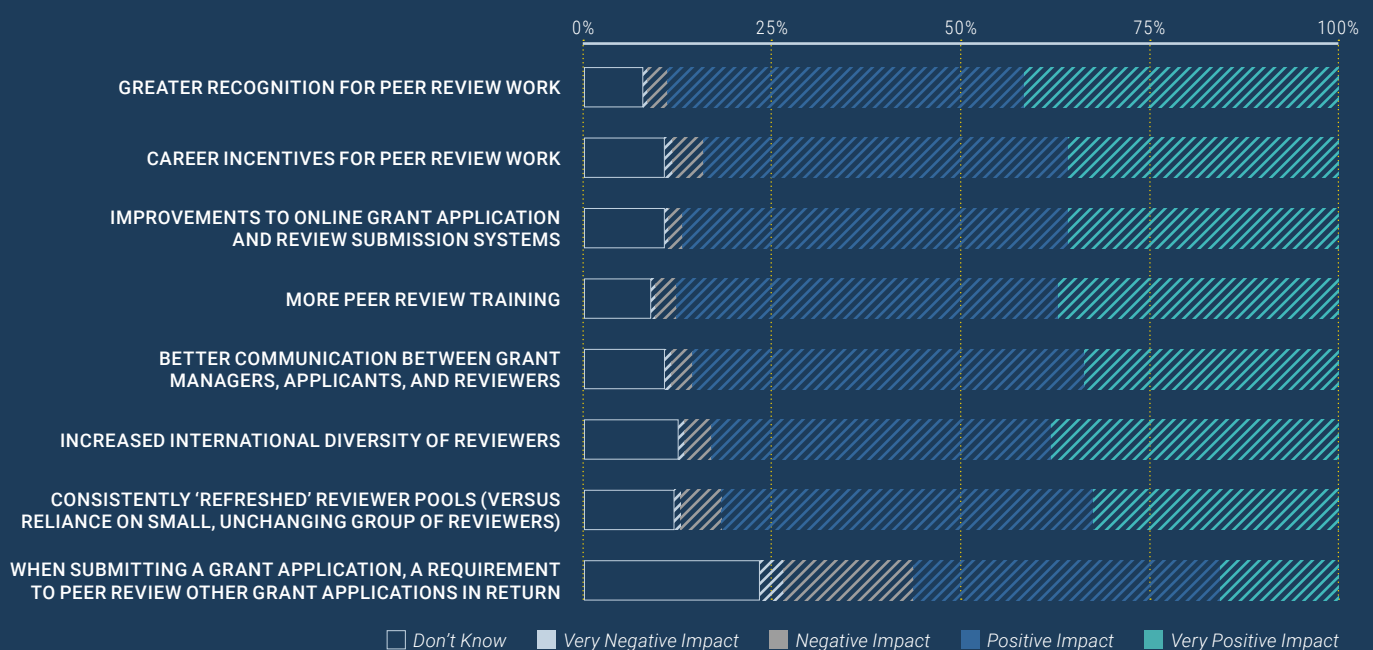
FUNDER INTERVIEW INSIGHTS

"The training of peer reviewers is very important."

Matthias Egger, President of the National Research Council of the Swiss National Science Foundation (SNSF)

"A lot of researchers decline a review invitation because they feel they don't know everything within the grant application. Improved guidance from the funder could help hugely here, to encourage people to review where they can. There is also often nervousness from a researcher on the time a review might take. If a funder simply qualified their invitation by saying we would expect this to take, for example, no more than 3 hours of your time, that would make a huge difference."

Eleanor Riley, Director of the Roslin Institute and experienced grant panel member

FIG.17 – HOW COULD THE GRANT REVIEW PROCESS BE IMPROVED?

Legend:
- ☐ Don't Know
- Very Negative Impact
- Negative Impact
- Positive Impact
- Very Positive Impact

Categories:
- GREATER RECOGNITION FOR PEER REVIEW WORK
- CAREER INCENTIVES FOR PEER REVIEW WORK
- IMPROVEMENTS TO ONLINE GRANT APPLICATION AND REVIEW SUBMISSION SYSTEMS
- MORE PEER REVIEW TRAINING
- BETTER COMMUNICATION BETWEEN GRANT MANAGERS, APPLICANTS, AND REVIEWERS
- INCREASED INTERNATIONAL DIVERSITY OF REVIEWERS
- CONSISTENTLY 'REFRESHED' REVIEWER POOLS (VERSUS RELIANCE ON SMALL, UNCHANGING GROUP OF REVIEWERS)
- WHEN SUBMITTING A GRANT APPLICATION, A REQUIREMENT TO PEER REVIEW OTHER GRANT APPLICATIONS IN RETURN

A demand for greater recognition from funders

Researchers are strongly in favour of more explicit recognition for peer reviewers, they also rate explicit recognition for their university or employer as the factor which would make them more likely to undertake grant peer review.

