

Consultation: Welsh Government's draft Innovation Strategy

Summary of views submitted by the Microbiology Society

We note that our submission reflects the views expressed by ten members of the Microbiology Society who responded to our call for input. It is not our intention to speak on behalf of the whole microbiology community. Rather, we highlight anecdotes and the perspectives of our respondents, most of whom shared similar views on the ambitions highlighted in the draft Strategy, and provide recommendations where appropriate.

1. Introduction

1. The Microbiology Society is a membership charity for scientists interested in microbes, their effects and their practical uses. It is one of the largest microbiology societies in Europe with a worldwide membership based in universities, industry, hospitals, research institutes and schools. Our members have a unique depth and breadth of knowledge about the discipline. The Microbiology Society's role is to help unlock and harness the potential of that knowledge.
2. We welcome the opportunity to inform the Welsh Government's draft Innovation Strategy by responding to this consultation. We have over 140 members in Wales with expertise spanning many areas related to innovation including agriculture, industrial biotechnology, waste management and more. The microbiology community can therefore offer a valuable perspective on innovation policy.
3. In May 2022, we submitted a Microbiology Society response to the 'Nature and Us' survey from Natural Resources Wales. We recognise that some of our recommendations have been taken forward in the draft Innovation Strategy, and welcome this second opportunity to inform Welsh Government strategy.

2. Short-, medium- and long-term goals

2.1 What would you like the Innovation Strategy to achieve in the short/medium (2 to 5 years)/long (5+ year) terms?

Short term

4. **Reducing barriers to cooperation** between institutions, businesses, universities and government will make for a more fruitful research and innovation (R&I) ecosystem. We envision a future where businesses find it easy to grow within or move into Wales, and are given the space and infrastructure to engage with the local community and cooperate with Welsh institutions. In addition, incentivising cooperation between universities would

increase opportunities for collaboration and reduce inter-institution competition which can be destructive in the long-term.

5. While we commend the ambition of the Innovation Strategy, **the practicality of some of its short-term aims could be further clarified**. For instance, it is unclear how the Welsh Government hopes to guarantee employment to all under 25, especially if these individuals are to have some agency in choosing their career path. We suggest including specific, measurable targets and detailed policy plans clarifying how these targets will be achieved.

Medium term

6. **Increased investment in science – both people and projects – along with more robust measures of investment** would transform the standing of Welsh research. Wales can take inspiration from other small nations, like Scotland, where innovation performance has improved significantly over the last decade. Scotland's innovation ranking within the EU increased from nineteenth to ninth in just four years between 2010 and 2014¹, and in 2017, Scotland ranked fifth among the twelve UK regions in terms of spend per head. Wales was the lowest ranked region². Integrating Westminster funding of local councils into the wider national agenda and increasing total research funding would enrich the Welsh R&I ecosystem, leading to increased external grant capture, and greater critical mass in areas of research strength. This, in turn, would attract businesses to Wales and generate more commercialisation opportunities.
7. **Expansion of the Welsh transport system** will improve the quality of life for Welsh citizens, and make collaboration across Wales easier for innovators while also having a positive impact on climate and the environment as well as public health. To establish areas suitable for novel public transport infrastructure, we recommend collecting data on the most important routes citizens take in their daily lives. This could be achieved using questionnaires, tracked bus tickets and Google Maps data showing the most frequently driven routes.
8. We welcome the Strategy's commitment to facilitating the transition to a greener future. This can be accelerated, for example, through the establishment of **recycling** facilities, the harvesting of **renewable energy**, improved **insulation**, more **public transport** options, provision of specific **funds for start-ups** to allow them to immediately invest in green company structures, and more. This will increase the number of green businesses, and help Welsh firms to market themselves globally in line with increasing demand for sustainable

¹ Fraser of Allander Institute (2017) FAI Economic Commentary, 2017 Q4, Perspective 3 – Scotland's Innovation Performance: a review of recent evidence: <https://fraserofallander.org/publications/fai-economic-commentary-2017-q4/>

