



EUROPE

The changing research landscape and reflections on national research assessment in the future

Executive Summary

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A national retrospective assessment of research is carried out in the United Kingdom every five to seven years. This exercise assesses research in all disciplines across the country and is used to allocate funding to higher education institutions (HEIs). While the preparation and execution of these exercises continues, the research landscape is changing as technology advances, public policy develops and the international environment shifts. Research England commissioned RAND Europe to conduct a study to understand the direction of change within the research system in order to explore how national research assessments may need to adapt. It considers factors such as the international environment,

technological advances and public policy developments.

This report provides an in-depth analysis of the views gathered from the sector and existing literature. It is intended for the research community, those leading and managing HEIs, and those funding and evaluating research in the United Kingdom and internationally.

ES.1 What is this study about?

The purpose of this study was to explore how the research landscape and research assessment may be affected by trends in the international environment, technological advances and public policy developments in

the next 5 to 10 years. It considers the current system and possible changes to the research environment in the future in relation to the following questions:

- Why do we assess research and how might that change in the next 5 to 10 years?
- How do researchers expect the forms of output they are producing to change in the next 5 to 10 years?
- How do researchers expect the types of societal impact their research produces to change in the next 5 to 10 years?
- How do researchers expect the research environment they are in to change in the next 5 to 10 years?
- How could national research assessment exercises learn from developments in peer review?

The study used a mixed-methods approach to gather a wide range of evidence that could be triangulated. It consisted of four rapid evidence analyses of academic and grey literature (each focusing on a different theme); a survey of over 3,600 researchers from across England (see Figure ES.1 and Table ES.1 for

the distribution of respondents by geography, career stage and discipline); views on the key questions from representative bodies across the sector associated with academic research; and three workshops with representatives from the government and national funding bodies, organisations that fund research, the higher education sector, academics, academic publishing houses, and experts in emerging technologies (with each workshop focussing on a different theme). The relationship between the methods used and the key questions is summarised in Table ES.2. A detailed explanation of the methods, including limitations, can be found in the full report.

ES.2 Why do we assess research and how might that change in the next 5 to 10 years?

Key findings:

- The reasons for doing research assessment can be summarised by six 'A's: analysis, advocacy, allocation, accountability, acclaim and adaptation.

