

“The future strategy for science and innovation in the UK”

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Good evening.

Tonight I want to stimulate a debate on our national science and innovation strategy, and whether it is adequately geared up to cope with the future.

Since day one in this job, the global economic downturn has dominated.

With its origins firmly linked to systemic problems in the global financial system, the current downturn has been more severe and more rapid than anything we've seen in recent memory.

The nasty combination of a recession with a global credit crunch is affecting every sector and every market.

I can relate personally to the impact of recession on businesses and on people. As an undergraduate

apprentice sponsored by British Leyland in 1979, I well remember Red Robbo's picket lines ranged in front of K Gate at Longbridge and saw a once-great business collapsing before my eyes.

As a science entrepreneur after my PhD, during the difficult period of the early '90s, I had to make colleagues redundant, and I had the bank manager threaten to put my company into receivership if I wasn't able to pay off the business overdraft.

I got through those tough times, but those experiences taught me some lessons.

Like the importance of having a broad portfolio of products and services; not relying too much on one area which can expose you to sudden risk; of knowing what your strengths are – and of playing to them.

And being aware of limited resources – and investing them wisely.

I mention these lessons because I believe we should ask ourselves – in the midst of this global economic downturn

– are we applying these lessons well enough to our science and innovation policy?

I believe that, right now, people, businesses and indeed countries are asking themselves essentially two questions.

The first is about the "here and now": how are we going to get through these tough times?

The second, though, is about the future: how do we get ourselves in the best position to exploit the upturn when it comes?

Now, from a science and innovation perspective, we in this country start from a very strong position. We have transformed the science base over the last 10 years – a more-than-double, real-terms increase in science spending, rising to almost £6 billion a year by 2010/11.

And among the most positive changes over the past 10 years has been the way in which the science base has forged productive links with business.

Universities have been growing their external income – reaching around £1.8 billion in 2007. And I believe – I

have seen for myself - that we have seen effectively a renaissance in science and innovation in this country.

And it's at times like these – when there's a squeeze on government revenue – that the virtue of a ring-fenced science budget really becomes apparent. The ring-fence protects money for science from competing demands in the short-term. In the long term, it provides the reliable support that the research community needs to deliver top results.

As a result, the quality & number of science innovations from our universities have never been higher, and the investment opportunities for spin-outs, and for technologies from our science, have never been better – as I have been told very recently by the venture capital industry.

However, the growth over the last few years in financial services has sucked talent and investment from high tech manufacturing industry.

Despite a strong nascent high tech industry and strength in the number of university spin-outs, not enough of them have grown into large high added-value manufacturers.

Now the current lack of capital and credit is threatening to choke off growth in the high tech sector – just when we need it most.

So, the current downturn makes these issues pressing and demands action to rebalance our economy.

What are the future growth areas? Where will future jobs and wealth come from? Where does the UK really have the potential to take world-class science and build world-class business from it? What is the government's role in facilitating this transition?

Peter Mandelson has argued for what he calls 'a new industrial activism', where government sets out a strategic framework as a bridge to the future, where investors and business have, as a result, confidence in the long-term direction.

What is the role of science policy here?

I believe it's important for me to set out some key principles.

Firstly – it's vital we maintain the investment in science that we've made over the last ten years. As the Prime Minister has said, we will maintain our investment in science. Britain's future depends on it.

Secondly – it's vital we maintain our focus on excellence. Four out of the top ten universities in the world are British. Our science is the most productive and efficient in the G8.

Thirdly – it's vital we maintain our investment in pure, fundamental science as well as in applied science. Because science is serendipitous, we can't predict where the breakthroughs will come from. It's also what attracts people and investment to science and underpins the UK's international science reputation.

Fourthly – we need to maintain a broad base in science, because we don't know where the challenges are going to come from – for example, who would have predicted the recent collapse of bee populations (we really do need to understand that better now) – and because the synergies from a broad based excellence in science promote world class leadership and interdisciplinary breakthroughs. Only with a diverse range of skills and deep reservoirs of

knowledge will we have the flexibility to provide the expertise required in different fields.

Take the STEM agenda, for example. We still need larger cohorts of young people studying maths, physics, chemistry and biology post-16 at A-level, before going on to both pure and applied degrees. And we know that the best preparation for this involves boosting the numbers of pupils taking triple science at GCSE.

Between 2002/3 and 2006/7, there was an 11 per cent increase in the number of students taking first degrees in the STEM subjects, and a 35 per cent increase in students getting masters degrees.

And yet, at the moment, just one in 10 pupils from maintained schools achieve a single pass in an A-level science subject. I'm determined to address the situation – and to build public support for, and engagement with, science in this country. That's what lies behind the 'Science So What: So Everything' media campaign that the Prime Minister launched last week.

Fifth – it's vital that we stick to the Haldane principle in setting our research priorities. Peer review, the

judgements of the science community and the independence of the research councils are all key to our continued success.

So far, I imagine we are all in broad agreement.

However, tonight I want to spark a debate about whether we need to go further than the five principles I've listed above.

Given that this global economic downturn is radically and dramatically reshaping the relative and absolute economic strength of nations – and that other nations are making choices about which areas to focus on in order to drive future growth – shouldn't we do the same to boost the economic impact of our science base?

Has the time come for the UK – as part of a clear economic strategy – to make choices about the balance of investment in science and innovation to favour those areas in which the UK has clear competitive advantage? As Peter Mandelson has said, "Science is not only the ladder by which we will climb out of the downturn – it is also critical to our success in the upturn."