² Office for National Statistics (2019) Gross domestic expenditure on research and development Scotland 2017: <https://www.gov.scot/publications/gross-expenditure-on-research-and-development-scotland/documents/>

practices. You can read more of our specific recommendations for moving towards a greener future in our [response to the Natural Resources Wales 'Nature and Us' survey](#).³

Long term

9. Investing in **centres of excellence, where businesses with compatible interests are located in close proximity**, can help to foster a circular economy and encourage innovative collaboration between industry and academia. These centres can also feed into educational efforts by aligning with local education centres and engaging with citizens in local residential areas (e.g., through open days and public engagement activities). By allowing the population to actively participate in innovation, economic growth can occur in an inclusive environment. Wales could consider developing longer-term funding in research and innovation via a programme similar to the [Industrial Biotechnology Innovation Centre \(IBioIC\)](#)⁴, one of Scotland's successful and well known centres targeting the bioeconomy, while also incorporating best practices from successful Welsh programmes such as the [Materials & Manufacturing Academy 'M2A'](#)⁵. It is critical that all Welsh universities become partners in industrial innovation. Such initiatives would also enhance skills development and career progression.
10. In the long-term, **pathways to engage the next generation of potential innovators** will be pivotal. By providing schools with the resources and training necessary to inspire children to pursue STEM careers, Wales can cultivate the next generation of innovators, which is particularly important for economically weak areas.
11. Education and training for individuals up to the age of 25 offers a solid foundation; however, **momentum needs to be maintained beyond this to ensure that innovation is sustained**. It is important that innovation is visible throughout the education pathway so that opportunities are not missed with incentives for the next generation to embrace innovation.

3. Challenges and barriers to innovation

3.1 What are the main challenges and barriers to innovation in Wales? What needs to be done to overcome these barriers?

12. **The investment in university research is significantly weaker in Wales when compared to Scotland and England**. In 2019, the UK spent £577 per head of the population on research and development (R&D). £511 of that was spent in England, £42 in Scotland, and only £12 in

³ Microbiology Society (2022) Summary of Views – 'Nature and Us' Survey: https://microbiologysociety.org/resource_library/consultation-response/microbiology-society-summary-of-views---nature-and-us--survey.html

⁴ IBioIC (2022) Industrial Biotechnology Innovation Centre: <https://www.ibioic.com/>

⁵ Business Wales (2022) Materials and Manufacturing Academy (M2A): <https://businesswales.gov.wales/skillsgateway/skills-and-training-programmes/recruitment-and-staffing/materials-and-manufacturing-academy-m2a>

Wales⁶ (see point 6). This has been impacting the country's capacity to attract and retain talented researchers and innovative companies both from within Wales and overseas. The long-term transformation of the research ecosystem underpinned by the Strategy requires an increase in public investment in Welsh R&I. If Wales fails to boost investment in home-grown research it risks triggering a loss of critical mass in expertise, leading to fewer successful grant applications, and a downward trend in human capital that is difficult to reverse. By investing more in national R&I, Wales can build human capital, which will stimulate innovation, and generate opportunities for early career researchers to progress their careers without needing to relocate.

13. **A lack of diversity in innovation funding along the pipeline of research** is a barrier to innovation in Wales. Many funders will only support products with a high 'technology readiness level', meaning that the innovations are already close to entering the market. This inhibits projects at the basic research or proof of concept stage, leading to a lack of breadth, depth and adaptability in the research base. These are all essential components of the scientific community's ability to identify, create or seize new opportunities. Wales would benefit greatly in the longer term from investing early in projects at the basic research phase that may not have an immediate impact. We recommend allocating funding to strongly support both applied and basic research across the full breadth of scientific disciplines.
14. **Lack of opportunities for cooperation** is a barrier to innovation in Wales, and the **limited strategic collaboration between universities** restricts the benefits available to communities and businesses (see point 4).
15. **Suboptimal industry contacts within academia and vice-versa** can make it difficult for the two groups to forge cohesive partnerships. Wales would therefore benefit from nation-wide programmes designed for industry professionals and academics to meet, network and collaborate. '[Accelerate Wales](#)⁷', a programme co-funded by the European Regional Development Fund, the Welsh European Funding Office, the Welsh Government's Health and Social Services group, universities, Life Sciences Hub Wales and health boards, has helped to plug this gap for healthcare, encouraging and stimulating collaborations between industry and academia over the last three years. Once this programme ends, there will be a potential gap in this area once again which could hinder progression in this area. We recommend that the Welsh Government continues to facilitate collaboration between sectors, which will further boost innovation.
16. One Microbiology Society member believes that **promotion of the Welsh language** is a main barrier to innovation in Wales:

