PraxisAuril response to the R&D Roadmap
August 2020

Raising our research ambitions

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

A key aim of this Roadmap should be to optimise conditions for knowledge exchange as the foundation for R&D and innovation. The dynamics of research and innovation have been well-explored in numerous sector and government inquiries. We know that we should: protect basic research through dual-funding; avoid 'one-size fits all' solutions for knowledge exchange; incentivise demand-side engagement and investment in the research base; provide more opportunities across wider geographies; and enable diverse individuals and institutions to play their part. All of this learning should be incorporated into the future research landscape that we want to see.

At the same time, the Covid-19 pandemic has demonstrated how a single, urgent, challenge can drive novel approaches to innovation in the current R&D system. The purpose provided by aligning around a challenge, the need to move at speed, to work across disciplines, and to quickly leverage industry partnerships has changed research innovation culture and – importantly – the perception of innovation and the value of research among the general public. We have yet to establish what changes could, and should, be retained as we return to more normal conditions but there will certainly be important learning for research funding, collaboration and translation that will benefit the overall R&D environment. Such learning should be a first step on this R&D roadmap.

The application of new knowledge

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

a) Recognise the quality of UK knowledge exchange

The UK has an extensive network of engagement professionals represented by a number of networks with specialisms and shared concerns: NCCPE, ARMA, PraxisAuril, UKSPA, AIRTO, KTN. All should have better recognition as part of the R&D community and be represented on new R&D expert groups - proposed in the Roadmap - to contribute their perspectives alongside researchers, industry and other research users.

These are the people who work alongside researchers and external partners – collaborators, customers, investors – to help deliver impact and outcomes from research and translate innovation into new companies, products and services. The UK has invested in this activity and professional cohort for 20 years, through Higher Education Innovation Fund and equivalent programmes in devolved nations. It is highly successful and as a result the UK is regarded as a KE world-leader. PraxisAuril has delivered training in the UK to 3000+ people, developing and connecting what has become a professional community in the R&D landscape. Our members are leading translational research (e.g. IRC, CRUK), research commercialisation & enterprise (Cambridge Enterprise , Oxford Uni Innovation, SETsquared, QUBis and more), SME engagement (Manchester Metropolitan Uni,

Coventry, Lancaster), and industry collaboration (Sheffield, Cranfield, Bristol). They have insight into geographical, sectoral and disciplinary challenges as well as a sense of 'what works' for people and

programmes, what the gaps are in funding and finance, what infrastructure is needed, and the mechanics that underpin good knowledge exchange (including IP protection). It is important that this insight informs R&D policy and programmes.

b) Learn from KE in crisis response

During the Covid-19 crisis, PraxisAuril has learnt from its KE professional members of the new challenges and opportunities facing them. Across the UK, universities have been taking leading roles in coordinating regional responses and developing regional economic strategy with their local communities. They are working with businesses who are having to react to very challenging market conditions. There is increasing demand from businesses for practical, immediate support, and that is being mirrored by increasing enthusiasm for KE from researchers who want to put their expertise to good and practical use. Seeing opportunities to support businesses, or step-in with solutions, is a key KE skill. Creativity and resilience are also on display - battling to keep core activities going and thinking about communities and the national emergency.

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?

a) Encourage diversity of innovation programmes

- Make it easier for start-up businesses to work with public services and provide innovations. This could be a win-win as the business gets supported and developed and the public service gets access to new innovations.
- Focus on increasing support for social science-type innovations as these are more likely to have a public service aspect to them. The Connected Capability Fund ASPECT programme (led by the LSE) is making good progress in this respect.
- Make it easier for businesses to access support when innovations are used more broadly or incrementally, for example through Innovate UK programmes.

