

Submitted to **R&D Survey**

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About you

Organisation:

Society for Applied Microbiology

Raising our research ambitions

1 How can we best increase knowledge and understanding through research, including by achieving bigger breakthroughs?

Please comment here (500 words max):

To increase knowledge and achieve bigger breakthroughs, research funding should be spread to talent outside of the traditional golden triangle universities (located in Cambridge, London, and Oxford), which currently receive a disproportionate amount of public and private funding. Grants for researchers from smaller, post-92 universities would enable that talent to contribute more diverse ideas from different specialities and thus avoid homogenous research. For the same reason, grants should not concentrate on established academics but should also be accessible to smaller institutions and new academics, such as funding more PhDs with a wider pool of supervisors.

The way funds are currently distributed should also be re-evaluated. The current competitive, peer-review approach to grant applications is both overly bureaucratic and unduly consumes time, which could be better spent on research for both the applicant and reviewer. Moreover, this traditional, risk-averse approach discriminates against and hinders open-minded and innovative research as the peer-review process tends to favour less risky applications.

To support knowledge exchange, it is also crucial that cross disciplinary research can secure funding and resources more easily. Different areas of research often benefit from being cross disciplinary, including utilising research and data from other areas. However, since the current funding structures are divided by priority area, it can be very difficult to procure funding for research that intersects those priority areas.

More public funding for early-stage research would also increase knowledge. As vaccine research for COVID-19 has stressed, discovery research, while very risky and often involving significant rates of failure, can be high reward not only in terms of successful outputs but also generating preliminary data for further research. While discovery research has been largely funded by the pharmaceutical industry, big pharma's presence in the UK has been consistently decreasing (through withdrawal from high-risk research, relocating outside the UK, etc.) as their businesses are beholden to shareholders and returns on investments. This has left a significant gap in funding and development of discovery research, which takes many years to establish.

The application of new knowledge

2 How can we maximise the economic, environmental and societal impact of research through effective application of new knowledge?

Please comment here (500 words max):

Driving up innovation

3 How can we encourage innovation and ensure it is used to greatest effect, not just in our cutting-edge industries, but right across the economy and throughout our public services?

Please comment here (500 words max):

Providing funding for PhD students to gain experience working with industry or local government could encourage more innovation through increased access to resources while also supplying the right skills and training to scale up and apply that innovation. For example, providing more funding for Knowledge Transfer Partnerships (KTPs) would enable more research graduates to gain experience in applying science through business and access more tools or data while also providing businesses with new knowledge to produce more innovative products.

To encourage more innovation across industries, it is important to fund more blue-sky research with the potential for scale up. The majority of current funding is directed towards research based on reams of papers with evidence that already prove the research is viable. Funding based on that criteria is counter to innovation and discourages scientists to pursue riskier fields.

Inspiring and enabling talented people and teams

4 How can we attract, retain and develop talented and diverse people to R&D roles? How can we make R&D for everyone?

Please comment here (500 words max):

As researcher's success is often measured by the number of research outputs they produce, researchers regularly work excess hours in order to be seen as competitive. This measurement particularly dissuades and discourages women and early career researchers with family caring responsibilities from pursuing STEM R&D roles. Funding should look to discourage working long hours with unrealistic deadlines by rewarding more grants to researchers based on their research ideas rather than the number of outputs they have produced.

Since maternity/paternity leave funding can vary based on the grant provider, often negatively influencing research recruitment decisions, diverse candidates are deterred from pursuing research. A 2014 NPA survey of 66 institutions found only 26% of postdocs, paid directly by external funders, were paid maternity leave. Grants should support maternity/paternity leave and seek to clarify what recipients are entitled to in order to retain diverse talent.

Funding should also be directed towards providing more returnships to equip individuals returning from extended career breaks, such as for health or caring reasons, to return to STEM careers. Organisations like Daphne Jackson Trust, which provides 3-year fellowships for individuals returning to STEM careers, encourage diverse talent to return to research by providing the financial and training support they need. Returnships not only benefit individuals returning to research, but also, the UK's research capability. As Daphne Jackson Trust's 2015 survey found, 75% of former fellow respondents published at least one-peer reviewed paper during their Fellowship and of those former Fellows who continue in research, 78% supervise future researchers.

Levelling up R&D across the UK

5 How should we ensure that R&D plays its fullest role in levelling up all over the UK?

Please comment here (500 words max):

Akin to our response to Question1, diversifying grant recipients by funding research outside of the golden triangle would support levelling up the rest of the UK. For numerous personal reasons, such as cost of living or partners' job locations, many talented researchers live outside of those areas. By depriving funding to those researchers, the UK ultimately loses their potential creative contributions.

Investing public funds in regions outside the golden triangle is also more likely to attract private investment in those areas. This would alleviate pressure on public funds to sustain projects, particularly risky ones with high failure rates, and incentivise further private investment. A 2015 analysis of private and public investment in science research found that a 1% increase in public expenditure on R&D could lead to an increase in private expenditure on R&D between .48% and .68%. This means that a £1 increase in public investment could lead to a £1.13 to £1.60 increase in private expenditure. Industry support would not only be financially beneficial but could also provide complimentary expertise by supporting collaborations of academia and industry experts through initiatives like research institutes.

Establishing consortiums or research networks is one potential route for levelling up research across the UK. These consortiums would enable researchers, across academia, industry, SMEs, and government labs to share resources, findings, and analytic approaches regardless of location. This collaborative approach would not only ensure the best talent is contributing towards innovation but would also avoid duplication of research efforts. The UK Kidney Research Consortium is an example of a successful distributed research model with three renal networks and twelve clinical study groups spread throughout the UK.

Developing world-leading infrastructure and institutions

6 How should we strengthen our research infrastructure and institutions in support of our vision?

Please comment here (500 words max):

Being at the forefront of global collaboration

7 How should we most effectively and safely collaborate with partners and networks around the globe?

Please comment here (500 words max):

Harnessing excitement about our vision

8 How can we harness excitement about this vision, listen to a wider range of voices to ensure R&D is delivering for society, and inspire a whole new generation of scientists, researchers, technicians, engineers, and innovators?