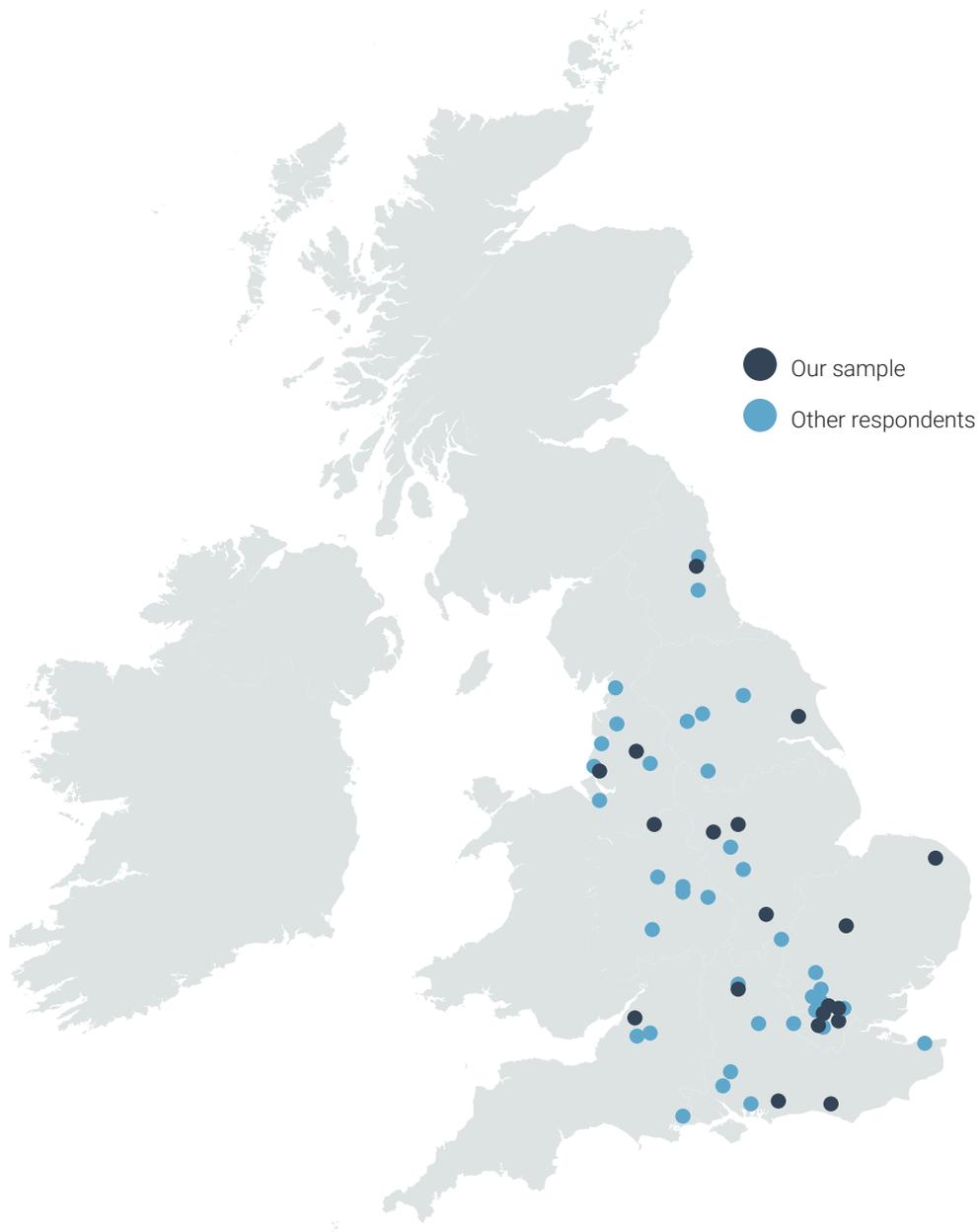
Table ES.1: Distribution of respondents participating in the survey by discipline and career stage

| Discipline ¹ | Number of respondents | Career stage ² | Number of respondents |
|--|-----------------------|--------------------------------|-----------------------|
| Medicine, health and life sciences | 1,409 | PhD Student | 896 |
| Physical sciences, engineering and mathematics | 955 | Early-career researcher | 1,045 |
| Social sciences | 664 | Mid-career researcher | 804 |
| Arts and humanities | 582 | Established researcher | 955 |
| Interdisciplinary | 126 | Retired or emeritus researcher | 47 |
| Unknown | 32 | Unknown | 21 |

1 We used REF 2021 units of assessment (UoAs) and main panels as a proxy for disciplines by which to interrogate the analysis. Main Panel A: medicine, health and life sciences; Main Panel B: physical sciences, engineering and mathematics; Main Panel C: social sciences; and Main Panel D: arts and humanities. Respondents were assigned to a main panel based on the main UoA they reported that represented them. They are classified as interdisciplinary if they selected two main UoAs that spanned multiple main panels. 'Unknown' indicates that the respondent did not fill in this question.

2 Career stage was self-reported. 'Unknown' indicates that the respondent did not fill in this question.

Figure ES.1: Locations of researchers participating in the survey



- The reasons for assessing research are understood and interpreted differently by different stakeholders.
- The rationale for, and emphasis of, research assessment is likely to evolve in the future.

There are many reasons for assessing research. This study expands on the four 'A's previously described in the literature³ – accountability, advocacy, analysis, and allocation – by adding two further 'A's: acclaim and adaptation (Box ES.1).

