Increasing the impact of public investments in innovation
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Discussion Note

Albert Bravo-Biosca
Director, Innovation Growth Lab, Nesta

When considering what policies European governments need to adopt in order to increase innovation, there are at least three overarching questions worth asking. First, what to invest in? Second, how much to invest? And third, how to do it effectively to maximise the return-on-investment?

The first two questions too often monopolise policy discussions to the detriment of the last one. Because of this, while I touch on all three questions, the focus here is on the third one: how to do it effectively.

My discussion builds on the work that we are doing at the Innovation Growth Lab (IGL) at Nesta. IGL is a global partnership that brings together governments, foundations and researchers to test different approaches to accelerate innovation, entrepreneurship and growth. Our shared ambition is to make innovation and growth policy more impactful through experimentation and evidence.

What to invest in: Common challenges but diverse ecosystems

There are some clear priorities which represent common societal challenges across Europe and beyond, and which without doubt require additional investment. These include areas such as climate change, aging, artificial intelligence, or the future of work.

Beyond those, it is difficult and risky to generalise. Innovation ecosystems across Europe are diverse. Each region has different strengths and weaknesses, so we need flexible frameworks that ensure that investment choices respond to regional competitive advantages (as the EU Smart Specialisation is currently doing).

While there is no one-size-fits-all policy mix, a guiding principle in our policies should be to promote inclusive growth, so that innovation investments ultimately benefit as many people as possible. This is not only important to increase productivity and reduce inequality, but also as a way of preventing a political backlash against innovation.

How much to invest: Europe lags behind the US, and productivity suffers

Europe invests too little in innovation. R&D investment relative to GDP in the EU (1.9%) lags both the United States (2.7%) and China (2.1%). Europe also underperforms in intangible investments, a wider metric of innovation that captures many of the required investments to commercialise new innovations and maintain firms' competitiveness (7.2% in the EU vs. 8.8% in the US).[1]

Lower inputs ultimately result in lower outputs. Labour productivity is 33% higher in the US than in the EU, hampering both living standards and long-term financial sustainability. Also, if we look at the number of "unicorns", startups reaching a $1 billion valuation, the US has over four times more than Europe (200 vs. 45 respectively).

Innovation investment creates large knowledge spillovers that benefit the wider economy. The social rate of return to R&D investment is about 60%.[2] In contrast, the euro area 30-year government bonds yield currently stands at 1.12%, and 10-year real government bonds yields have fallen below zero in all euro area countries. The case for additional public investment in innovation could not be stronger.

How to invest effectively to maximise the return-on-investment: The "how" is as important as the "what"

Governments have a range of policy instruments available to support innovation. The decision on how to combine them involves a number of tradeoffs which are beyond the scope of this note.[3] Instead, I believe it is important to take a step back and discuss how innovation policies are designed and implemented: what are the ingredients that lead to better policies?

Funding levels and priorities understandably dominate policy debates, but it is often "how" these policies are designed and implemented that makes the difference between success and failure.

What can be done to ensure that the innovation policy mix is fit-for-the-future, effective, ensures value-for-money and maximises impact?

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[1] R&D intensity data corresponds to 2017 (latest available year). Intangible investment corresponds to the average for 2000-2013 (only 14 European countries available).
[2] Lucking, Bloom, and Van Reenen (2018), based on three decades of firm-level data in the US. The estimates are consistent with other studies in the literature.
[3] For a discussion on the different policy instruments available and the evidence on their impact see the following: the Compendium of evidence on innovation policy, the evidence reviews of the What Works Centre for Local Economic Growth, and Bloom, Van Reenen and Williams (2019).

In our research at Nesta we have looked at some of the ingredients for successful policymaking, such as institutions, data, regulation, experimentation and evidence. For instance, new sources of data combined with machine learning can help policymakers understand complex innovation systems with unprecedented levels of precision, granularity and timeliness, and make innovation policy more agile in responding to the changing opportunities and needs in the ecosystem.[4]

The discussion that follows focuses on two of these ingredients. First, policy experimentation, an underutilised approach to innovate in the design of public programmes and learn what works (and what doesn't), helping to make decisions on which interventions to scale and which ones to stop. Second, innovative regulation approaches, considering some measures that governments can take to build more innovation-friendly regulatory regimes.