In addition to our earlier analysis of researcher perspectives on current and proposed incentives (Figure 17), we explicitly asked researchers if funders should do more to recognize peer review: 80.9% thought they should.

RESEARCHER SURVEY COMMENTS

"[We could establish] an international record for grant peer review, similar to the editorial list that we have in scientific journals."

"Peer review should be explicitly valued by funding agencies as a merit as good as publications...[currently] it counts for nothing neither CV–wise, nor career–wise or to apply for funding or a job. It is simply NOT a merit."

"Closer work [is needed] with universities, institutes and departments, in order to make the review work more recognizable and included as normal work time and valued for work evaluation."

"Reviewers need way more recognition."

"[Grant review should] be equally important as publications. As a scientific communication and exchange in the field."

Anonymous survey respondents

89%

of respondents believe that greater recognition of grant peer review work would improve the grant peer review process

81%

of respondents believe that funders should do more to explicitly recognize peer review contributions

Incentives to encourage researchers to review

Cash incentives came 6th in a list of initiatives that would make researchers more likely to review, whilst better recognition comes top.

When looking at what would make researchers more likely to review grant applications, better recognition comes top, followed by information about grant outcomes and then systems to track peer review history and metrics.

We deliberately did not ask researchers to choose a limited number to allow for multiple choices. It is therefore particularly surprising that cash still ranked so low in these responses – 6th on the list of initiatives that would make researchers more likely to review.

This tallies closely with the results of a similar question from the *Global State of Peer Review* report, which found that more explicit recognition of peer review contributions from universities or funders was selected by 45% of respondents as something that would make them more likely to accept peer review requests from journals.

FUNDER & RESEARCHER INTERVIEW INSIGHTS

"We suspect that the honorarium is not a strong incentive, but that most of our reviewers participate out of a sense of duty."

Max Bernstein, SMD Lead for Research, National Aeronautics and Space Administration (NASA)

"Grant review is an unsung service, yet grant reviewers have a considerable responsibility – deciding if the application under review is really the best way to spend the funder's money. Will this make a difference in people's lives? Is it worth the effort? This is an important service and some credit should be given to grant reviewers."

Koye Oyerinde, former Columbia University professor and team leader for Needs Assessments at AMDD

FIG.18 – WHAT ENCOURAGES REVIEWERS TO REVIEW?

MORE EXPLICIT RECOGNITION OF PEER REVIEW CONTRIBUTIONS FROM UNIVERSITIES OR EMPLOYERS

MORE EXPLICIT RECOGNITION OF PEER REVIEW CONTRIBUTIONS FROM FUNDERS

MORE INFORMATION ABOUT WHAT HAPPENED TO THE GRANT I REVIEWED

AN ONLINE RECORD OF GRANT PEER REVIEW HISTORY WITH CERTIFICATES AND METRICS ACROSS ALL FUNDERS

FUNDER FEEDBACK ON THE QUALITY OF MY REVIEW

CASH OR IN–KIND PAYMENTS

IF REVIEW REQUESTS WERE MORE CLOSELY ALIGNED WITH MY RESEARCH EXPERTISE

PERSONAL ACCESS TO THE PUBLISHED OUTCOMES OF THE GRANT

What's in it for funders?

If funders can identify the means of providing greater recognition to their reviewers, they will realize material benefits to the grant peer review process.

When asked what would make them more likely to review grant applications, we found 'more explicit recognition of peer review contributions from funders' amongst the most popular responses (54.8%), behind only 'more explicit recognition of peer review contributions from universities or employers' (Figure 18).

55%

of reviewers said that greater recognition from funders would make them more likely to review for them

FUNDER INTERVIEW INSIGHTS

"The biggest problem is encouraging people to review grants. Anything that can be done to support this would be very helpful. The process is certainly not perfect as it is – every reviewer that declines to review gets you further away from the most expert reviewers for the application in hand. There is a real danger we lose quality in the process if we do not address this."