Table ES.2: Methods used to address the key questions

| | | Questions | | | | |
|----------------------------|---|--|---|---|---|--|
| | | Why do we assess research and how might that change in the next 5 to 10 years? | How do researchers expect the forms of output they are producing to change in the next 5 to 10 years? | How do researchers expect the types of societal impact their research produces to change in the next 5 to 10 years? | How do researchers expect the research environment they are in to change in the next 5 to 10 years? | How could national research assessment exercises learn from developments in peer review? |
| Rapid evidence assessments | Reasons for research assessment | ✓ | | | | |
| | The trends and factors changing the research landscape | | ✓ | ✓ | ✓ | |
| | The role, process and infrastructure of peer review | | | | | ✓ |
| | Application of emerging technologies in peer review in various contexts | | | | | ✓ |
| Survey | | | ✓ | ✓ | ✓ | |
| Sector view collection | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Workshops | 'Purpose of research assessment' with policymakers and academics in research assessment | ✓ | | | | |
| | 'Peer review' with publishers, academics and funders | | | | | ✓ |
| | 'Emerging technology' with technology and data specialists from higher education and industry | | | | | ✓ |

Box ES.1: Definitions of the proposed six 'A's as reasons for research assessment

| | |
|-----------------------|--|
| Analysis | To understand why, how and whether research is effective, and how it can be better supported. |
| Advocacy | To demonstrate the benefits of supporting research, and enhance the understanding of research and its processes among policymakers and the public. |
| Allocation | To determine how to distribute funding across the research system. |
| Accountability | To evidence that money and other resources have been used efficiently and effectively, and to hold stakeholders to account. |
| Acclaim | To compare and recognise the value of higher education institutions and the research conducted within them. |
| Adaptation | To steer change in organisational structures, behaviours and cultures, and research activities and priorities. |

The reasons for research assessment are both implicit and explicit, which results in a varied understanding and interpretation by different stakeholders as to why research is assessed. Over time there has been a shift in the focus of the rationale behind assessment, possibly due to the legitimacy of the aims developing and the different aims gaining popularity or importance within the research system and wider society. Within the United Kingdom, while the explicit aims of the Research Excellence Framework (REF) are allocation, accountability and acclaim, the Stern review and recent research on the REF have illustrated that the effects of the assessment exercise went beyond these broad aims. For example, the inclusion of the impact element in REF 2014 has driven researchers and HEIs to increase their focus on the wider societal impact of research (i.e. adaptation).

As the research landscape changes, the reasons for performing national research assessment are likely to continue to develop. Participants in the workshop on the reasons for research assessment noted that within the funding community in particular, additional emphasis was now placed on analysis (in the

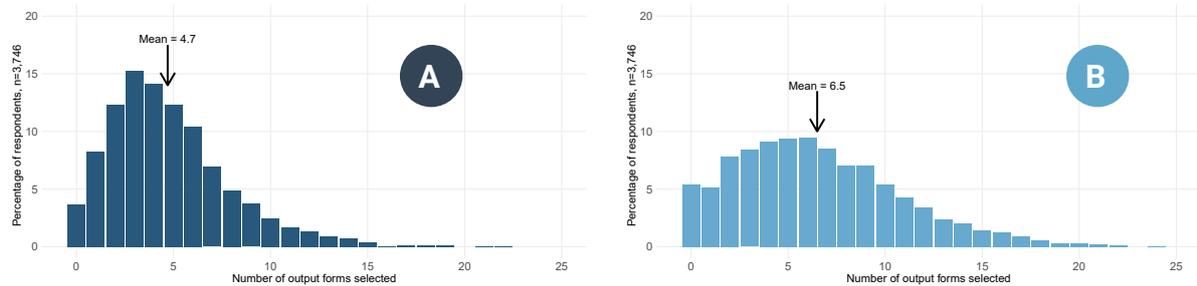
use of research assessment to inform higher education and funding strategies), and that for institutional stakeholders, acclaim has become increasingly important (in the ranking of universities and departments according to the research conducted within them). Given that the six 'A's are dynamic and interrelated elements for research assessment, they are likely to continue to evolve, and the weight and importance of each 'A' as a reason for assessment may continue to shift over time.

ES.3 How do researchers expect the forms of output they are producing to change in the next 5 to 10 years?