"Regrettably, as a non-Welsh speaker who has lived 27 years in SE Wales, one of the main barriers to innovation in Wales, and extending the country's influence in and outside the UK appears to me to be the increasingly aggressive promotion of Welsh language in all walks of

⁶ Office for National Statistics (2021) Gross domestic expenditure on research and development, UK 2019: <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukgrossdomesticexpenditureonresearchanddevelopment/2019>

⁷ Welsh Government (2022) Accelerate Wales: <https://lshubwales.com/support/accelerate-wales>

life, with the inconvenience and increased expenditure for businesses and services that this inevitably entails [...] I do feel that insistence on all services being provided in Welsh is likely to be reducing interest in investment from outside Wales, as well as wasting huge amounts of time” – Microbiology Society member

17. **For individuals working in sectors directly allied to innovation, opportunities are apparent. However, where this is not the case, it can be more difficult to engage.** Even when opportunities do exist, accessing them can be challenging. The Strategy successfully conveys that innovation is encouraged from all citizens in Wales. We recommend that the Welsh Government disseminates this message to the wider population, clarifying that the support by which this can be achieved is accessible to all – not just to those organisations ‘in the know’.

4. Objectives

- 4.1 **The Strategy aims to grow a more Resilient Wales which aims to improve a healthy natural environment, adopt circular economy principles and increase our capacity and capability in adapting to change.**

Do you believe the proposed Innovation Strategy has set out clear objectives to achieve these outcomes? If not, what is missing?

19. We appreciate the importance of Wales moving towards a greener future and recognise that Welsh Universities have a solid reputation in this area. However, **we feel that the Strategy is lacking focus in regard to healthcare and fails to recognise Wales’ strong track-record in infection science and immunology, particularly within Cardiff University.** Throughout the SARS-CoV-2 pandemic, Welsh viral and immunological research played a major role in the national response. However, infection research is not mentioned in the Strategy’s areas of strength. We encourage the Welsh Government to take a strategic approach when identifying areas to invest in by including healthcare and infection science. By investing purposefully in areas of national interest, the Welsh R&I ecosystem can strengthen its knowledge base.
20. **Given the aging demographic of Wales⁸, there is an incentive to allocate resources to preventative and proactive healthcare innovation.** The Welsh healthcare governance structure is unique in that the seven Welsh health boards can respond in a unified manner, as demonstrated during the COVID-19 response. Although we recognise that Wales cannot be a leader in all areas of healthcare, it has the potential to innovate in a way that is much harder to achieve in other parts of the UK and is therefore in a great position to foster healthcare innovation.
21. **While Wales often plays a key role in the basic research phase of healthcare research which is necessary in the pipeline of innovation, often the translation and commercialisation of this research is done elsewhere.** A Welsh life sciences cluster of

⁸ Welsh Government (2021) Age friendly Wales: our strategy for an ageing society: <https://gov.wales/age-friendly-wales-our-strategy-ageing-society-html>

biotechnology companies and the establishment of one large Welsh pharmaceutical company would help to retain Welsh ideas and intellectual property, as well as create jobs to attract talented workers and retain key members of staff who often leave to conduct their research elsewhere (see points 13 and 18).