Eleanor Riley, Director of the Roslin Institute and experienced grant panel member

"Offering greater recognition to reviewers is definitely something we see changing in the future, and supporting increased transparency."

Unnamed official interviewee, Association of Medical Research Charities (AMRC), UK

RESEARCHER SURVEY COMMENTS

"Funders could improve transparency by publishing a pool of reviewers – as journals currently do – at the end of each year."

"Lack of recognition to grant reviewers is one of the factors causing some reviewers to turn down the offer to review."

"The effort is sometimes not worth it: you only get a one line [thank you] email!"

"[A] Peer Reviewing Index should be established to encourage reviewers."

Anonymous survey respondents

APPENDIX

A NOTE ON OUR RESEARCHER SURVEY AND DATA SOURCES

Our researcher survey was completed by researchers registered on Publons, a platform enabling researchers to track their publications, citation metrics, peer reviews, and journal editing work in a single profile. There are over 1.9-million researchers on Publons and we invited a sample of nearly 100,000 (c. 6%) of these researchers to complete our survey.

These users are opted into the most frequent cadence of correspondence from Publons. Most of these users created a Publons profile as a means of tracking their publication peer review activity – 74% have at least one such record against their profile. (Given the grant review experience subsequently identified by survey responses, this is a telling insight into the crossover of grant and publication peer reviewers, with journals and funders competing for researcher attention.)

We received 4,700 responses. This is the most extensive researcher survey of grant peer review to date and this sample allows us to understand the trends that are happening within grant peer review. On starting the survey, respondents where asked to self-select their experience with grant peer review: around 30% of respondents had not applied for grants or reviewed for them and were therefore asked relevant questions on their general opinions; 20% had applied for grants but not reviewed them; and the remainder had both applied for grants and reviewed them.

The respondents to our survey are not representative of the global research community, but driven by the Publons user base, those who met the selection criteria for our survey sample and those who decided to answer the survey. Looking at the geography of where people were based, 40% of our respondents came from

Europe (including the UK), 13% from the USA and only 2% from China. This is very different to the global make up of researchers and funders. However, the internationalization of research funding is certainly apparent in the funders these predominantly European and North American researchers reviewed for. As illustrated in Figure 11, the funders these researchers had reviewed for were spread across 95 countries worldwide. Below is a breakdown of these funders by region.

REGION	% OF FUNDERS CITED
Europe	49.6%
North America	18.8%
Latin America	9.7%
Association of Southeast Asian Nations	5.0%
Australasia	4.7%
Middle East and North Africa	4.7%
Indian Subcontinent	3.0%
Greater China	2.6%
Africa	1.6%
Unknown	0.30%
Russia & the Commonwealth of Independent States	0.10%

According to 2015 UNESCO statistics, over 32% of global researchers reside in North America and Europe, two regions which collectively provided over 50% of our responses. These same UNESCO statistics also identify 28% of global researchers as female, whilst in our survey 24% of respondents identified as female. Our respondents had an average of 7 years grant peer review experience, and 9 years grant application experience. They had reviewed an average of 22 grants and been awarded an average of 7 grants.

The graphs published in this report are either pulled directly from multiple choice survey questions or were combined with free−form comments solicited from respondents. For example in Figure 13, 'Cash' was not an explicit option in the survey, so the figures against this were calculated based on the write in comments from respondents and therefore is likely to under represent the prevalence of cash payments (as also noted in the supporting text).

There is no equivalent to the centralized peer reviews system which operate in the journal publishing space. Statistics such as those on reviewer workload and number of reviewer requests required for a successful reviewer invitation are based on self-reported figures from the survey or funder interviews.

The funder in focus

Global research and development spending is forecast to exceed $2.3-trillion in 2019.[1] This total includes research and development spend by corporations and other private enterprises whose share has been increasing rapidly,[2] in addition to spend by governments and non−profit organizations like the Wellcome Trust. The focus of this report is on academic research which mainly takes place at universities and research institutions and is predominantly funded either via governments or private non−profit research funders. These funders contribute to the bulk of research funding. Corporate−affiliated authors

make up just 3% of the published research.

The funding landscape for academic research is varied, based on national, regional and subject differences. For example, within the United Kingdom government funding is split between block grants to universities based on the Research Excellence Framework (REF), the UK's national assessment exercise, and individual research grants, whereas in the United States more of the cost of research is funded by individual research grants. Within this report we focus on competitive grants for academics at research institutions, looking at those funders whose grants are explicitly acknowledged by researchers when looking at data from *Web of Science*, and those whose peer reviewers completed our survey.