b) Create the right incentives and give them sufficient funding to succeed

Find ways for smaller businesses to contribute to funding R&D and to benefit from that contribution, such as through consortia or match-funding. Innovate UK's long-running KTP programme has been very successful in this respect where around 70% of KTPs now involve an SME partner. But this programme is at risk because of a shortfall in funding. KTPs are all about embedding the very best academic knowledge into our businesses to help them grow and prosper, supporting the exchange of knowledge and expertise between the UK research base and UK businesses. The scheme has been running for over 45 years and has a strong history of demonstrable outputs for both businesses and universities involved. Each KTP is an example of applying academic research to help businesses achieve their strategic goals, improve productivity, or become more innovative. This has a net positive effect on the business base, increasing its absorptive capacity for innovation and upskilling existing staff. As KTPs are spread across the UK they contribute to the 'levelling-up' agenda so

necessary in areas outside London and the South East. In 2019's budget, additional funds were allocated to KTP specifically to address the productivity challenge in UK SMEs. Despite this the amount of funding available from Innovate UK to fund traditional KTPs dropped in early 2020 and the situation has been exacerbated by the Covid-19 pandemic. Innovate UK indicates that this is likely to be the case for the foreseeable future.

Over the last few funding rounds businesses that were ready to invest and access academic expertise have been unable to proceed with their plans. It is notable that the demand for KTPs has remained strong throughout the pandemic with businesses wanting to utilise academic expertise to help secure future opportunities.

c) Change the image of R&D and create innovation mindsets

Established organisations may struggle because their culture does not embrace an innovation mindset. Innovation is risky, and people or groups within an organisation may be too risk adverse to embrace and follow through with innovative approaches. Rather than seeing strategic innovation as a top down initiative provide routes and support to bring about disruptive change from all parts of an organisation. This is about changing cultures so that creativity and innovation is not discouraged by the usual way of doing things. This is as important in research culture as in business culture. R&D needs to embrace a wider disciplinary base so that it is more inclusive of research ideas and approaches. There needs to be greater respect for the role of

arts and design in developing innovation, alongside STEM subjects for example. Progress is being made with respect to the role of social sciences and humanities, but this is still relatively unexplored territory with low public profile or recognition in R&D tax credits. What is important is that R&D is not just seen as a domain for a select group of people; the approach of NESTA is relevant here, for example, but also the IPO's 'Cracking Ideas' programme directed at schools.

These approaches encourage innovation from a wide societal base without disciplinary or sectoral silos. We should change the current R&D narrative which is largely focused on metrics and delivery, so that it is about identifying and nurturing commercialisation/innovation opportunities, including those with social rather than (or as well as) economic value.

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?

a) Address research and innovation culture

Create a positive and progressive research and innovation culture; allow people to move more easily between commercial projects and academia: the best way to share knowledge is between people (movement of people was a key recommendation in 2015's Dowling Review). Pay researchers well and provide job security, particularly in early career stages. Ensure that there are opportunities for a greater proportion of those who want to engage in KE/R&D e.g. by increasing success rates on collaborative grants and providing more professional support for KE in research organisations. Researchers do not necessarily want to get involved in the next step on the development path once

a project has reached its conclusion. Coming up with a great idea is one thing but getting it to market is another often requiring different skills as well as finance.

b) Ensure innovation is seen as just as important as pure research for research career paths and promotion.

The enterprise route is not yet sufficiently recognised in research culture as a route to peer recognition or promotion, so create more routes into the academic career pathway at different points in careers i.e. not relying on the classical pathway as the route by which R&D staff should develop. The fellowship model can be useful for buying time to explore KE and enterprise routes. Good examples include NERC's KE Fellowships and the Royal Society's Entrepreneur in Residence scheme. Alternative pathways can be a route to diversity, supporting those who cannot take the risk on the low pay at the beginning of R&D careers or risk casualised contracts later on. This may particularly affect women taking a career break to look after children for example.

c) Create new KE career pathways

The Roadmap should also recognise the potential of knowledge exchange as a career path for doctoral students. GuildHE has suggested that part-time doctoral studentships would combine academic study with a job placement, to strengthen research and practice. This is a highly effective mode of knowledge exchange and likely to build strong relationships between a business and the research base – similar to that created through KTPs. We refer also to the recent announcement by the South East Physics Network (SEPnet) to offer collaborative PhDs, funded through Research England's RED fund. These types of initiatives have the potential to change attitudes to university-business collaboration by embedding knowledge exchange right from the outset, rather than seeing it as an add-on to a research career.