We still have a long way to go to embed systematic innovation, experimentation, learning and evidence in the design of funding instruments, support programmes and regulatory frameworks. The purpose of the ideas discussed here is to take us closer to that vision.

Every year we invest €150 billion without really knowing its impact or maximising value-for-money, hampering productivity growth

European governments invest around €150 billion every year supporting businesses to innovate and grow[5], as do many other governments around the world. Are we making the most of this investment? Are there more effective ways of using this funding? How would we ever know?

The What Works Centre for Local Economic Growth at the LSE examined almost 15,000 evaluations and evidence reviews of local economic policies, and concluded that only 2.4 per cent of them provided credible estimates of impact, and of those only one in four demonstrated a positive effect on employment (or 0.6 per cent of the total).[6]

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[4] This Nesta report showcases how to transform innovation policy with new data sources, analytics and ways to present information, for instance to understand future skills needs or identify emerging clusters and technologies, helping to inform better policy choices. See also our report on how innovation agencies work, which explored how governments can get better at designing and running innovation agencies, drawing on examples from around the world.

[5] Firpo and Beevers, 2016.

[6] Specifically, the team assessed for each study the methodology used and their results. While not all of these were impact evaluations, they only found 361 studies (or 2.4% of the total) that involved a credible counterfactual and provided strong evidence of causality ("Credible" refers to impact evaluations satisfying the level 3 of the Scientific Maryland Scale, which means that they had a clear justification for why the companies that had not received the intervention would have performed in a similar way as those benefiting from the intervention if the intervention had not happened). Note that not all relevant questions can be addressed with counterfactual evaluation methods, but there is

Ultimately, this lack of evidence leads to policies that are less effective (or potentially even counter-productive), and the risk of wasting limited resources on programs that do not work. As a result, despite substantial public investments, Europe's productivity is lower than it could (and should) be.

Policy experimentation can lead to more impactful policies

Only a few weeks ago, Abhijit Banerjee, Esther Duflo, and Michael Kremer were awarded the Nobel prize in Economics for their experimental approach to alleviating global poverty. Over the last two decades they have set up countless experiments to find out what were the most effective interventions to fight poverty. Over 400 million people have been reached by programmes that were scaled up after being evaluated by them or their colleagues at the MIT Poverty Action Lab (JPAL), the lab that they founded to pursue this research.

With their work, they have demonstrated the value of starting small, testing out different interventions to find out what works best, and then scaling them up. They have tested programs in the same way as we test pharmaceutical drugs, using randomised controlled trials that compare the impact of an intervention relative to the status quo.[7] They have showed how our priors, beliefs, hypothesis or models can be wrong. And therefore that there is no substitute for testing new programmes rigorously in the real world. The knowledge they have generated has improved the lives of millions and radically transformed research in this field.

Innovation policy is neither innovative nor experimental

The contrast with innovation policy is stark. The aim of innovation policy is to support innovation and experimentation with new products, services or business models. Yet, paradoxically, innovation policy itself is neither innovative nor experimental.

We face new challenges that we have not encountered before, and which will require imaginative solutions. The context has changed, so old solutions may not work (if they ever did). Emerging technologies offer new and unexploited opportunities for policymakers, but it is unclear how best to take advantage of them. And last, but not least, we lack the evidence to guide our decisions.

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definitely immense scope to use them to increase the quality and quantity of evidence in this policy space.

[7] The idea behind randomised controlled trials (RCTs) is a simple one. Participants are randomly placed in a 'treatment' group and a 'control' group (or across multiple 'treatment' groups), and the impact of the intervention is estimated comparing the behaviour and outcomes of the two. Randomised controlled trials can provide an accurate estimate of the impact of an intervention, without suffering the selection biases that hamper many other types of evaluation (although as any other tool, trials can answer some questions but not others).

Becoming experimental means turning the current model of policymaking upside down. Despite all the unknowns, governments often act as if they had all the answers, rather than recognising that they don't. They introduce new policies without prior small-scale testing, assuming they have chosen the best design and hoping it will work.

The alternative is to follow the example of this year's Nobel prize winners: start small, trial different designs systematically, learn what works to increase impact and scale it up.