Key findings:

- Researchers currently produce a diversity of output forms.
- Researchers expect that they will produce a greater diversity of outputs in the future.
- Researchers expect to continue to produce journal articles and conference contributions, and that they will remain the dominant forms in many disciplines in the future.

Figure ES.2: Number of different forms of output that researchers produce now (A) and expect to produce in the next 5 to 10 years (B)



- Many researchers expect to start to produce more diverse forms of output aimed at a wider audience.
- Researchers’ decisions on which forms of output to produce are influenced by factors such as career progression and personal preference, as well as institutional incentives and funder requirements.
- Researchers from different disciplines currently produce different output forms, and researchers’ expectations suggest that these differences will continue in the future.

The survey presented researchers with a list of forms of output (e.g. journal articles, books, conference proceedings, visualisations and code) and asked them which forms of output they were currently producing and expect to produce in the next 5 to 10 years. It is important to note that this captured the presence or absence of the creation of different output forms by an individual researcher, rather than the volume of each output form that they produce. The number of forms of outputs produced by researchers is expected to increase, from the current average of 4.7 (Figure ES.2A) to 6.5 in the next 5 to 10 year period (Figure ES.2B).

The majority of researchers expect to continue to produce journal articles and conference contributions, which remain the dominant forms in many disciplines in the

future. Currently, the only other forms of output produced by more than 50 per cent of respondents were chapters in books and authored books in arts and humanities. Individual researchers also expect to start to produce more diverse forms of output aimed at a wider audience. The forms of output with the greatest expected percentage increase in the number of researchers producing them over the next 5 to 10 years are books (authored books, chapters in book and edited books), non-confidential research reports for external bodies and openly published peer reviews.

The changes are driven in particular by an expectation of individual career progression, which brings with it the opportunity or requirement to produce different output forms (e.g. books). Other factors influencing the changes in output forms included desire to reach new audiences and create societal impact, changes controlled by external bodies (e.g. funding, open access requirements, REF) and wider changes that may influence the research landscape (e.g. societal changes and new technology).

There are significant differences in the forms of outputs being produced by researchers from different disciplines. For example, fewer arts and humanities researchers produce journal articles than researchers in other disciplines; while more researchers in the social sciences and arts and humanities produce book types

(i.e. chapters in books, authored books, book reviews and edited books), social media, blogs, podcasts and working papers. More researchers in medicine, health and life sciences, and physical sciences, engineering and mathematics, produce peer review, code, research datasets, and databases and preprints than researchers from the social sciences and arts and humanities. Some outputs are also highly specific to certain disciplines, for example analysis plans are mainly produced in the disciplines of medicine, health and life sciences, and software is mainly produced in physical sciences, engineering and mathematics. Although there are some differences between career stages, these are relatively minor compared to discipline-level differences. These differences are expected to continue in the future.

ES.4 How do researchers expect the types of societal impact their research produces to change in the next 5 to 10 years?

Key Findings:

- More researchers expect that there will be societal impacts from their research in the future, although the balance of types of impact is expected to remain largely the same.
- Societal impact types differ across disciplines, and this is not expected to change.
- Researchers expect that they will continue to focus the majority of their efforts in the future on producing outputs.
- Respondents had differing views as to whether the importance placed on societal impact should increase or decrease in the future, and the reasons for this change.

Some 77% of respondents currently expect their research to have societal impact,

compared to 86% who expect their research to have societal impact in the future.

Researchers also expect their research to lead to more types of societal impact in the future, with the mean number of types of societal impact produced from their research increasing from 2.2 to 3.2. Across respondents, the types of societal impact they expected to have did not alter, with only impact on culture and impact on the economy switching over in prevalence between now and the future (Figure ES.3). Societal impact type differs across disciplines, and this is expected to continue (Figure ES.4).

When asked about the distribution of balance of effort between producing research outputs and societal impact, researchers expect the majority of effort to remain on outputs in the future, but with a slight increase in effort spent producing impacts, mainly due to the continued emphasis on the impact agenda and its implications for funding at an individual and institutional level.

ES.5 How do researchers expect the research environment they are in to change in the next 5 to 10 years?