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?

The character of a place (political, business environment, physical geographies and location) can either support or inhibit innovation. Any place consists of a wide number of different actors and collaborations, funding mechanisms, political priorities and policies. It is a complex lens that lends itself to a multi-disciplinary approach. This is important to address in any new approach.

Universities as 'anchor institutions' have a role to play in identifying nascent industries, upskilling the population as needed and promoting success as it happens. There is a well-established narrative about the benefit of university spin-outs; as creators of new employment, as investors in R&D, as attractors for inward investment. Universities themselves invest in place-based infrastructure such as science parks, which is where much translation and development will take place. They should continue to be supported in making these investments, particularly where private investors will not.

As an R&D community we need to explore the barriers and enablers to innovation within the context of place: 'what works' in terms of KE engagement and practice; how we frame and fund the opportunities to do something new and different in the place context; how to motivate and engage our academic communities in the region in which they are based; how to thread some of our international collaborations for research and innovation back into a more local context. And, of

course, sharing good practice whilst appreciating that what works in one place may not be the right fit for another.

We also need to make sense of metrics and data to tell the stories we want to tell. How much does data get in the way of what we know to be true on the ground? How might we talk about 'exports and imports' at the regional or local level (of people, products, services and knowledge). How do we capture the inputs, impacts, outputs and outcomes from KE at different geographic levels? How do we make places more attractive to investment and to the skilled people we want to stay after university or move there for jobs? How long might it take to regenerate a left-behind place and who is best-placed to decide what that regeneration will look like?

Rather than relying on existing 'places' we should allow self-defined geographical groups to define what problems they need to solve through R&D and Innovation. This is the approach taken by UKRI's 'Strength in Places Fund'. It relates to principles of exploring (industrial) heritage, the indigenous skills-base, and projecting future needs to make R&D relevant to a place. The eventual outcomes of the SiPF closely studied but also more generously funded to ensure their longevity. We have many models to draw on here: Knowledge Quarters, University Enterprise Zones, Innovation Districts – we need to understand what these models deliver for the people and organisations involved in the long-term. We have to consider the impact of the withdrawal of ERDF monies in this context too, and what might replace their role in funding R&D and business support through the proposed Shared Prosperity Fund.

Developing world-leading infrastructure and institutions

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

a) Put the KE in R&D

The KE Framework metrics and KE Concordat have been welcomed by PrA and its members as a way of changing the conversation about KE but – importantly – for giving recognition to this activity in our R&D landscape. It too often goes un-noticed and un-celebrated and our members are not regularly consulted or listened to. But the KEF and KEC should be the starting point for the next two decades of KE; they should describe the KE we want and need to see as part and parcel of the R&D Roadmap, not simply be a way of describing what we already have.

The KE profession has developed over the past 20 years so that more disciplines are involved – notably now the arts, humanities, and social sciences – and new ways have evolved to tackle well-known issues (how to engage more SMEs, how to create long-standing research collaborations) and newer ones (civic engagement, greater diversity in enterprise, better frameworks for investment). This has been supported by programmes such as Research England's Connected Capability Fund, which should be better-funded so that programmes can run for longer whilst also targeting self-sustainability.

b) Balance 'hard' and 'soft' infrastructure

We support the NCCPE's argument that physical infrastructure is obviously essential to a well-functioning R&D system but 'soft', people-based infrastructure is vital to maximise collaboration and

involvement across the system. By utilising existing infrastructure and networks, working with and through organisations such as NCUB, NCCPE, PraxisAuril, ARMA, TCCE, CBI, GuildHE, UUK, the UK's university mission groups, and Learned and Professional societies we will generate enthusiasm and support for the roadmap across the R&D ecosystem.