To date, the best evaluated programmes funded by European taxpayers take place not at home, but in developing countries. The time has come to change that, and become more experimental in the programmes that we use to improve productivity and living standards in Europe, rather than only in those done in developing countries.

Policy experimentation has unexpected benefits

Policy experimentation encourages novel solutions to policy challenges and creates a dynamic of continuous improvement. It also makes it easier to discontinue unsuccessful programmes, given that there is a clear expectation upfront that the scheme will be time-limited unless it generates clear evidence of impact (how often are programmes started that won't work and don't have an end date?).

Policy experiments can also help de-risk the process of exploring new policy ideas and changes. By starting small and testing effectiveness early, experiments can in fact make it easier for risk-averse organisations to sample novel approaches and venture into more innovative fields, without having to commit large amounts of resources (and thus reputation) in the process.

Experimentation also lowers overall policy costs, because, despite investing a little more upfront in learning and evaluation, experiments allow policymakers to "weed out" ineffective programmes early on, potentially saving taxpayers from footing the bill.

Ultimately, experimental policymaking leads to more learning, better decisions, more impactful policies and higher value-for-money.

There are different ways to experiment: Some examples[8]

[8] For additional examples, see the IGL online repository of policy experiments related to innovation, entrepreneurship and business growth, describing each trial and summarising their key results and policy implications, available at https://www.innovationgrowthlab.org/igl-database-v2.

As the examples below demonstrate, policy experiments can be used in many different ways to increase the impact of our policies:

1. **To evaluate a programme and find out whether it works, or doesn't:** Two academics trialled a low-cost networking intervention in China. They demonstrated that organising monthly meetings between business owners increased firm revenue by 8%, a much larger impact than for much costlier interventions. The programme was scaled up and a similar programme is set to be trialled in the UK.

2. **To improve existing programmes, by testing small or large tweaks in the implementation process:** The UK's Business Department used 'nudging' trials experimenting with different language to recruit business mentors, resulting in an additional 800 mentors recruited and achieving the policy target that otherwise would have been missed (to the surprise of the team involved, a quote by Adam Smith on the virtues of volunteering unexpectedly made the most difference). Small tweaks can also have large impacts. The Startup Chile accelerator programme trialled sharing application feedback with its participants, resulting in startups raising over 50% more funding. An IGL partner is currently planning to replicate this trial with their own funding programmes.

3. **To examine the underlying causes of a problem:** A trial by the Dutch government found that innovation vouchers created new collaborations between SMEs and universities. But these collaborations didn't continue once the subsidy stopped, suggesting that the main barrier to SME-university collaboration was not lack of information (the underlying assumption behind the policy), but rather a much more fundamental one. However, despite this, the effect on the SMEs' innovation performance still persisted almost a decade later. An ongoing trial with Innovate UK is expected to shed more light on this question.

For a more complete overview of the different ways that governments can experiment, and examples of how they are doing it in practice, see our overview paper on experimental innovation policy.[9]

Some governments are making policy experimentation a priority

To realise the benefits of policy experimentation, governments need to develop the right incentives, structures, cultures and skillsets. For instance, Finland and Canada have made experimentation a key government goal, setting an experimentation unit in the Finnish Prime Minister's office and mandating dedicated budgets for policy experimentation in Canada.

[9] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3460100.

These are two ways to address the misalignment of incentives that often hampers policy experimentation, and change perceptions about what is expected and/or feasible. But there are other levers that could be used, many under the control of finance ministers, for instance as part of the budgeting process or by setting up new funding mechanisms.

Experimentation funds are a useful tool to identify and support new policy ideas

Becoming experimental in-house is only part of the solution. A recurring challenge in policymaking is how to identify the most promising policy ideas and develop them into impactful programmes. In the spirit of open innovation, the best policy ideas rarely come from inside government ministries, but rather from actors across the ecosystem that are closer to businesses and their needs. Unfortunately, governments typically lack the funding instruments to encourage, identify and test novel policy ideas.