Key Findings:

- Researchers think that collaborating with other academics is the most important driver of change.
- There are significant differences across disciplines in the perceived importance of most of the drivers, although the three most important drivers are consistent.
- Overall, most drivers were seen as more important by PhD students and early-career researchers than by mid-career and established researchers, particularly open science.

Figure ES.3: Types of societal impact that respondents are producing now and expecting to produce in the next 5 to 10 years

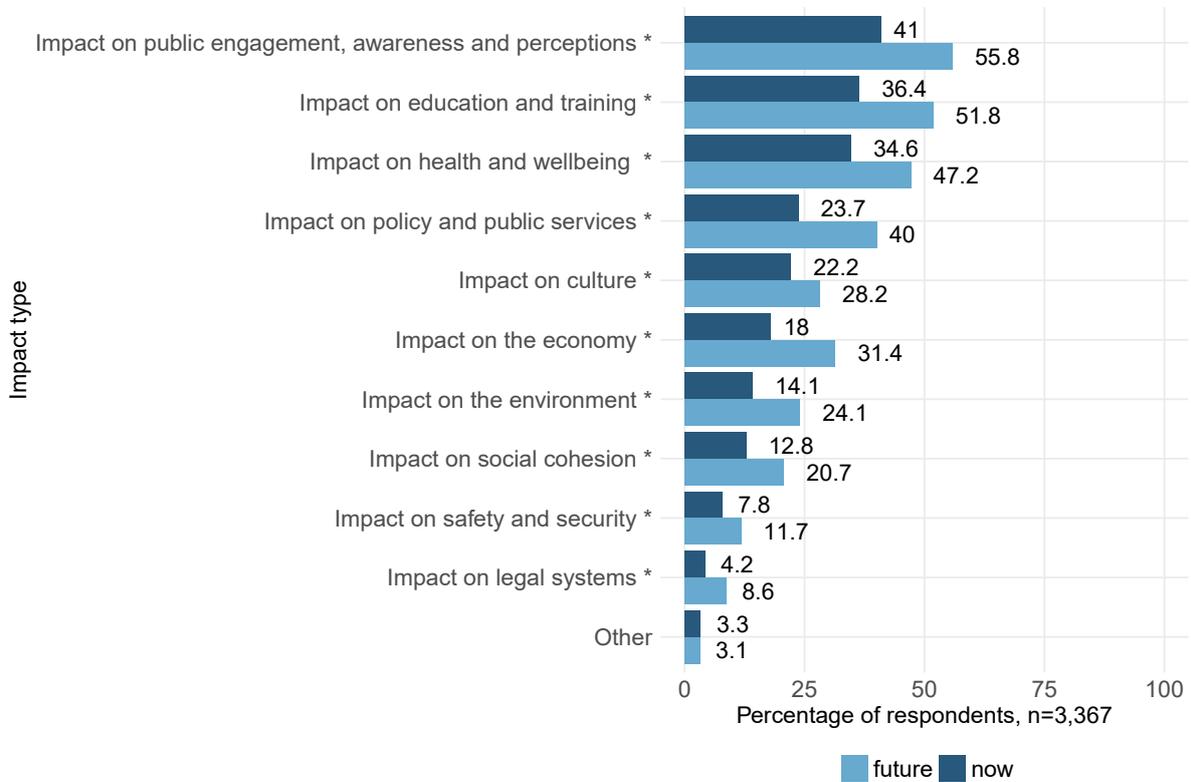


Figure ES.4: Types of societal impact that respondents from each discipline are producing now and expecting to produce in the next 5 to 10 years (percentage)