Being at the forefront of global collaboration

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

a) Provide frameworks and support to grow personal connections

Collaborations and partnerships grow through need and shared contact plus personal connection. We need a way to fund collaborations to grow organically, that will provide standard terms that many different countries and sector can all agree too. This means that the UK needs a mechanism, similar to EU Frameworks, to work with researchers across the globe to address the biggest challenges such as those set by the Sustainable Development Goals. A move towards open source publishing may help to diffuse knowledge from the research base, to non-research communities or to less-developed countries, but there is still a great deal of support needed to understand how knowledge can be applied.

Smaller UK HEI's can struggle with the costs associated in reviewing international IP terms and contracts, so standardisation can help but only if there is wider acceptance and uptake of templated approaches. The UK's IPO doing good work in this respect through international editions of the Lambert Toolkit, although this is an entirely voluntary scheme and we wish it to remain so.

Attaching economic value to knowledge does not always help to facilitate collaboration. There is a place for economics around R&D but this often sits at odds with societal and global benefits for humanity. We know that many universities, in particular, offer low or no-cost use of research outputs in cases where charging for use would be prohibitive. This means that UK innovations can benefit more people, globally. This is particularly relevant in global health and the approach has been amply demonstrated in universities' approach to the Covid-19 pandemic. This aspect of UK R&D / knowledge exchange is quite low profile but could be given more prominence in our R&D narrative.

b) Use the UK's international KE network

The UK's KE network itself has international reach, since many people come to work in the UK from overseas research organisations and many UK professionals have established careers overseas: notably in the US, Europe, and Australia. Links remain strong thanks to personal ties – creating a professional alumni network – but also to more formal ties between national professional organisations. Examples of knowledge sharing include:

- the National Associations Advisory Council (NAAC) of European KE associations. This includes the UK (and will do so post Brexit) where PraxisAuril represents our KE community and interests.

- the internationally accredited Registered Tech Transfer Professional (RTTP) programme is championed by PraxisAuril in the UK where we are driving adoption of amongst our member base (see https://www.praxisauril.org.uk/RTTP).
- PraxisAuril's training in China, delivering training based on our UK programme to 400+ individuals

This all means that the UK is contributing to the sharing of good practice and has an opportunity to learn from KE models in other countries. We have, however, noted in previous inquiries, that incorporating a local flavour into any model is vital for its success.

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?

a) Engage with stories of discovery, translation and positive outcomes

Use the Covid-19 pandemic as an opportunity to reinforce the importance of research & innovation, and the value of deep expertise into a particular field. We should reintroduce and reinforce the message that lifelong learning is positive and make available mechanisms for this for everyone, making a positive virtue of changing careers and moving between industry and research, for example.

Campaigns such as 'plastic in our oceans' inspire people and offer avenues to finding out more and getting involved. Grand Challenges, such as 'Healthy Ageing' have this potential too – this is something that will affect us all – but need to be made more available and relevant to non-expert audiences.

b) Tell stories and celebrate success.

In particular, celebrate what success means to the user not just the science breakthrough or application. In the US, AUTM's 'Better World' project promotes "public understanding of how academic research and technology transfer benefit…millions of people around the world." In the UK, there are huge numbers of case studies, gathered through the REF and created by research organisations, which are not shared with the general public. This is rich content for creating inspirational R&D narrative. Similarly, the R&D community have many awards for innovators and innovative programmes. These are largely invisible to external, non-specialist audiences but could be made more high profile. It's important to recognise all people who make the story happen - researchers, KE professionals, technicians, funders, investors and collaborators - so that individuals can identify with roles that they want to be in.

End.