22. We commend the Strategy's ambition for a more resilient Wales, and believe it could strengthen its aims by **acknowledging the potential of natural products and nature-based solutions to improve resilience, health and adaptation to change, as well as generating inward investment and income**. By using existing industrial strengths and expertise, Wales can drive new and improved technologies which are sustainable and contribute towards the nation's aims for net zero. There are many Welsh research groups working on natural products and nature-based solutions, many of which use microbes in the manufacture of chemicals, pharmaceuticals, biocontrol agents and more. The number of new and established businesses expanding in this field is a real opportunity for Wales. You can read more about natural products and nature-based solutions in our [Climate Change Briefing](#)⁹, [Circular Economy Policy Report](#)¹⁰ and our [Soil Health Policy Report](#)¹¹.
23. **As it stands, there is limited onus in the Strategy on protecting existing habitats, and regenerating degraded Welsh habitats**. The green economy forms an important part of the wider Welsh economy, and we believe that the Strategy could widen its focus to further promote biodiversity and habitat health. This includes advancing our understanding of the current state of the environment, for instance the lasting impact of intensive agriculture which is widespread throughout Wales. You can read more about how to mitigate the impacts of agriculture on ecosystems in our [Soil Health Policy Report](#)¹².
24. **Wales could benefit hugely from green energy if it were to be prioritised, specifically tidal energy due to the extensive coastline available**. We made specific scientific recommendations for maximising the benefits of green energy in our [response to the Natural Resources Wales 'Nature and Us' survey](#)¹³.
25. **We recommend that the Welsh Government communicates the benefits of innovation to all citizens to maximise participation**. While multiple initiatives to support resilience in Wales do exist, not everyone is aware of them (see point 17). The objectives of innovation

⁹ Microbiology Society (2022) Climate Change: Microbes as our Allies:
<https://microbiologysociety.org/publication/briefing/climate-change-microbes-as-our-allies.html>

¹⁰ Microbiology Society (2020) A Sustainable Future: Circular Economy Policy Report:
<https://microbiologysociety.org/publication/briefing/a-sustainable-future-circular-economy-policy-report.html>

¹¹ Microbiology Society (2020) A Sustainable Future: Soil Health Policy Report:
<https://microbiologysociety.org/publication/briefing/a-sustainable-future-soil-health-policy-report.html>

¹² Microbiology Society (2020) A Sustainable Future: Soil Health Policy Report:
<https://microbiologysociety.org/publication/briefing/a-sustainable-future-soil-health-policy-report.html>

¹³ Microbiology Society (2022) Summary of Views – 'Nature and Us' Survey:
https://microbiologysociety.org/resource_library/consultation-response/microbiology-society-summary-of-views---nature-and-us--survey.html

therefore need to be communicated clearly, and opportunities for involvement need to be visible, accessible and easy to navigate.

4.2 An equal Wales is an objective of the Innovation Strategy. This proposes a transparent innovation ecosystem that ensures inclusivity in all Research, Development and Innovation activity and a fairer distribution of investment.

Do you believe the proposed Innovation Strategy has set out clear objectives to achieve these outcomes? If not, what is missing?

26. **A fairer distribution of funds across Wales would encourage businesses and academic institutions to collaborate nationwide, and align with the UK governments levelling up agenda.** As it stands, there are disparities in the geographical distribution of investment in Wales, and hence businesses that innovate are concentrated in certain areas. For instance, there are fewer businesses within the western or more rural parts of Wales for academics and universities to collaborate with. It is important to note that each region can have areas with very different innovation needs. For instance, Cardiff and the rural Valleys are close in proximity, but do not have the same investment needs. We recommend assessing investment needs at the local level, to ensure funding is allocated efficiently.
27. In addition to providing access to faster broadband and digitising services as mentioned in the strategy, **supporting businesses that create resources that have a positive impact on rural or digitally excluded communities will allow all citizens to participate in innovation, and make for a more accessible and inclusive R&I system.**
28. **Collaboration between academic institutes and industry is pivotal to successful grant bids, and needs to be forged now more than ever due to the withdrawal of EU funding.** While this is mentioned in the Strategy, it lacks concrete details on how it will go about filling this shortfall or ensuring academics with limited experience applying for non-EU funding will be successful in their applications.
29. **For Wales to foster a truly diverse and inclusive R&I system, we recommend that the Welsh Government encourages and supports under-represented groups to participate in innovation.** This can be achieved through engagement with schools and higher education providers and ensuring visibility of individuals from minority groups. R&I can also be a difficult sector for individuals with caring responsibilities to break into. We therefore recommend that the Welsh Government provides support for full-time carers and parents within this sector.
30. **Improved transparency of Welsh health collaborations and networks** would allow academics, NHS staff and industry members to identify key contacts and opportunities to explore potential collaborations regarding innovation in healthcare.