One tool that governments can use is experimentation funds. These funds are a very useful mechanism to identify, test and support the most promising ideas for support programmes tackling a particular policy challenge, learn how to implement them most effectively, and distinguish between those ideas that should be scaled up vs. well-intentioned but ultimately ineffective efforts.[10]

The UK Business Basics Fund: Using an experimentation fund model to accelerate tech adoption

To reverse the slowdown in productivity growth is not enough to continue pushing the knowledge frontier forward. We also need to accelerate the diffusion of new technologies across the European economy, something at which Europe underperforms relative to the US. Even more worryingly, recent OECD research shows an increasing divide between the best performing firms and the rest of firms. Reducing the size of this gap could make a substantial contribution to productivity growth and help to reduce inequality.

[10] The idea of experimentation funds originated in other policy areas. For instance, the UK-based Education Endowment Foundation is conducting over 130 randomised controlled trials involving more than a 1,000 schools and 900,000 pupils in order to test different ways to improve educational outcomes. And the French government runs an experimentation fund for young people, a bottom-up approach to identify innovative interventions to improve youth outcomes (crowdsourced from organisations across the country), implement them at a small scale, and rigorously evaluate them to find out whether they work, before deciding whether they should be scaled up. More recently, both the European Commission and the UK government have taken up this idea and applied it to innovation and growth policy. The European Commission has launched a small-scale pilot call for policy experiments targeted at innovation agencies across Europe, while in the UK the government has set up the Business Basics programme as part of their new industrial strategy.

This is not a new challenge, but past attempts have not been as successful as hoped, so the UK government is trying a different approach to find more effective solutions. Being delivered in partnership with IGL, the UK's Business Basics fund is aiming to test innovative ways of encouraging SMEs to adopt technologies and management practices. It provides funding in exchange for rigorous evaluation, both for small proof of concept pilots and larger scale trials to test ideas at scale. For instance, one of the trials is testing how to get SMEs to adopt AI-based technologies.[11]

An experimental 1 billion productivity fund for the euro area

Building on these experiences, we propose the creation of an experimental 1 billion productivity fund for the euro area. This new fund would identify and test the most promising interventions to accelerate productivity growth and increase competitiveness in the euro area.

The fund would seek to encourage novel ideas and approaches that tackle these key challenges in an innovative way, but could also be open to testing existing interventions with limited evidence of impact.

With its bottom-up approach, this fund would crowdsource the best policy and programme ideas across Europe, both from traditional organisations but also from newcomers. The funding provided would enable to test the most promising programmes in the "real world", directly benefiting entrepreneurs, innovators and SMEs.

Funding would be conditional on rigorous evaluation, generating actionable insights for decision makers across Europe on the impact of different types of schemes. Better evidence on what works and what doesn't would lead to better decisions on which programmes to scale, which ones to rethink, and which ones to stop.

Lastly, the example it would set (plus the incentives it would provide) would induce national, regional and local governments to become more experimental themselves, seeding a culture of evidence-based policymaking that is open to innovation and constantly seeks to increase value-for-money.

If implemented well, this fund would spark a transformation in how member states use their own national budgets to improve their competitiveness, leading to more impactful policies across the board.

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[11] See this blog for additional information on the Business Basics programme: https://www.innovationgrowthlab.org/blog/why-you-should-know-about-business-basics-programme.

Experimentation funds are flexible instruments, so the focus of the fund could be adapted depending on the priorities identified by the Eurogroup. It could be open to any pilot scheme that addresses any of the barriers that hamper Europe's economic performance, or alternatively target specific areas. Some examples include improving SME management practices, accelerating tech diffusion, deepening university-business collaboration, reskilling the workforce in response to AI, improving access to finance for intangible-rich SMEs, or last but not least, developing innovation skills in educational systems.[12] Alternatively, it could also seek to address societal challenges such as climate change, for instance by testing out interventions that increase adoption of carbon-saving technologies and behaviours.

This new experimental productivity fund would be an impactful BICC investment

The new budgetary instrument for competitiveness and convergence (BICC) could provide a conduit for this new experimental productivity fund. In order to be impactful, BICC will need to focus on investments that unlock wider changes in member states, rather than only replacing investments that member states would have done themselves.

Therefore, one way to leverage BICC's limited budget is to seek to increase the effectiveness and efficiency of the substantial investments that members states are already doing in innovation and productivity-enhancing measures, helping to improve the competitiveness of both frontier and laggard regions and firms.