The funders our surveyed researchers engage with

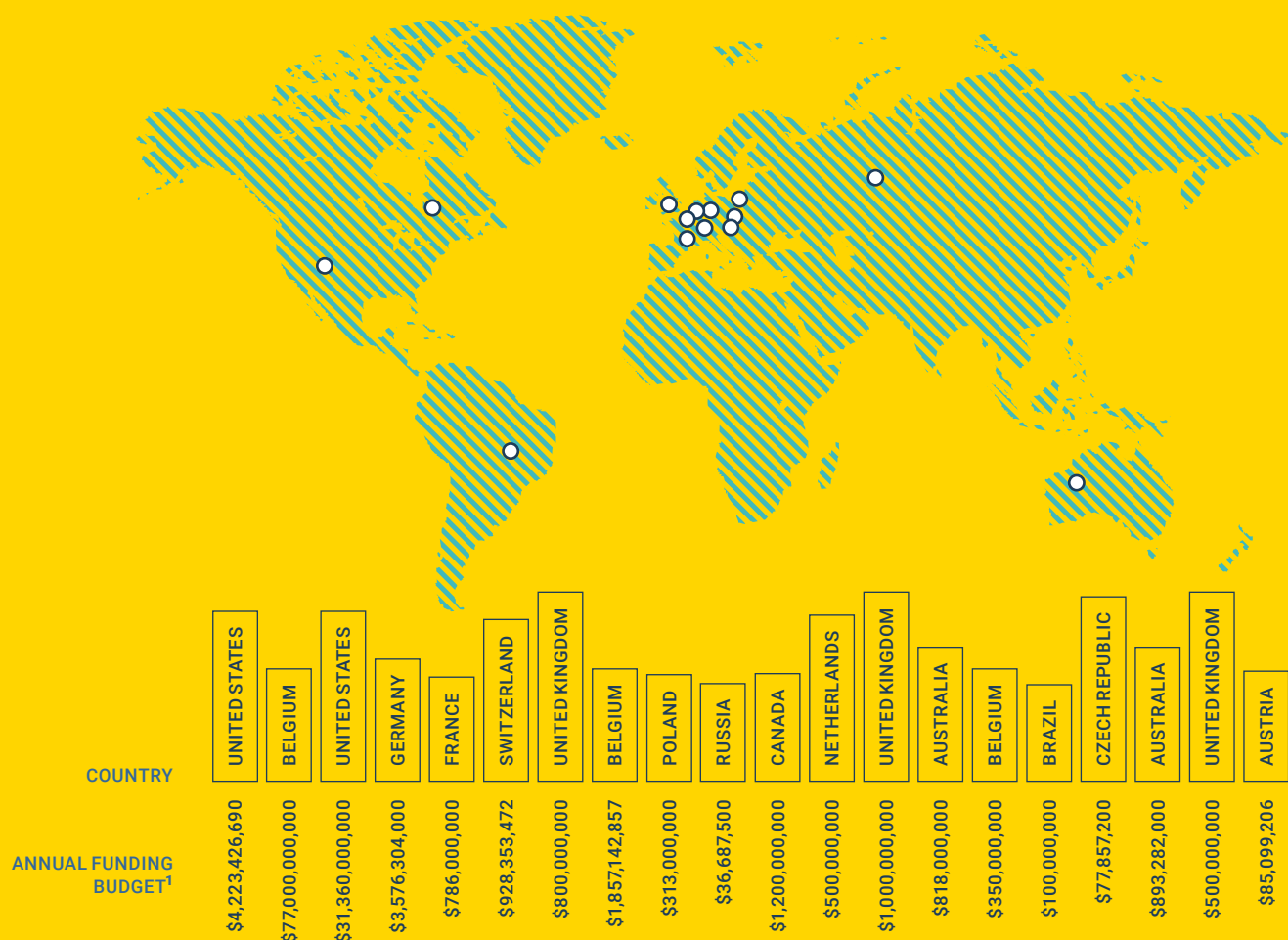The respondents had reviewed or applied for grants from 878 funders spread across 95 countries.

