

Sources of Sustainable Prosperity and Jobs

Institute of Physics submission to the
Liberal Democrats policy consultation.

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consultations and inquiries can be viewed at
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6 April 2012

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Jenny Stammers,
Policy Unit,
Liberal Democrats,
8-10 Great George Street,
London SW1P 3AE

IOP Institute of Physics

Dear Ms Stammers,

Sources of Sustainable Prosperity and Jobs

The Institute of Physics is a leading scientific society promoting physics and bringing physicists together for the benefit of all. It has a worldwide membership of around 40 000 comprising physicists from all sectors, as well as those with an interest in physics. It works to advance physics research, application and education; and engages with policy makers and the public to develop awareness and understanding of physics. Its publishing company, IOP Publishing, is a world leader in professional scientific communications.

This submission was prepared in consultation with the Institute's Business and Innovation Board, with input from members of the Institute with direct experience of the issues raised.

The Institute welcomes the opportunity to respond to the Liberal Democrats policy consultation: 'Sources of Sustainable Prosperity and Jobs', the attached annex includes responses to points of particular relevance the Institute and its work.

If you need any further information on the points raised, please do not hesitate to contact us.

Yours sincerely,



Professor Stuart Palmer FEng CPhys FInstP
Honorary Secretary



John Brindley
Director, Membership and Business

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Physics-based businesses contribute more than £70 billion to the UK's economic output and employ more than 5% of the UK workforce¹. Such businesses, which build on the strength of the UK's research base and range from high-technology manufacturing to medical imaging, will be at the heart of a re-balanced UK economy. For these industries to grow and continue to generate prosperity and jobs, they will need access to the products of physics research, targeted and timely funding, and the next generation of skilled workers.

Accessing finance for business

7. Does any particular size of business or sector find it harder to access finance? Would this change if financing were more prevalent through smaller or sector focussed lenders? Would banks in other countries take a different approach?

The path from discovery or innovation to a first sale and, ultimately, profit can take many years in R&D-intensive smaller companies. Within the physical sciences, there is the further complication that technologies and innovations tend not to reach the market as stand-alone products, but are instead incorporated into other products or devices e.g. a novel electric component in a mobile phone handset, meaning that the innovative component may need to find its way through several companies, and several R&D cycles, before it can be seen to be profitable. The resulting long timescales between initial investment and final return in many science-based businesses can also act as a form of cultural deterrent to investors, with a lack of understanding of (and so confidence in) the sector counting against it. These problems are longstanding (even through the economic 'good times') and were well characterised in the ETB's *SET and the City* report in 2006 which noted the higher rates of engagement with science-based businesses by American investment funds.

8. What are the implications of the new non-bank entrants into the investment and lending arena such as peer-to-peer lenders?

No comment.

9. What role should equity financing provide? Are sources of venture capital and private equity in the UK sufficiently accessible or too limited? Are the demands placed on businesses backed by venture capital and private equity reasonable, or overly demanding?

There has been a significant decline in the availability of investment funds for science-based companies in the UK over recent years, both in terms of early-stage

¹ http://www.iop.org/policy/briefing/file_50325.pdf

venture capital and also later stage investment in companies aiming to undertake R&D². However, while this should be addressed, the role of venture capital funds investing in early stage companies should not be over-emphasised. There are often legitimate business reasons for the unwillingness of commercial funds to put money in at the earliest stage, and, in countries where there is significantly more investment at this level, much of it is leveraged against or provided directly by state-funded operations. The UK government should play its part in providing investment for science-based businesses both through directly supporting investment funds and also through agencies such as the Technology Strategy Board (TSB).

10. Do current tax structures unnecessarily hamper any particular form of financing?

No comment.

11. Can and should the banks 'owned' by the taxpayer be restructured in a way to address the issues identified above? Should they be wholly or partly structured to meet the needs of small and micro businesses or a particular region or sector?

No comment.

12. What impact is current Government policy having? What is the evidence that Government low interest rates are benefiting businesses and is this benefit limited to particular sizes of business or particular sectors? What impact does credit easing have on lending to businesses (and is this limited to businesses of a certain size, location or sector)?

No comment.

Fostering Innovation

13. What other barriers exist around fostering innovation? What more should Government be doing? How successful is the current research and development tax credit system? What role should public procurement and co-investment take?

- **Barriers to innovation**

In contrast to the strength of its academic research base, seen to be the second strongest in the world, the UK is comparatively low-ranked in terms of business investment in research and development as a proportion of GDP. While such metrics cannot be said to be perfect measures of the strength of innovation in the UK³, they are measures that can easily be compared internationally and it is clear that the UK has not made significant progress toward its 'Lisbon' target of increasing gross R&D

² http://www.nesta.org.uk/library/documents/Venture_Capital.pdf

³ An area where there should perhaps be more work is in identifying a more appropriate metric for knowledge exchange and commercialisation.

spending to 2.5% of GDP⁴ - the most recent ONS bulletins put the UK figure at 1.76% of GDP in 2010, down from 1.84% in 2009⁵.