Over the next 7-year budget period European governments will invest over 1,000 billion euros in policies to support entrepreneurs and businesses to innovate and grow.[13] The proposed productivity fund would represent less than 0.1 per cent of this amount (1 billion). Investing 0.1 per cent to find ways to maximise the impact of the remaining 99.9 per cent represents a very modest investment, with huge upside potential.

A more dynamic regulatory regime is also needed

Innovating in how we use public funding is necessary, but not sufficient. We also need to innovate in the second lever that policymakers have at their disposal to support innovation: regulation.

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[12] Recent research shows that unless you are a top student from a high-income family, your chances of becoming an inventor or filing a patent are very low. As a result, we are missing out on entire generations of inventors and their good ideas - the so-called "lost Einsteins". This is both detrimental to economic growth and a contributor to income inequality (Bell, Chetty, Jaravel, Petkova, and J Van Reenen, 2019).

[13] Assuming current expenditure levels continue over the next 7-year period (€150 billion per year, http://www.innovationgrowthlab.org/blog/much-%E2%82%AC152-billion-spent-across-europe-supporting-businesses-does-it-work).

If we want to improve Europe's innovation performance, we need to embrace more open, dynamic and anticipatory approaches to regulation. This is important at the sectoral, national and EU-level, since traditional ways of regulating are struggling to cope with the pace of change in technology.

The introduction of the UK's Financial Conduct Authority Regulatory Sandbox is an example of how sectoral regulators can support innovation, a model which has now been replicated in some shape or form by over hundred regulators worldwide. This scalable example showcases how regulators can take a more anticipatory approach, seeking to work in partnership with innovators without being captured by them, and achieving a better balance between the precautionary principle and the innovation principle.[14]

An increasingly used policy tool in this space are "real-world testbeds". They provide bounded real-world environments designed to test technologies in the complex systems in which they will ultimately be used (for instance, several member states have created testbeds for self-driving cars, although the same approach is being used for a much wider range of technologies).[15]

Incentivising sectoral regulators to take a more forward-looking and anticipatory approach to regulation can often be challenging. One strategy to overcome this resistance is being used in the UK, with the launch of the Regulators' Pioneer Fund. It provides funding to regulators to rethink the way they work by piloting initiatives that help businesses bring innovative products and services to market.

A new Eurocompany: Re-inventing business regulation in Europe to increase innovation and accelerate the growth of innovative startups

Piece-meal regulatory reforms that progressively adapt our existing regulatory environment to a rapidly evolving ecosystem can without doubt unlock additional innovation, although they are constrained by the status quo and institutional inertia. Creating a new set of rules from a blank piece of paper would result in a much better regulatory framework designed for the 21st century, rather than one inherited from the 19th century.

Because of this, I would like to conclude with a more radical vision to increase innovation and accelerate the growth of European innovative startups across the EU: A new

[14] See Nesta's report on anticipatory regulation to learn more about how regulators can adapt to secure the benefits of technological innovation while managing the risks.
[15] For additional examples of how innovation testbeds are being used to safely test out innovation and new technologies in the real world, see Nesta's new report on real-world testbeds.

"Eurocompany" legal form. In other words, the creation of a new full-fledged business regime, sitting alongside the 28 national regimes without replacing them.[16]

This "29th regime" would give startups the option (but not the obligation) to operate under the same set of simplified rules and procedures across participating countries, while still preserving the rights of member states over specific issues such as tax rates and social protection levels.

Dealing with 28 different jurisdictions may be merely an annoyance for large multinationals, but it can be an insurmountable challenge for innovative smaller firms willing to grow. A new 29th regime would therefore create a real single market for entrepreneurs, and give entrepreneurs from countries with poor regulatory environments the opportunity to opt-out from inefficient national rules (introducing regulatory competition without a race to the bottom).

In practice, there would be 3 levels of regulation in this 29th regime. Some domains would be fully harmonised, such as bankruptcy legislation. In others, definitions and processes would be unified, but countries would be free to choose parameters (e.g., a harmonised tax base but freedom to determine the tax rate). Finally, countries would have absolute freedom to impose additional regulation in other domains, but with one condition: that entrepreneurs could access it and comply with it through a common EU-wide online platform.