| Impact type | Medicine, health and life sciences n=1,252 | | Physical sciences, engineering and mathematics n=812 | | Social sciences n=639 | | Arts and humanities n=529 | |
|---|---|-----------|---|-----------|--------------------------|-----------|------------------------------|-----------|
| | Now | Future | Now | Future | Now | Future | Now | Future |
| Impact on public engagement, awareness and perceptions | 38 | 54 | 29 | 44 | 51 | 66 | 52 | 65 |
| Impact on education and training | 33 | 50 | 30 | 46 | 43 | 55 | 45 | 61 |
| Impact on health and wellbeing | 63 | 79 | 19 | 33 | 18 | 28 | 10 | 16 |
| Impact on policy and public services | 22 | 40 | 11 | 26 | 47 | 65 | 15 | 29 |
| Impact on culture | 7 | 13 | 7 | 12 | 30 | 37 | 68 | 75 |
| Impact on the economy | 11 | 27 | 30 | 50 | 21 | 31 | 10 | 15 |
| Impact on the environment | 8 | 17 | 28 | 44 | 15 | 25 | 4 | 8 |
| Impact on social cohesion | 6 | 13 | 2 | 6 | 31 | 43 | 21 | 33 |
| Impact on safety and security | 5 | 7 | 16 | 24 | 8 | 11 | 2 | 3 |
| Impact on legal systems | 2 | 6 | 2 | 6 | 12 | 20 | 3 | 6 |

Percentages are shown in bold where there is a significant difference between now and in the future. Impact types are shown shaded in grey if there is a significant difference across disciplines now, and in bold if there is a significant difference expected in the future. Each cell is shaded from white to dark red according to the percentage of respondents reporting producing or expecting to produce each type of impact. The darker the red, the higher the percentage.

Figure ES.5: How respondents perceive the importance of potential drivers of change in the research environment



- There are a range of views from researchers on how the research environment needs to adapt to change.
- Changes to support and drive developments need to happen at both an institutional and a sector level.

Researchers identified a large number of drivers as important for influencing the changes happening in the research system (Figure ES.5). Academic drivers such as the need to collaborate, in general and internationally, were seen as more important than drivers related to societal impact.

Across disciplines, the three most important drivers of change in the research system were consistently identified as collaborating with other academic researchers, collaborating globally with other academic researchers and the focus on multidisciplinary research. However, there were significant differences in the importance of most of the drivers further down the list. For example, open science was ranked 4th by respondents in medicine, health and life sciences, and 5th by respondents in physical sciences, engineering and mathematics; but it was ranked 10th by respondents in social sciences and 14th by those in arts and humanities. The importance of being mobile as a researcher was ranked 4th by respondents in physical sciences, engineering and mathematics, but was less highly ranked by respondents from other disciplines. The importance of collaborating with non-academic partners (outside of industry) was ranked 4th

by respondents in social sciences and arts and humanities, but 14th by respondents in physical sciences, engineering and mathematics.

There are also differences across career stages, where most drivers were seen as more important by PhD students and early-career researchers than by mid-career and established researchers, this contrast was particularly pronounced for open science.

Researchers were asked about how the research environment needs to adapt to the changes they foresee in the outputs and societal impacts they produce. The range of topics discussed in the survey free text of how researchers would like the environment to change is presented in Box ES.2. To address these changes there is a need for support at an institutional and a sector level: respondents' suggestions in relation to this are provided in Box ES.3.

Box ES.2: Factors identified by participants that will shape the research landscape over the next 5 to 10 years

- Societal impact: both to increase and decrease the emphasis on this factor.
- Reducing pressure and incentives to produce a large number of research outputs in selective journals.
- Incentivising researchers to produce higher quality and new forms of output to engage a more diverse audience.
- Focusing on dissemination and engagement as routes to societal impact.
- Increasing collaborative research.
- Balancing basic and applied research.
- Making research accessible through open science and open access.
- Increasing support for interdisciplinary research

Box ES.3: Types of support suggested by survey respondents

- Funding to develop research that has societal impact.
- Valuing societal impact and engagement within HEI reward and recognition systems.
- Adjusting workload models and the creation of new roles to take into account work to develop societal impact.
- Changes to policy to address concerns about a culture of audit and the impact of the United Kingdom's changing relationship with the EU.
- Training to develop expertise in engagement, societal impact and new digital methodologies.
- Changes to the academic publishing system to increase openness and improve peer review.
- IT and infrastructure to support openness and collaboration on a global scale.