We selected the top 20 funders from this list (as measured by respondent engagement). Below is a summary of their key information. They represent a total annual research budget of $126 billion (c. 7% of global Research & Development funding). They also appear in over 30% of research output associated with a funding body.[3]

[1] R&D Magazine – 2019 Global R&D Funding Forecast

[2] Merivs, J. 2017. 'Data check: U.S. government share of basic research funding falls below 50%', *Science Online*

[3] Source: *Web of Science*

TOP 20 FUNDERS, RANKED BY VOLUME OF REVIEWS ACKNOWLEDGED BY PUBLONS USERS

RANKING	FUNDER	COUNTRY	ANNUAL FUNDING BUDGET[1]
1	NATIONAL SCIENCE FOUNDATION (US)	UNITED STATES	$4,223,426,690
2	EUROPEAN UNION	BELGIUM	$77,000,000,000
3	NATIONAL INSTITUTES OF HEALTH (NIH)	UNITED STATES	$31,360,000,000
4	GERMAN RESEARCH FOUNDATION (DFG)	GERMANY	$3,576,304,000
5	AGENCE NATIONALE DE LA RECHERCHE (ANR)	FRANCE	$786,000,000
6	SWISS NATIONAL SCIENCE FOUNDATION (SNSF)	SWITZERLAND	$928,353,472
7	MEDICAL RESEARCH COUNCIL (MRC)	UNITED KINGDOM	$800,000,000
8	EUROPEAN RESEARCH COUNCIL (ERC)	BELGIUM	$1,857,142,857
9	NATIONAL SCIENCE CENTRE (NCN)	POLAND	$313,000,000
10	RUSSIAN SCIENCE FOUNDATION (RSF)	RUSSIA	$36,687,500
11	NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL (NSERC)	CANADA	$1,200,000,000
12	NETHERLANDS ORGANISATION FOR SCIENTIFIC RESEARCH (NWO)	NETHERLANDS	$500,000,000
13	ENGINEERING AND PHYSICAL SCIENCES RESEARCH COUNCIL (EPSRC)	UNITED KINGDOM	$1,000,000,000
14	AUSTRALIAN RESEARCH COUNCIL (ARC)	AUSTRALIA	$818,000,000
15	RESEARCH FOUNDATION – FLANDERS (FWO)	BELGIUM	$350,000,000
16	NATIONAL COUNCIL FOR SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT (CNPQ)	BRAZIL	$100,000,000
17	CZECH SCIENCE FOUNDATION (GACR)	CZECH REPUBLIC	$77,857,200
18	NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL (NHMRC)	AUSTRALIA	$893,282,000
19	BIOTECHNOLOGY AND BIOLOGICAL SCIENCES RESEARCH COUNCIL (BBSRC)	UNITED KINGDOM	$500,000,000
20	AUSTRIAN SCIENCE FUND (FWF)	AUSTRIA	$85,099,206

Almost 30% of grant review contributions from our survey respondents came from these top 20 funders alone.

[1] Publicly sourced from websites and/or reports.

Interviews with a range of global funders

We interviewed 11 individuals from a range of funders with a collective annual budget of c. $20-billion.

INTERVIEWEE	FUNDER	COUNTRY	ANNUAL GRANT BUDGET
Matthias Egger, President of the National Research Council	Swiss National Science Foundation (SNSF)	Switzerland	$985 million
Sarah Collinge, Head of Research Funding Operations	Medical Research Council (MRC)	UK	$925 million
Julia Dickinson, Senior Strategy Advisor	UK Research and Innovation (UKRI)	UK	$9.2 billion
Yasuhiro Iye, Executive Director	KAKENHI, Japan Society for the Promotion of Science (JSPS)	Japan	$2.1 billion
Eleanor Riley, Director of the Roslin Institute and experienced grant panel member	Reviewed (panel or applications) for UK Research and Innovation, National Institutes of Health (US), the CNRS (France), the EU and the Wellcome Trust (UK)	UK, US, France and EU	Various
Unnamed official interviewee	Association of Medical Research Charities (AMRC), UK	UK	$1.1 billion
Arailym Akbolat	The National Center of Science and Technology Evaluation (NCSTE)	Kazakhstan	$1.6 billion
Research Funding Team	Royal Society Te Apārangi	New Zealand	$100 million
Jose Labastida, Head of ERC Scientific Department	European Research Council (ERC)	Europe	$2.2 billion
Unnamed official interviewee	National Science Centre (NCN)	Poland	$300 million
Max Bernstein, SMD Lead for Research	National Aeronautics and Space Administration (NASA)	US	$600 million

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