I know that the research councils and the Technology Strategy Board have already begun to do this. Indeed, a key feature of the budget settlement covering the current spending period was the announcement of a cross-council grand challenge. These grand challenges adopting a multi-disciplinary approach to the most pressing issues facing our society and our economy: the consequences of an ageing population, global warming, the search for renewable energy and solutions for global insecurity. The research councils are now working together on an unprecedented scale.

The same goes for the Technology Strategy Board, whose innovation platforms are financing collaborative ventures in the same areas – on low-carbon vehicles, intelligent transport and assisted living – and whose knowledge transfer partnerships are supporting business doing cutting-edge work with universities.

We have made a start. My question is whether we need to go further and – while maintaining our overall investment in science – shift a greater balance of our investment toward those areas.

Perhaps we could consider three criteria for identifying those areas for greater focus:

- where the UK has a clear competitive advantage;
- where the growth opportunity over the next twenty years is significant;
- and where the UK has a realistic prospect of being no1 or no2 in the world.

It is important that any decision should not be taken by government ministers alone – but would be based firstly upon a debate concluding that such a choice makes sense and then the emergence of a consensus about what those areas are – between the private and public sector; between academia, government and business.

It's also important that any assessment is done in the context of the global environment – taking account of what other nations are doing. So much of science is collaborative. Take the United States: the Obama administration has signalled its intent to massively increase science spending as part of its economic stimulus package.

The President has pledged to double the research budgets of the National Institutes of Health, the National Science Foundation and other key agencies over the next decade – with a focus on such fields as computing and nanotech. He wants to increase investment in the US space programme and in the Pentagon's Defence Advanced Research Projects Agency. And we all know about the new willingness in the States to engage with genetic research, particularly stem cells.

The likely revival in US science has to be an additional spur for the UK to strengthen its position too. They're raising their game. We must identify where our competitive advantage lies and play to our strengths.

Now tonight, I don't intend to provide you with my views on what those areas may be – that's step 2, once we have determined that the identification of priority fields is necessary and important.

But what I am prepared to do tonight is talk about one area – which I believe to be a candidate – to illustrate my point, to show how this analysis could work in practice, and the difference it could make.

Medical research has long been a strength of the UK. We accorded it the highest priority in the most recent spending review, and – last June – approved the 200 million pound rebuild of the Laboratory of Molecular Biology in Cambridge. It has long been supported by the British public, most notably through sustained and generous giving to our medical research charities. We have a rich history of Nobel laureates and scientific breakthroughs which have had a global impact.

The demand for medical research to deliver improved healthcare is both global and infinite – presenting governments across the world with increasingly difficult resource allocation decisions as medical science presents ever more complex and expensive treatments based upon our accelerating understanding of the science. Ageing populations and long term global trends such as obesity further exacerbate demand.

We have a strong industrial base in life sciences – No2 to the United States with both big pharma and biotech resident here, although they're presently facing tough challenges: big pharma experiencing declining R&D productivity; biotech suffering a capital funding drought.

So that's two out of three on my criteria. What's the third – our clear competitive advantage?

The National Health Service.

An amazing resource for fostering research and innovation in patient care, drug discovery, medical devices and services: a resource that we have only just begun to realise.

Take one area of medical science, albeit a very important one: genomics – where the study of the genetic basis of disease may be advanced hugely through access to large and well documented patient databases – such as those generated by the NHS since its inception in 1948.

No other country has this. Nor does it have a healthcare system so universally appreciated by its people as does the UK. This is a major advantage for us as a nation – not just in providing a 21st century healthcare system for all – free at the point of use – but at the same time providing the lever to create a world lead in medical research – and from this a world lead in the life sciences industry: both pharma and biotech. In turn, they can provide the growth

and jobs that will help to rebalance our economy and fund future public investments, such as in scientific research.

We've already done it in cancer. We are now arguably the leading country in the world when it comes to cancer trials. The UK is recruiting more people to trials than the United States, which has five times our population. That state of affairs is based upon a long term commitment to science and clinical research.

We could do the same in stem cells, thanks to the excellent debate in this country which led to thoughtful and effective legislation.

Following a recent meeting at No10 between the Government and the life sciences industry, it was agreed that a new Government Office for Life Sciences would be set up – to implement a strategic plan of action to ensure we fully realise our leadership position in this area.

To do so we are going to have to find answers to problems over finance, IP and procurement, and these will not be easy. But we do have the To Do list. And a combined commitment from government and industry to work our way through it.

But this is not the only area that government is working to develop such a strategic framework. My colleague Stephen Carter launched last week his interim report on Digital Britain that scopes out the choices facing us in the creative, digital and communications sectors.

Ed Miliband is doing the same for green energy.

I believe we need to complement these strategic initiatives in life and earth sciences, in the digital and communications sectors, with an analysis and a debate on whether our science research focus is where it needs to be.

For example, are we spending enough on the science behind medical research? And if we need to spend more, what are we going to spend less on?

Let me be quite clear. I know that medical science requires strength in many disciplines – statisticians and physicists as well as biologists and chemists, for example.

It's not, I believe, just a debate about disciplines. Often the best research is inter-disciplinary and our leading facilities,

like the Diamond synchrotron, are used by scientists in many different fields.

It is a debate about our focus and the alignment of this focus to ensure that the UK continues to prosper as the world accelerates into the new century.

I'm confident that we are up to the challenge – and I look forward to debating these issues with you.