The principle would be simple: no entrepreneur operating in this 29th regime could be forced to comply with any regulation if they could not do it through this online platform.

Fitting all existing rules and regulations for businesses in an EU-wide online one-stop shop sounds like an absolute nightmare. Yet if business regulation has become too complex that even full-time bureaucrats cannot rewrite it to make it simpler and easier to access it, then this is clear proof that it has also become far too complex for entrepreneurs to be able to comply with it, and consequently that radical simplification is needed.

Admittedly, reaching the required consensus among all member states to launch such an ambitious proposal would prove difficult (if not impossible). But the same idea could be taken forward by a smaller group of countries with more aligned agendas.

The benefits would be substantial: a less-fragmented European internal market, lower competitiveness differentials and faster convergence across the euro area, and last but not least, the opportunity to innovate in how business activity is regulated as well as how this regulation is implemented and enforced.

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[16] See the original proposal for a more detailed discussion, available at: https://www.innovationgrowthlab.org/sites/default/files/29thregime.pdf.

Systems change: Planting the seeds that could transform public policies and accelerate future growth

One final thought. The two specific policy recommendations discussed here: an experimental 1 billion productivity fund and a new business regime for startups (the "Eurocompany") have something in common. They are both seeds that, if they take root and grow, could on its own spark a system-wide transformation of the two main levers that governments have at their disposal to support innovation: funding and regulation.

The experimentation fund would set in motion a process of continuous improvement in our extensive range of policy instruments, while the "Eurocompany" business regime would break regulatory inertia, forcing us to rethink existing rules and its implementation rather than always defaulting to the status quo. The result: more impactful public programmes across the board and a much more modern and innovation-friendly regulatory regime, leading to higher innovation, faster economic growth and better living standards across Europe.

Annex: About the Innovation Growth Lab

The Innovation Growth Lab (IGL) was set up by Nesta, the UK's Innovation Foundation, back in 2014 to make innovation and growth policy more impactful through experimentation and evidence. IGL is a global partnership bringing together governments, foundations and researchers to test different approaches to accelerate innovation, entrepreneurship and growth. Ultimately, our ambition is to transform policymaking in this space, embedding a culture of experimentation across economic ministries and innovation agencies around the world.

This is not done overnight. It will take time. It requires raising awareness of the value and feasibility of policy experimentation. Identifying early champions within governments. Helping them set up their first trials, often small ones, which in turn make it easier for them to build coalitions to undertake larger and more impactful trials. Getting the resulting evidence used and successful programmes scaled-up. And, lastly, sustaining this change until it becomes part of the norm, institutionalised in processes, instruments and budgets.

While it will be a long process until the full impact starts to materialise, we are already starting to see some progress. When IGL was launched, few policymakers across OECD

countries had seriously considered setting up policy experiments in this space. When confronted with this idea their response was often quite dismissive: “It can’t (or shouldn’t) be done”.

Today over 15 government agencies in 10 OECD countries have launched or are actively considering policy experiments, with several developing in-house capacity to undertake trials. We’ve supported over 67 trials, have IGL partners or projects in 26 countries, and have worked with more than 25 organisations to help them become more experimental.

We’ve also started to build a global community of policymakers and researchers that share this mission, and our events, capacity building workshops and online resources have reached thousands of policymakers from close to 50 countries. We are also starting to see the first steps towards institutionalising policy experimentation through experimentation funds.

Our portfolio of 67 projects is exploring many relevant questions on how to accelerate innovation and productivity growth. For instance, how can we help people to become more innovative and entrepreneurial? How can we increase university-business collaboration? What is the best way to select which innovation projects to fund? Is money or in-kind support more important for startups and SMEs? How can we accelerate tech diffusion and the adoption of better management practices?

Overcoming the economic challenges we face will require not only new ideas, but also learning whether they work. At IGL we believe that becoming experimental will help policymakers ask the right questions and get better answers.

If you would like to find out more about IGL and our work, get in touch, visit our website at www.innovationgrowthlab.org, sign up to our newsletter, or join us at the IGL2020 Global Conference in London in 2-4 June 2020.