5. Innovation culture

5.1 The strategy aims to create a culture of innovation in Wales, one which collaborates, shares risk, encourages participation and supports the ecosystem to innovate.

What does an innovation culture mean to you? What is needed to develop an innovation culture in Wales?

31. **A thriving innovation culture prioritises research and researchers in order to drive new scientific discoveries, which will ultimately deliver benefits to society.** We recognise that the strategy makes much of translating these discoveries into products through business and industry. However, we believe that it lacks concrete plans for investing in science at the discovery, basic research stage of the pipeline (see point 13). More investment at the basic research phase will build critical mass in major research areas, leading to greater grant capture, higher quality scientific output, and a well-trained high-tech workforce.
32. **An innovation culture constitutes an environment in which novel thinking and its application is nurtured from everyone, not just leaders.** To develop a culture such as this in Wales there needs to be a shift away from focusing solely on revenue generation, and towards value creation. We encourage the Welsh Government to prioritise this to maximise societal and economic benefit for Wales in the long run.

5.2 Do you feel that you have the opportunity to participate in innovation? Please explain why you feel that you are able / unable to participate in innovation?

33. **One Microbiology Society member noted that they cannot easily participate in innovation as they struggle to maintain a strategic research programme due to the short-term nature of lab-based contracts.** The funding system requires researchers to spend large amounts of time chasing small, fragmented pots of money, and leads to a lack of job security for their staff. This whole process drains time and effort for all involved.
“I have worked for 27 years as a Consultant Medical Microbiologist. During that time, it has become increasingly difficult to be meaningfully involved in research or innovation, partially due to budgetary and staffing constraints” – Microbiology Society member
34. **Often funding comes with stringent requirements that it be used solely for R&I projects entirely based in Wales.** This makes it difficult to collaborate across borders, and means that Welsh researchers cannot benefit from the infrastructure available outside of the nation. This limits opportunities for innovation.
“Very recently, on trying to explore the possibility of our Health Board's being involved in a trial coordinated by University of Nottingham clinical trials unit, I was informed that our research midwives could not participate due to the All Wales approach to testing” – Microbiology Society member
35. **Centralisation of decision-making in healthcare is another factor limiting opportunities to participate in healthcare innovation in Wales.** A number of Welsh clinical microbiology departments that were once governed internally are now under the broader management of Public Health Wales. One Microbiology Society member suggested granting more agency to

the staff working within microbiology services to improve the efficiency with which they are run. Another believes that very little of the Welsh Government development money allocated to microbiology is getting further than Public Health Wales, and that funding should instead be distributed directly to localities.

6. Implementation

6.1 Wales currently does not have one lead body responsible for the coordination and delivery of our innovation system. Turning to implementation, how would you like to see this strategy implemented?

36. A system whereby in all regions of Wales, **Councils and Welsh Government, universities and businesses are aligned in their aims**, would ensure maximum benefit for Welsh communities. One size does not fit all, and we recognise that implementation presents a real challenge. Great care needs to be exercised in implementing such a system in order to avoid another layer of management and therefore bureaucracy and expense, and unfair appropriation of resources by the larger and more vocal players. The objectives of key bodies must be co-ordinated to ensure resources are used efficiently to meet compatible goals.
37. **A central body responsible for innovation within Wales** could offer greater cohesion and support in terms of establishing effective collaboration across the country (see points 4, 14 and 15) and guiding Welsh academics in writing competitive bids for alternative funding bodies (see point 28). One Microbiology Society member suggested the creation of **a single body responsible for innovation** to help with delivery of the strategy, with innovation representatives from different organisations feeding into decision making.

7. Final remarks

Professional societies and scientific organisations represent the research and innovation community at large and can supply evidence-based advice and in-depth analysis of the sector to governments and other agencies. The Microbiology Society wishes to send a message of support to the Welsh Government and would welcome the opportunity to inform future projects.

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