To foster greater innovation in the UK, there needs to be a concerted cross-government strategy and a long-term framework, spanning many policy areas and several government departments. At the core of this must be a strong research base that encompasses both pure and applied research areas. It should not be thought that simply moving investment from blue-skies research to more applied programmes will have a beneficial effect, indeed there is some evidence suggesting that pure research has a greater ultimate economic value than more applied research fields⁶. There must also be companies that are capable of working with the products of research and either developing them in-house, or building on them to produce innovative solutions. Without the capacity to absorb the ideas and inventions from research, the options for commercialisation of such research are severely limited. This is an area which is often neglected in the drive to create a high-technology industry in the UK, where there can be an unhealthy emphasis placed on the role of university spin-out companies. A critical mass of innovative small and large companies, and supply chains, is an essential part of any commercialisation landscape. Integral to the success of such companies is the presence of skilled workers, trained in areas such as physics, who are able to adapt to novel techniques and technologies.

Finally, there must be effective intermediaries to link research with the steps to commercialisation. These include, but are not limited to, the work done by agencies such as the research councils and the TSB, and also many effective networks and programmes in science parks and other private sector enterprises. This category should also include accountants, lawyers and other professionals; often neglected in analyses, but essential for effective linkages between researchers, businesses and investors, driving innovation in the UK.

- **The Technology Strategy Board**

The TSB has been the key government agency supporting innovation in business and creating an environment that fosters R&D and knowledge exchange between universities and business. Its returns on investment, even at what could be described as a very early stage of its existence, have been significant, however the true impact of the TSB will be seen in the long term and it, and the government, should retain that focus. The last spending review tasked the TSB with doing more on a budget that has remained largely unchanged, with a new remit stretching from the promotion of innovation in the regions of England following the abolition of the Regional Development Agencies, through to supporting the new 'Catapult' technology and innovation centres. Existing programmes such as the Knowledge Transfer Partnerships and Knowledge Transfer Networks have shown success in bringing university departments and innovative businesses together and it is unfortunate that the recent changes have required the TSB to reduce the investment in these areas. The Catapult centres have the potential to bridge some of the gaps between research and commercial success. However, there are still many details to be clarified about the centres and long-term success will depend heavily on the ability of the centres to attract external industrial funding partners.

- **Research and development tax credits**

⁴ http://ec.europa.eu/invest-in-research/pdf/download_en/kina24050enn.pdf

⁵ http://www.ons.gov.uk/ons/dcp171778_258505.pdf

⁶ http://www.russellgroup.ac.uk/uploads/RG_ImpactOfResearch2.pdf

R&D tax credits been seen to have a positive impact on business' decisions to increase or maintain R&D expenditure⁷, and also in demonstrating to multinational R&D-intensive companies that the UK is 'open for business'. The introduction of the 'Patent box' is welcome as an example of long-term thinking in R&D policy, and should have a positive effect on research-intensive businesses in the UK⁸.

The recently announced changes to an 'above the line' system should also have a beneficial effect, particularly in larger companies where the incentive will be able to act more directly on managers and decision-makers in research departments. There are still some areas where uncertainty could be reduced, particularly in the process by which HMRC assess whether work undertaken is eligible for relief under the schemes. Currently, companies that submit their returns to the schemes do not receive acknowledgement of the eligibility of the claim outside of irregularly-timed audits by HMRC. This process may mean that innovative companies whose work has been deemed ineligible may be left with a tax bill stretching back several years, and reduces confidence on the part of companies applying. An additional focus should be increasing the level of awareness amongst assessors of the roles that physics R&D can play in different businesses across the economy.

- **Public procurement**

The government procurement budget is orders of magnitude greater than the direct and indirect support provided to research and science-based companies through other programmes. Innovative procurement has the potential to be a 'game-changer' in the support and growth of physics-based high-technology businesses, but it needs a strong and visible commitment from the government. Currently smaller businesses are largely excluded from bidding for procurement tenders by, variously, the byzantine nature of contract calls, a lack of 'insider' contacts, and the over specification of the calls themselves – all of these favour existing (typically larger) suppliers. Much of this can be fixed with a more open process, and there are also things that can be done with advanced notice of calls and underspecifying calls – “we need a means to get patients to hospital” vs. “we need a Mercedes Benz ambulance” – which would open up the competition to new providers. There has been some progress in recent years in opening up the process, however it is clear that if the full innovative potential of procurement is to be achieved, there also needs to be a culture change within departmental procurement offices. The Small Business Research Initiative (SBRI)⁹, steered by the TSB, has been expanding slowly into several government departments, but if it is to achieve its full potential it should be fully embraced by all departments, particularly the larger spending departments such as the Ministry of Defence.

⁷ <http://www.cbi.org.uk/pdf/20090204-cbi-r&d-tax-credit-survey-report.pdf>

⁸ http://www.iop.org/policy/briefing/file_54699.pdf

⁹ www.innovateuk.org/deliveringinnovation/smallbusinessresearchinitiative.ashx

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