ES.6 How could UK national research assessment learn from advances in other applications of peer review?

Key findings:

- Peer review is the predominant method for research assessment in the United Kingdom, and there is no expectation that this will change.
- Technological approaches are expected to further support peer review in the future.
- Cultural shifts, as well as technological shifts, are both needed and happening.

Peer review is the predominant method for research assessment in the United Kingdom. It is used across many contexts, such as grant applications, journal publications, *ex-post* assessment and conference contributions, and while it has both strengths and weaknesses, there was no expectation from workshop participants that its predominance in research assessment will change.

However, there is an expectation that technological approaches, which already underpin many aspects of peer review, may further support peer review in the future.

Attendees at the workshops on peer review and emerging technologies identified a number of technologies and approaches already being developed which span the entire pathway of peer review, from selecting reviewers and allocating items, to scoring, to calibration, moderation, validation and decision making, and incentives (Figure ES.6).

Although there are a variety of technologies potentially available to support the peer review process, it was noted that they are not necessarily aligned with all the underlying issues of peer review systems. For example, some of the issues that participants in the workshops on peer review and emerging technology felt most needed addressing, such as equality and diversity and the rewarding of reviewers, would not be exclusively solved by advances in technology, as currently imagined. A challenge for the sector is to not just be driven by technological advances, but to take advantage of the technology that does provide benefits. Additionally, improvements to peer review are likely to require cultural changes, such as the rise of open science, as well as technological changes, and may require additional approaches such as training and incentives.

Figure ES.6: The peer review process and examples of technologies that can support the different stages



ES.7 Reflections on how national research assessment may need to adapt to changes in the research landscape

Key considerations for the future:

- Research assessment needs to continue to consider the diversity of outputs produced by academic research.
- It is important to consider the needs of different disciplines when undertaking a nationwide assessment.
- Drivers that researchers perceive to be important are generally within the academic system.

- National research assessment is an important driver of behaviour for the sector.

Across these questions no disruptive changes that would indicate a large or immediate shift in the research landscape have been identified. Instead there are likely to continue to be gradual changes as current drivers within the system develop alongside developments in the external environments (e.g. technological developments). National research assessment is therefore likely to need to continue to remain engaged with the sector and respond to changes as they arise or can be anticipated.

In particular, research assessment needs to continue to consider the diversity of outputs produced by academic research. Currently

the vast majority of outputs submitted to the REF represent a small number of output types, largely journal articles.⁴ However, researchers want and expect to produce a greater diversity of types of output. If the increased diversity of output forms is considered valuable to the system then it may be necessary to consider suitable ways to encourage their submission. It will also be important to ensure appropriate capacity to both assess and ensure confidence in the assessment of these outputs.

Across outputs, societal impacts and drivers, there were more significant differences in the survey responses between disciplines than between career stages. This reinforces the importance of considering the needs of different disciplines when making decisions about and undertaking national research assessment.

While the majority of drivers were considered to be important in driving changes in the system, those that were seen as most important were more related to academic

impact rather than societal impact. In particular, the top five drivers for change were (1) the need to collaborate with other academic researchers; (2) the need to collaborate globally with other academic researchers; (3) the need to focus on multidisciplinary research; (4) the need to focus on research integrity; and (5) a drive towards open science.

It is important to remember that national research assessment is an important driver of behaviour and practice in the sector at an individual and institution level, as well as a system level. For example, universities increasingly use the results of research assessment exercises to promote their work, enhance their reputation, and inform strategic approaches such as recruitment. When tweaking or changing assessments it is important to consider the potential effects or consequences. Continued research is needed to understand the incentives and effects and ensure that they encourage a positive research environment.

4 For example, in REF2014 81% of outputs submitted were journal articles.
[https://results.ref.ac.uk/\(S\(41wezbilcaxf3dcoiveaq3zo\)\)/DownloadSubmissions/ByForm/REF2](https://results.ref.ac.uk/(S(41wezbilcaxf3dcoiveaq3zo))/DownloadSubmissions/ByForm/REF2)

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